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[54] **KEY-OPERATED MECHANICAL LOCK**

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[51] Int. Cl. E05b 19/18, E05b 25/00

[58] Field of Search..... 70/383, 382, 384,
70/403, 404, 419, 421, 411

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[57] **ABSTRACT**

Key-operated mechanical lock of the kind wherein the actual information of the key is sensed by means of a mechanical scanner having a sensing element for each information-conveying position of the key and wherein the positions of the sensing elements are compared with the required information for opening the lock, which required information is stored in the lock in a mechanical storage means, the lock being ready for opening when the actual and required informations coincide. The invention provides for a locking mechanism for the sensing elements which locks the sensing elements after each sensing movement in their relative positions for at least the period of time required for the comparison of the two informations.

13 Claims, 21 Drawing Figures

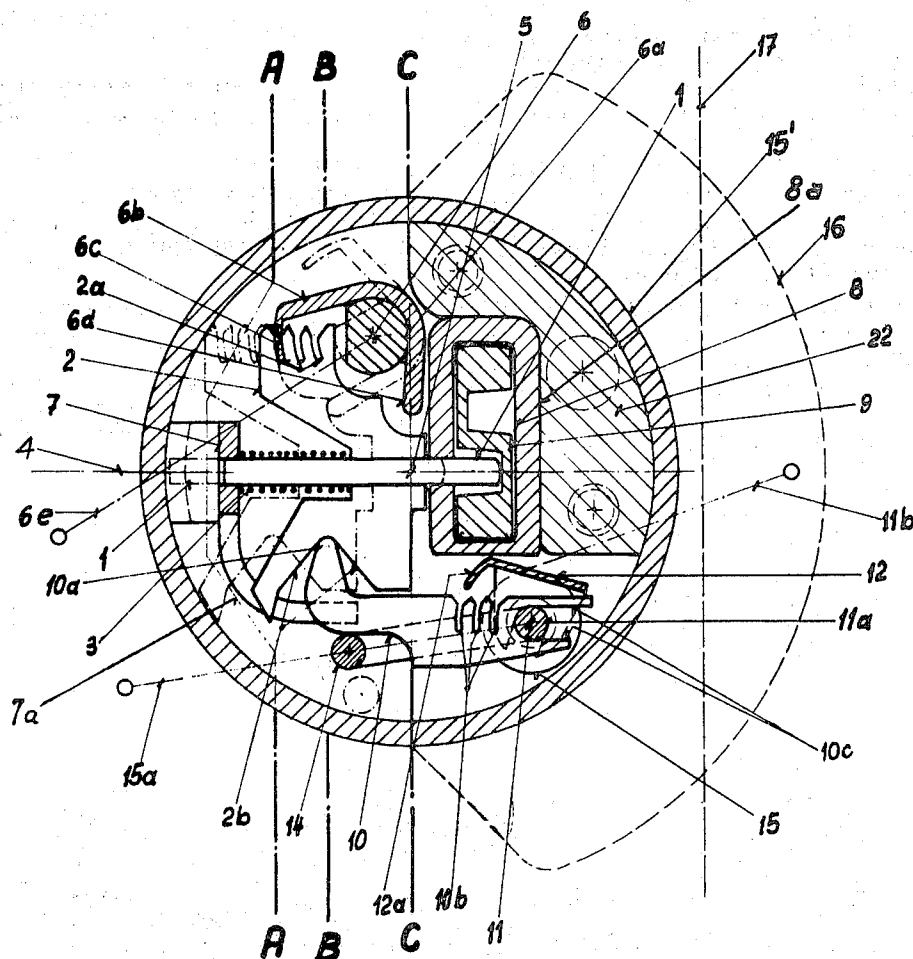


Fig. 1

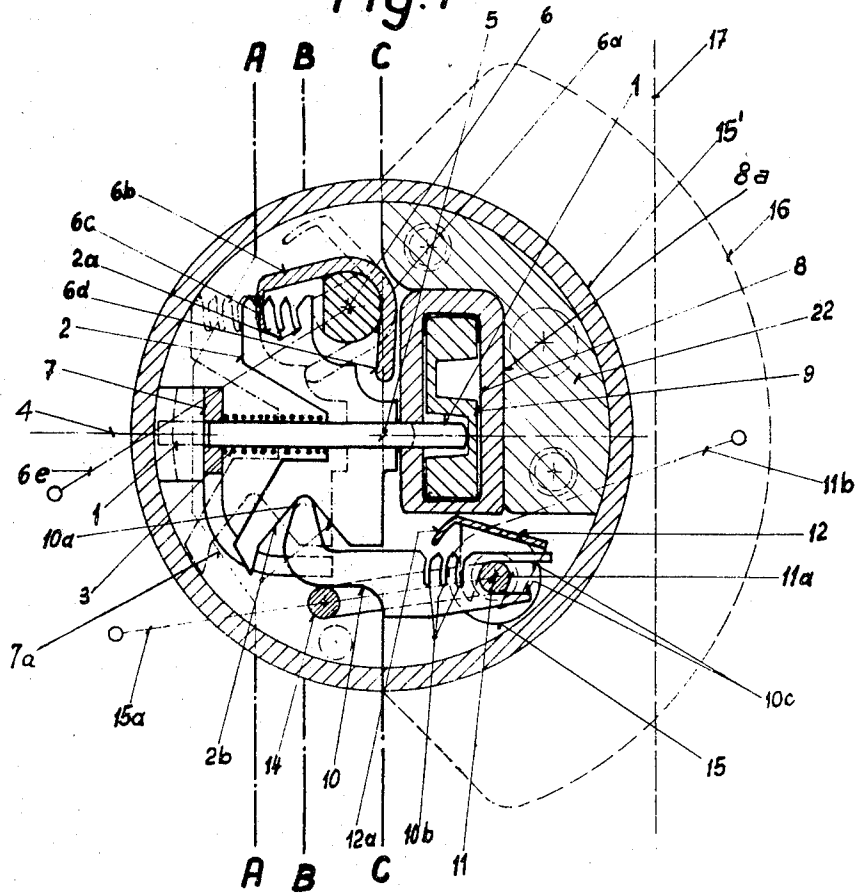


Fig. 2

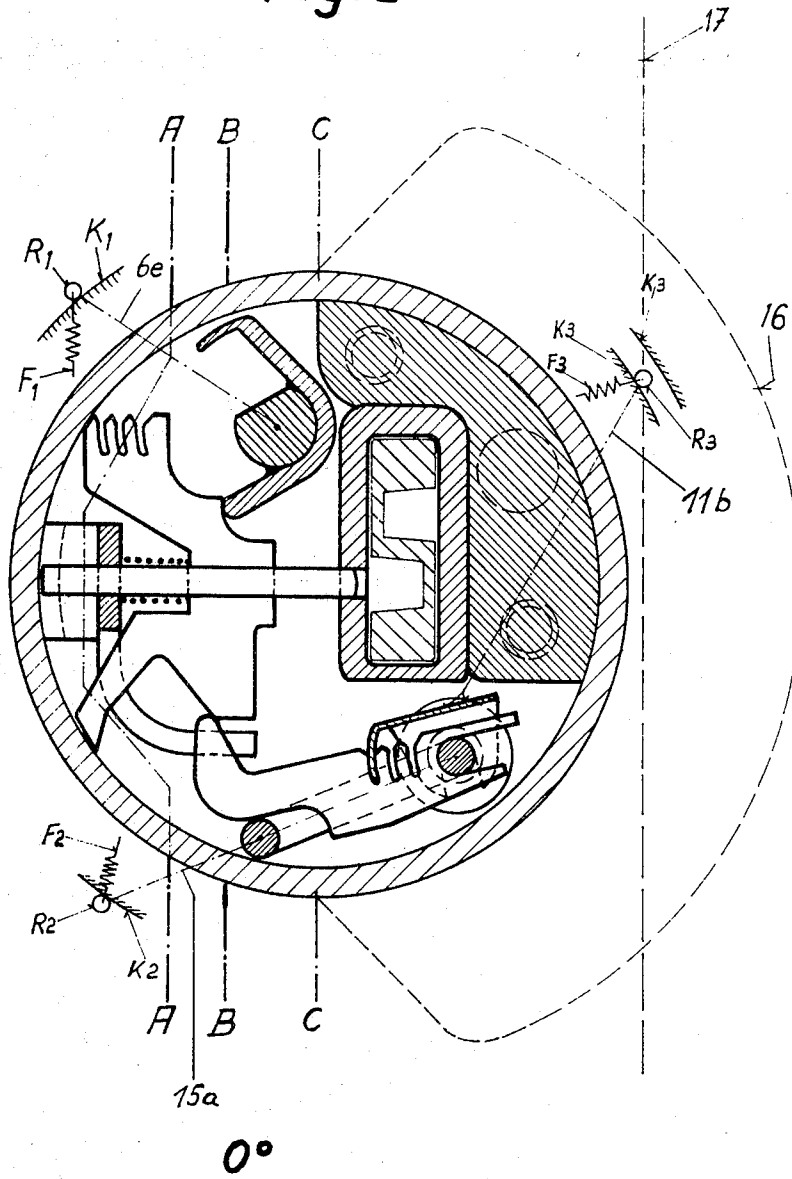


Fig. 3

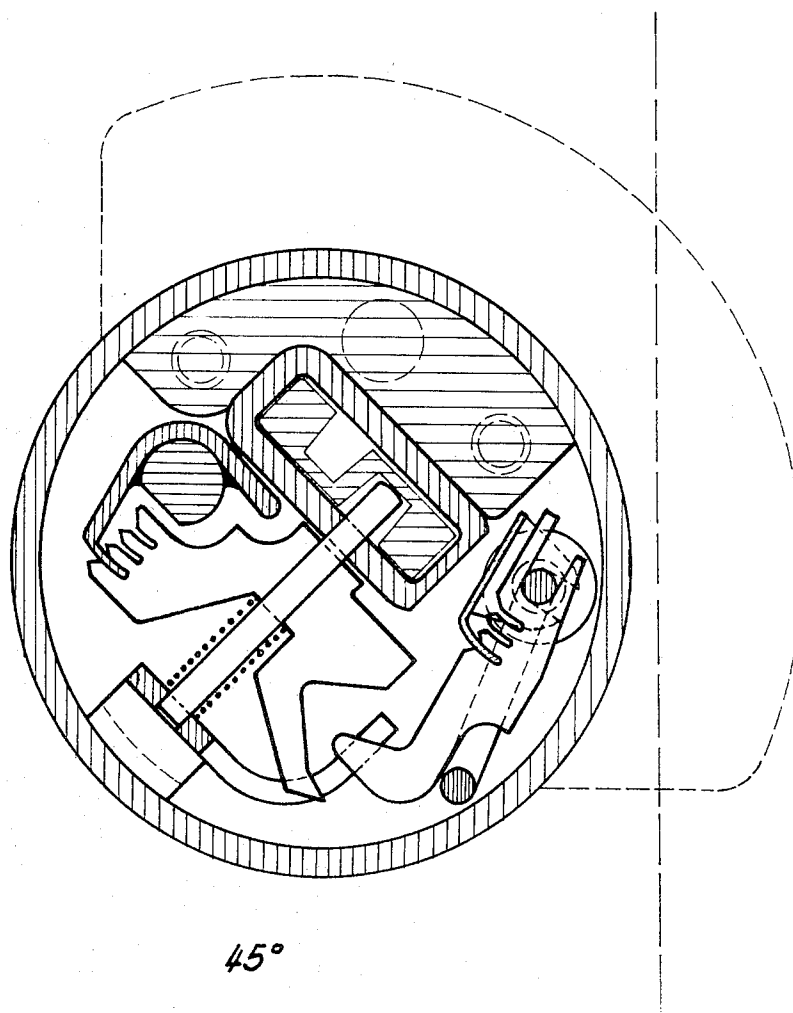


Fig. 4

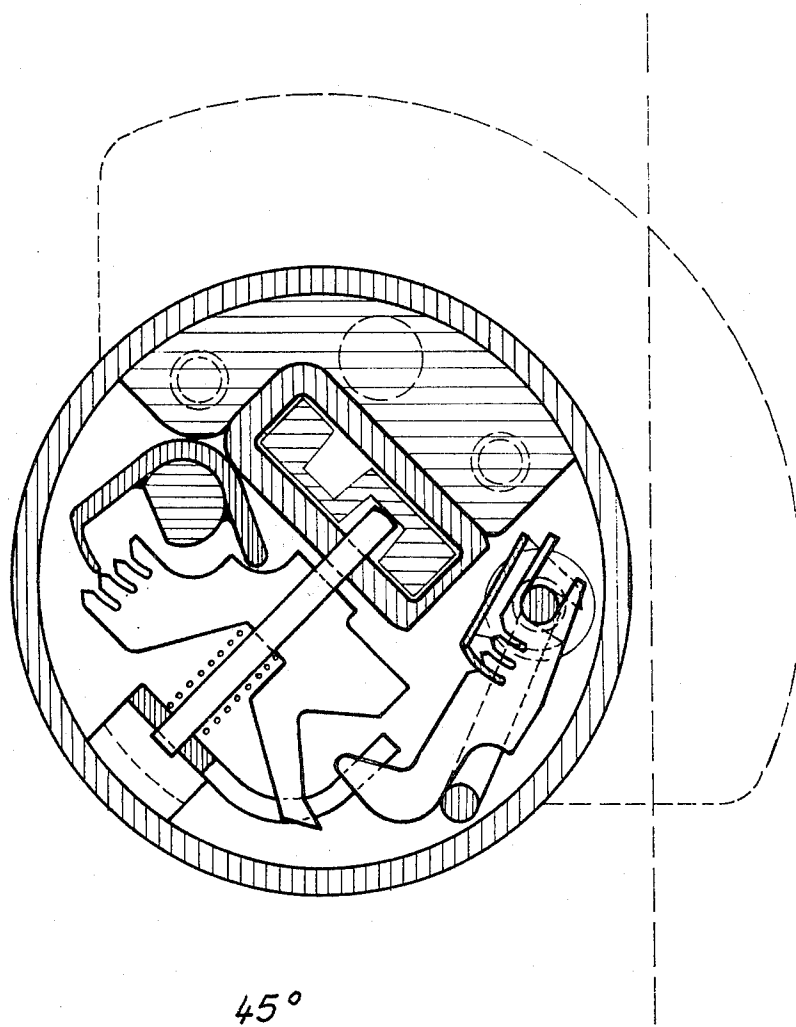


Fig. 5

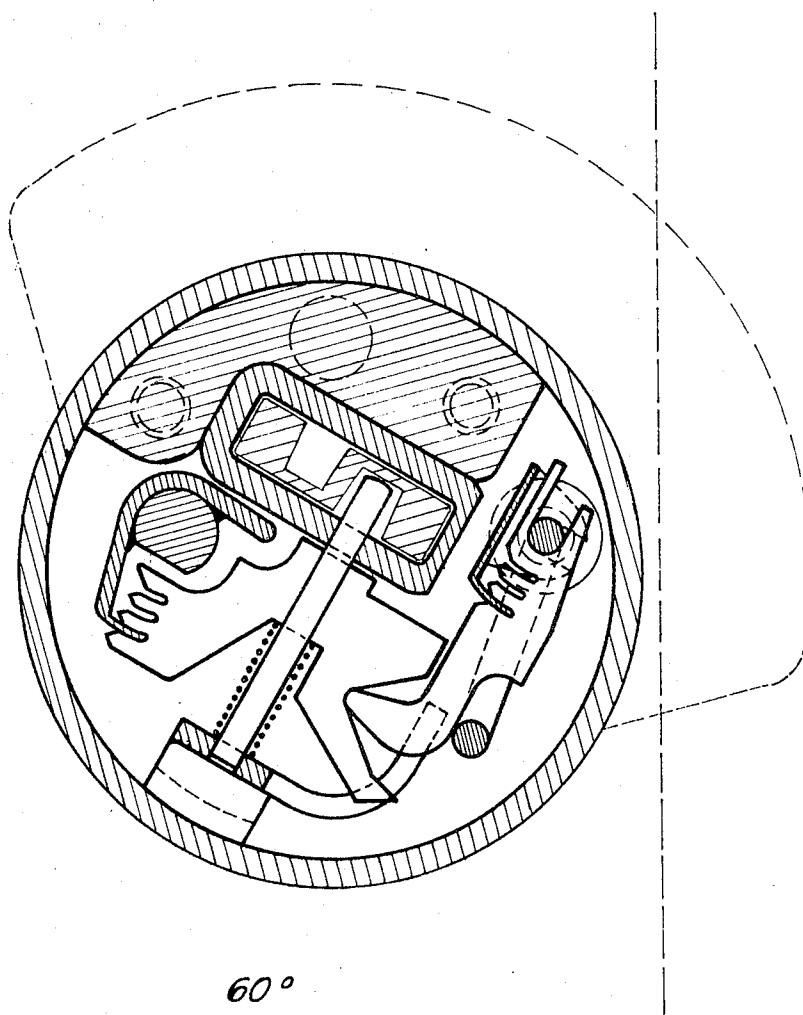


Fig. 6

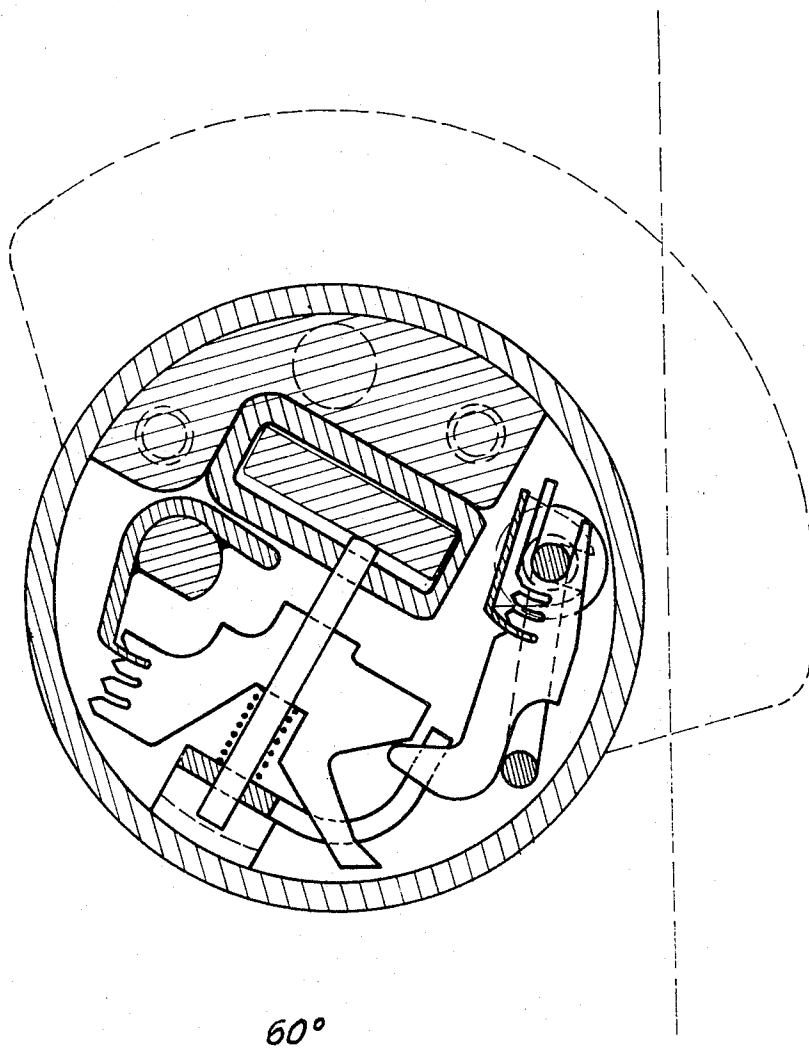


Fig. 7

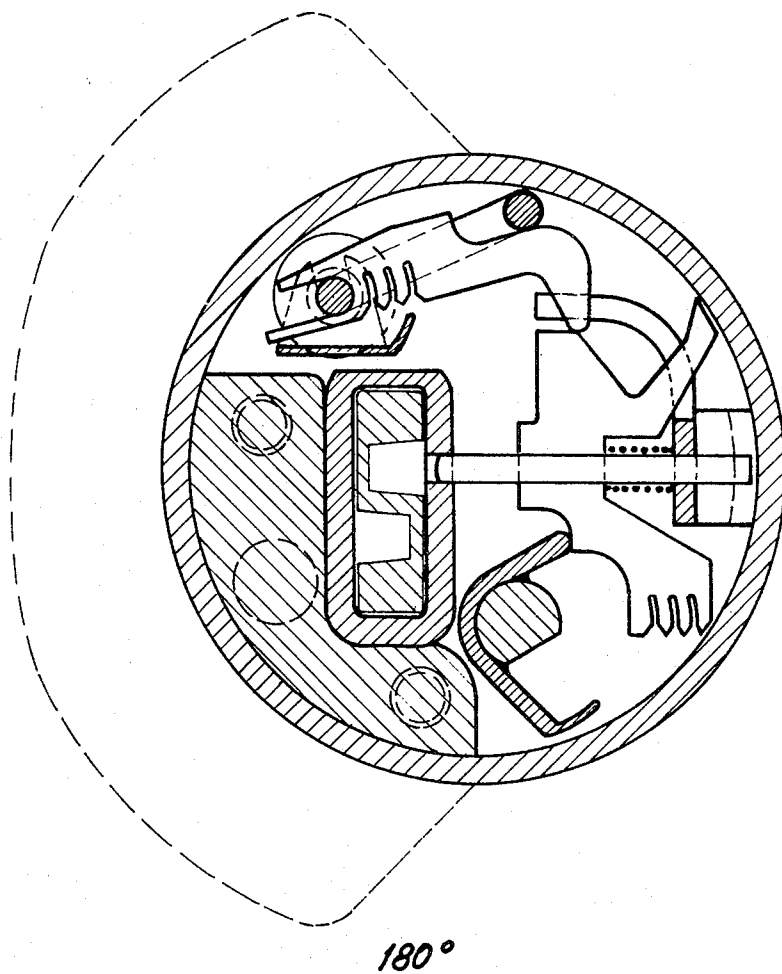
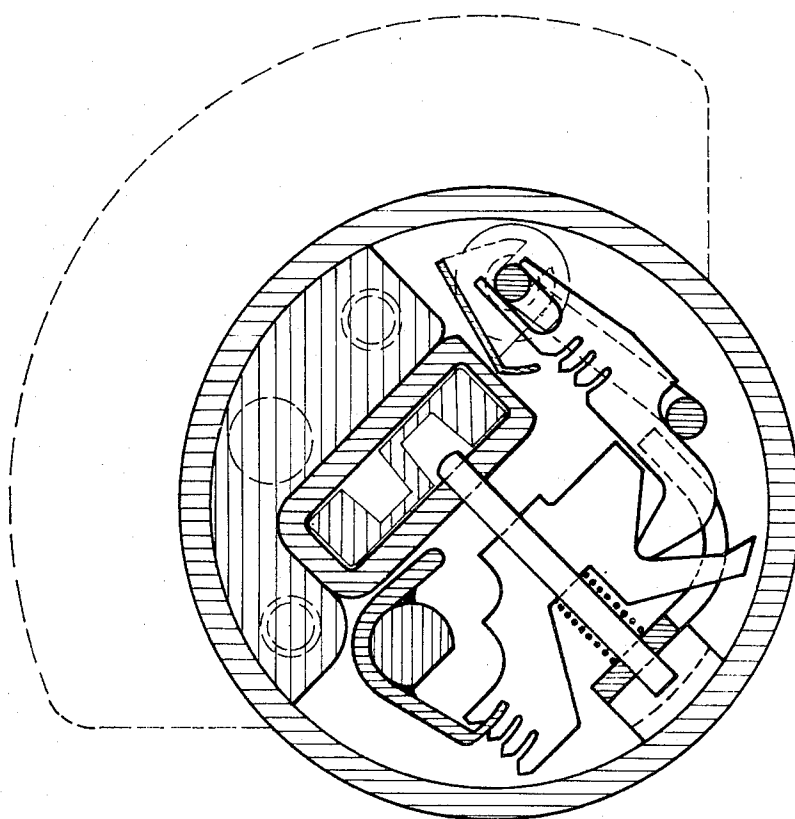
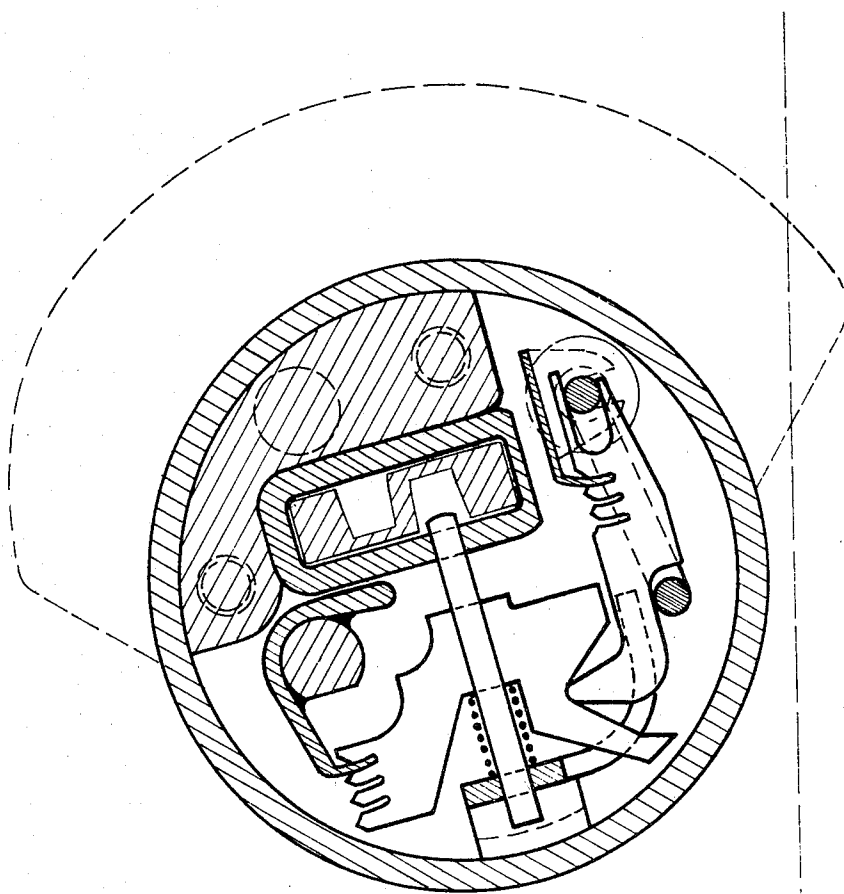


Fig. 8



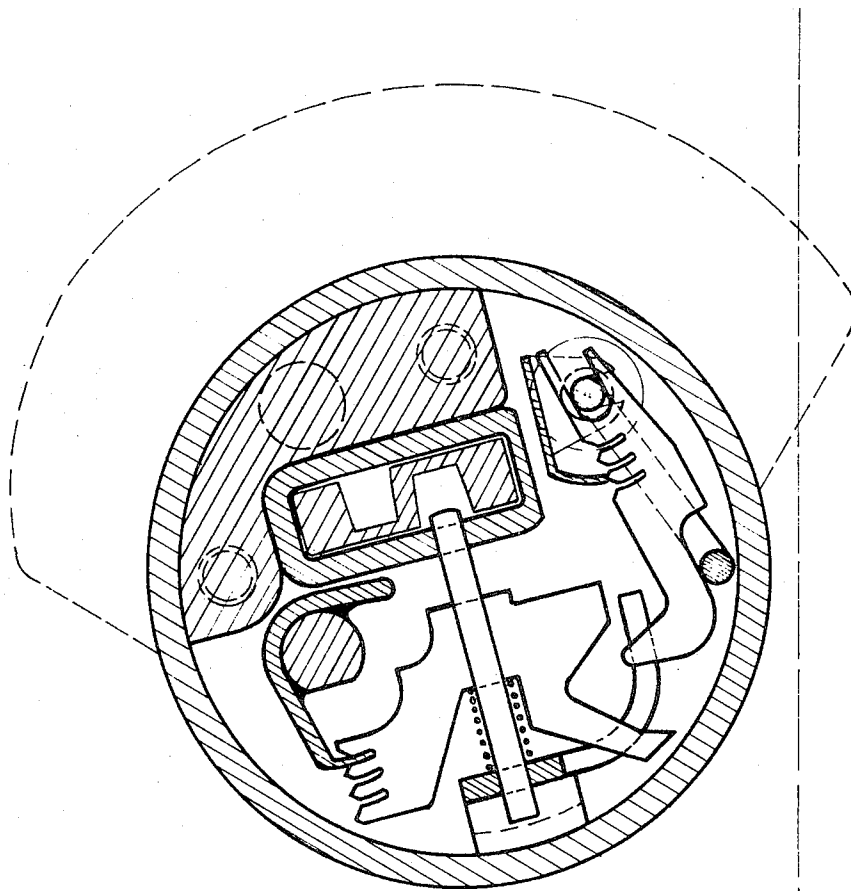
135°

Fig. 9



105°

Fig.10



105°

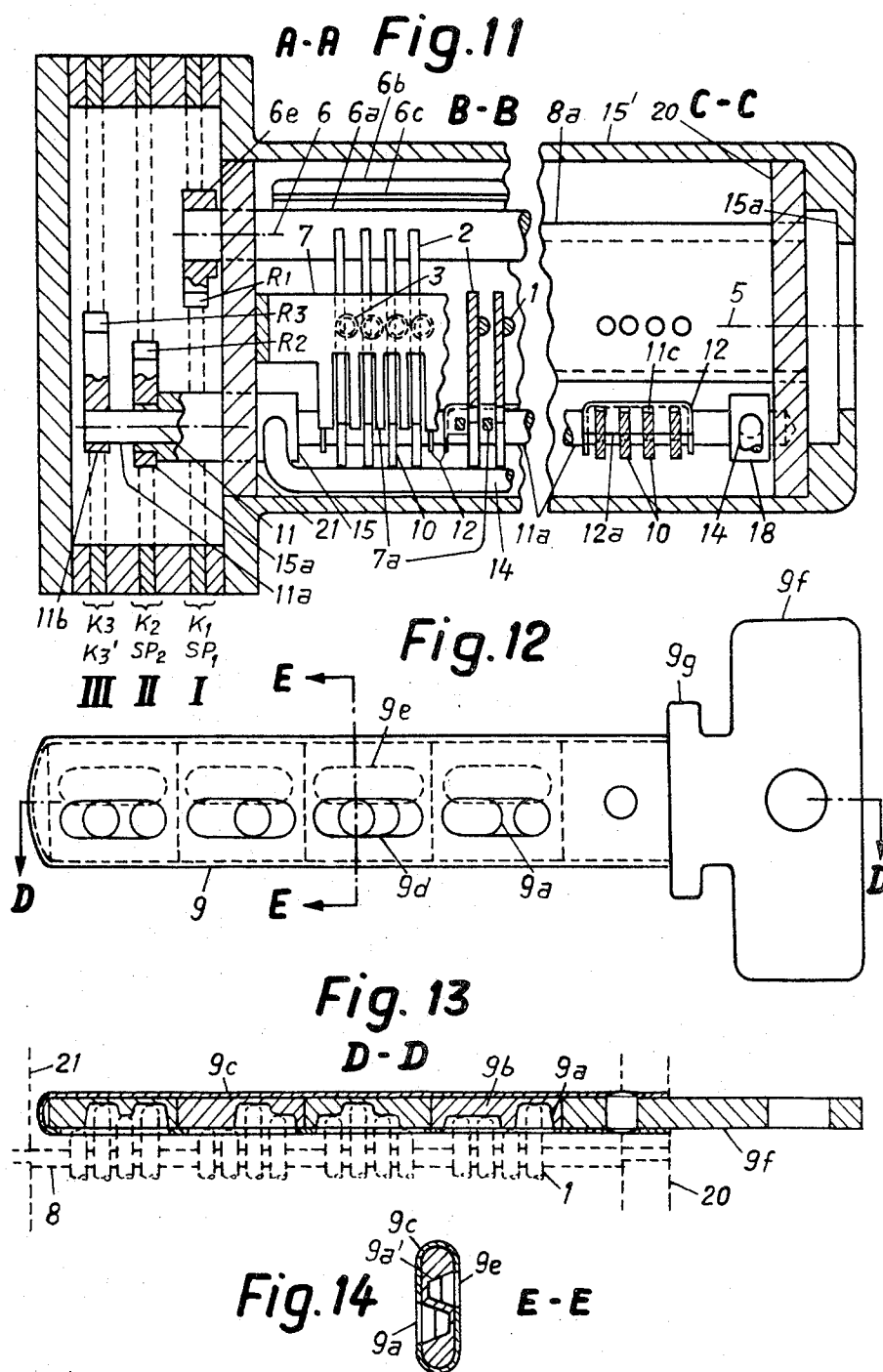
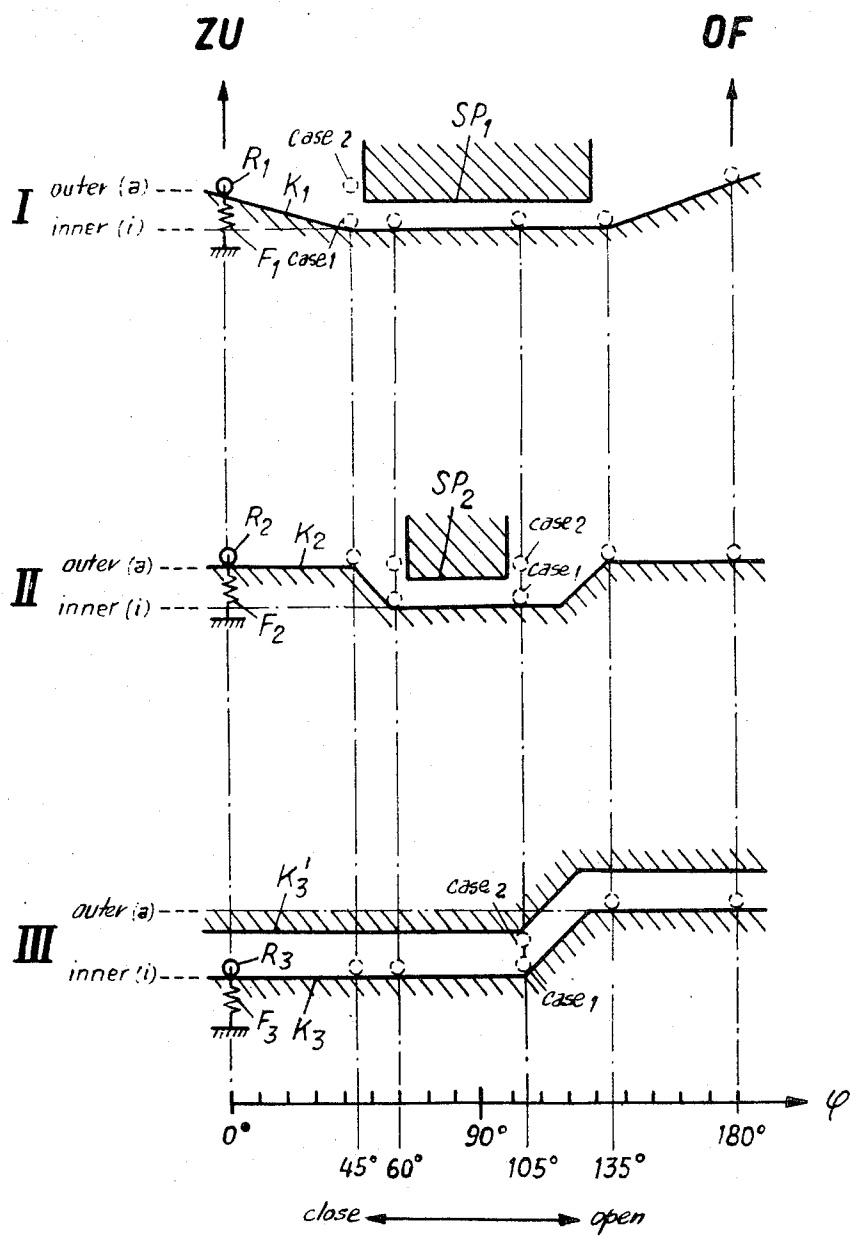


Fig.15



KEY-OPERATED MECHANICAL LOCK

FIELD OF INVENTION

The invention relates to key-operated mechanical locks wherein the actual information of the key is scanned by means of a mechanical scanner having a sensing element for each information-conveying position or area of the key and wherein the positions of the sensing elements are compared with the required information for opening the lock (hereinafter referred to as "the required information"). The required information is contained in a mechanical storage means provided in the lock. When the actual information and the required information coincide, then the lock is ready for opening.

BACKGROUND INFORMATION AND PRIOR ART

In known locks of the above-described kind, the scanning or sensing operation and the comparison operation take place simultaneously. The sensing elements, which are customarily referred to as "tumblers," are accessible from the key hole also during the comparison operation. This seriously and negatively affects the security of the lock in respect of unauthorized opening and such locks can thus be picked relatively easily.

This fundamental disadvantage of prior art locks of the indicated kind is overcome by the present invention by providing a locking mechanism for the sensing elements which locks the sensing elements in their relative positions after each sensing movement, at least for a period of time required to carry out the subsequent comparison between the actual and required informations.

In conventional locks, the required information (the lock information) which is stored in the lock cannot be changed. This means that if a key is lost or stolen or otherwise comes into the possession of an unauthorized person, lock and key have to be replaced. In order to overcome this drawback, it has previously been proposed to provide locks with adjustable or settable lock information.

The above disadvantage is overcome, according to the present invention, by providing means which render it possible to set different required information conditions at the required information storage means of the lock. Each of these different required information conditions is lockable by means of a locking mechanism for the required information storage means.

The variability of the known locks with adjustable lock information is limited by the fact that a separate key is required or has to be produced for each individual lock information. This disadvantage is obviated by the present invention by using a key whose shaft is constructed as a tube in which at least portions of the key information can be inserted in the form of inserts of plastic material.

From a functional point of view, so-called "adapting locks" or "memory locks" — referred to in the German-language countries as "Lernschlosser" and hereinafter referred to as "memory locks" — are particularly advantageous. In this lock type, each new lock information can be simply set by locking the open lock with a new key. During the locking procedure, the key automatically adjusts or adapts the lock information to conform to the key information.

Known memory locks, however, are of relatively complicated construction and thus are expensive to produce. Moreover, due to their complicated structure, they have a tendency to malfunction.

It has now been ascertained that a lock mechanism as proposed in this invention can be constructed as a memory lock without substantial modification. In this embodiment of the invention, the lock elements are suitably constructed so that after insertion of a key, which may be a new key, into the open lock and after the scanning or sensing of the key and the locking of the actual information of the key which has been transmitted to the lock, the actual information, in the further course of the locking movement of the lock, is mechanically and automatically transmittable to the temporarily unlocked required information storage means, whereupon after transmission of the new required information, this actual information is lockable by the locking mechanism of the required information storage means.

The various features of novelty which characterize the invention are pointed out with particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be had to the accompanying drawings and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

FIG. 1 shows an embodiment of a lock in accordance with the invention in cross section representing the essential parts of the lock.

FIGS. 2-10 show the lock of FIG. 1 in different conditions during the locking procedure, the Figures showing the lock also in cross section.

FIG. 11 is a longitudinal section of the lock along the lines AA, BB and CC of FIG. 1.

FIGS. 12-14 show a key in which

FIG. 12 is a side elevation of the key,

FIG. 13 is a sectional view according to line D-D of FIG. 12, and

FIG. 14 is a section according to line E-E of FIG. 12.

FIG. 15 shows curve diagrams for the control of the lock elements as a function of the angle of rotation of the lock.

FIGS. 16a, b and c show diagrammatically the co-action of a sensing element with a storage element, while

FIGS. 17-19 are additional embodiments for sensing elements and storage elements.

Turning now to the drawings, FIG. 1 shows the lock with its essential parts in cross section. While in FIG. 1 the parts are indicated by reference numerals, the same parts shown in FIGS. 2-10 have not been indicated by reference numerals.

FIG. 2 shows the lock in locked or closed condition (position 0°) in cross section, while FIG. 11 is a longitudinal section. The key 9 is shown in cross section, as inserted into the keyhole 8. The depressions 9a in the key may, for example, have three different levels. Perpendicular to the plane of the sheet, there are arranged in the key a number of such depressions of different levels (see FIG. 13). These depressions form together the key information. The depressions are scanned or sensed by means of the sensing elements which consist of the sensing pins 1 and the sensing members 2 secured to the pins 1. The sensing pins 1 are axially movably

mounted in bores of the keyhole tube 8a and of the guide member 7 (the axis of the pins is indicated by reference numeral 4).

A compression spring 3 presses the sensing pins 1 against the key 9. Perpendicular to the plane of the sheet of FIG. 2, sensing elements are arranged one after the other. For example, 16 such sensing elements may be arranged.

The sensing members 2 are provided at their upper side with three locking notches 2a and at the lower side with the V-shaped catch or latch curve 2b.

The locking mechanism for the sensing elements is arranged above the sensing elements 1, 2. This locking mechanism consists of the shaft 6a, which is rockable about an axis 6, and of the locking rail 6b, secured to the shaft 6a. The left-hand, tapered and bent locking edge 6c causes the locking with the locking mechanism and is engageable into anyone of the three locking notches 2a. A drawing-up or lifting edge 6d of the locking rail 6b serves the purpose to move the sensing elements 1, 2 back or away from the region of the key 9 in order to render possible unobstructed insertion and removal of the key. FIG. 2 shows the sensing element locking mechanism in the restored position. The shaft 6a is rotatably mounted in two lock plates 20 and 21.

Below the sensing elements 1, 2 there are arranged the storage elements 10 for the required or lock information. These storage elements 10 are, for example, constructed in the form of flat plates and contain the following portions:

- the storage sensing point (comparison point) 10a;
- the three storage locking notches 10b; and
- the guide fork 10c.

Each storage element is associated with one of the sensing elements 1, 2 and associated storage element 10 and sensing members 2 are situated in the same plane and are held or maintained in this plane by a guide rake 7a (see FIGS. 2 and 11) of the guide member 7.

The storage elements 10 are, on the one hand, rockable about the axis 11 of the storage element shaft 11a by means of the guide fork 10c, while, on the other hand, they are movably mounted in axial direction on the storage element shaft 11a, at least approximating the sensing direction of the sensing elements (pin axis 4).

The shaft 11a has a recessed or tapped guide groove 11c for each of the storage elements 10 (see FIG. 11).

Corresponding to the number of levels of the depressions which are arranged in the key 9 and which form the key information, and also corresponding to the number of locking notches 2a, the storage elements 10 in this embodiment also are provided with three storage means locking notches 10b.

The locking mechanism for the required information (lock information storage means) consists of the storage means locking rails 12 with bent-over locking ends 12a which are rigidly connected with the shaft 11, for example by means of milled means on the shaft 11.

For production reasons, the embodiment shows four storage means locking rail 12 one for each four storage elements 10 instead of one wide rail 12 for all 16 storage elements 10.

Upon turning the shaft 11a, the storage means locking rails are normally also turned and the locking ends 12a may then engage in one of the three notches 10b of the storage elements 10 and thus lock the storage el-

ements against axial movement. The locked storage elements 10 contain together in their axial positions (left-hand position, center position or right-hand position) the required or lock information. These axial positions extend relative to each other in about parallel manner to the sensing direction.

By means of an actuating element 14 for the storage means elements, which may be constructed as a stirrup which actuates all the storage elements 10 jointly, the sensing points 10a may be pressed upwardly against the sensing members 2. The actuators 14 are also arranged so as to be rockable about the axis 11. They are fixed on the bearing bushings 18 and 15 which are loosely rotatable on the shaft 11a, the movements of the actuators being transmitted through the bushing 15 to the stirrup 14 (see FIG. 11).

With the relatively small required stirrup forces (for example, 100–200 p), this double stirrup mounting is sufficient (left and right, see FIG. 11).

Shaft 11a and bushing 15 are rotatably mounted in the two lock plates 20 and 21. The lock elements are arranged between the two round lock plates 20 and 21 or are mounted thereon (see FIG. 11). The lock plates are connected with each other by means of a spacer 22 (FIG. 1) and the keyhole tube 8a. The lock plates are rotatably mounted in the stationary lock cylinder 15' about an angle from between 0° to 180°.

In the 0° position, the lock is closed (ZU) and in the 180° position it is open (OF) (see FIGS. 2–10 and FIG. 15).

The turning of the lock in the lock cylinder is effected in known manner by the inserted key 9. During the turning, three different control movements are transmitted to the lock elements.

I. Turning or control of the sensing element locking mechanism, at the same time restoring of the sensing elements 1, 2. This movement is taken off by means of contact cams or rollers R1 from the stationary control cam or curve K1 and is transmitted through a lever arm 6e to the shaft 6a (see FIG. 11).

II. Rocking or controlling the storage element actuator 14, which movement is taken off by means of contact cams (or roller) R2 from the stationary control curve or cam K2 and is transmitted through a lever arm 15a and a bushing 15 to the storage element actuator 14.

III. Rocking (or controlling) of the storage means locking mechanism 11, 12, 12a, which movement is taken off by means of contact cams (or roller) R3 from the stationary control curve or cam K3 and is transmitted to the storage element shaft 11a and thus to the storage locking rails 12 through a lever arm 11b.

The curves or cams K1, K2, K3, the contact cams R1, R2 and R3, the lever arms 6e, 15a and 11b are indicated in FIG. 2 and clearly shown in FIG. 11. Each of the contact cams is pressed against the associated curve by means of a spring (F1, F2 and F3).

FIG. 15 indicates the extensions or course of the three different control curves as a function of the rotational angle of the lock. In the uppermost line or column I, the control curve K1 for the control of the sensing element locking mechanism is indicated, while in the center line II the control curve K2 for the control of the storage element actuator 14 is represented. The lowermost line III indicates the control curves K3 and K3' for the control of the storage means locking mechanism, the curves K3 and K3' being situated in the same plane (see FIG. 11).

Columns or lines I and II, moreover, show the closure obstructions SP1 and SP2, SP1 (see FIG. 11) being situated in the plane of K1, while SP2 is situated in the plane of K2. The contact cams R, the curves K and the springs F correspond to the elements indicated in FIG. 2 and identified by the same symbols. The ordinates of the shape of the curves mean (in relation to FIG. 2) "innen," or "interior," to wit closer to the center 5 of the lock, while "ausen," or "outer," means further removed from the center 5 of the lock.

The stationary control curves and locking obstructions may be produced from punched sheet metal plates (see FIG. 11).

In reference to FIGS. 2-10 and FIG. 15, in the following the conditions of the lock elements and their manner of operation during opening and closing of the lock will now be explained.

In FIG. 2 at the 0° position the lock is closed (indicated in FIG. 15 as ZU). The main bolt 16, shown in dotted lines and fixed to the rotatable lock portion, blocks the door at the door jamb 17 indicated in dotted lines.

The locking mechanism 6 for the sensing elements is rocked outwardly so as to be completely away from the locking position, the sensing elements 1, 2 are drawn out from the keyhole 8 and the key 9 can be inserted (column or line I).

The storage element actuator 14 is rocked downwardly (outwardly) and the storage sensing points (comparison points) 10a are in the down position (line or column II).

The locking mechanism 12 for the storage means is rocked inwardly into the locked position.

By turning the lock about 45° in counterclockwise manner, to wit in direction of the opening, the position of FIG. 3, to wit the 45° position, is obtained. During this turning, the locking mechanism for the sensing elements is rocked inwardly and the sensing elements 1, 2 are released for sensing of the key (drawing up or lifting edge 6d is moved towards the right), whereafter the locking edge 6c immediately engages into one of the notches 2a and the sensing element 1, 2 is locked in the position sensed by the key 9.

The actual information thus consists of the combination of all the positions in respect of the sensing directions of all sensing elements 1, 2 which are locked by the common locking rail 6.

If the locking is proper, the lock can be further rotated (column I = 45°, Case 1 of FIG. 15).

If a key 9 is sensed with at least one defective level of the key information depressions, then the locking edge 6c would project from a tooth between two notches (see FIG. 4), whereby the contact cams R1 of the sensing element locking mechanism would not reach inwardly to a sufficient extent and the further rotation of the lock would be prevented by the blocking effect of the obstruction SP1 (column I = 45°, Case 2 of FIG. 15). The further rotation of the lock is only possible if the sensing element locking mechanism is properly engaged in the notches.

FIG. 5 shows the lock in the position corresponding to 60° (in direction of opening). In Case 1 it is assumed that the key information, which has been sensed from the key 9 and which thus is now locked in the sensing elements, corresponds to the lock information which is contained in the storage elements 10 and which lock information is also locked. In that case each storage

sensing point 10a can move forward to the lowermost point of the V-shaped catching or latching curve 2b, the stirrup-shaped storage element actuator 14 can, due to the action of the spring F2, rock completely inwardly and the lock can be further rotated (opened) to the 180° position (see FIG. 15 = 60°, Case 1).

The catching curves 2b at the sensing elements 1, 2 and the sensing points 10a (comparison points) at the storage elements 10 form the information-comparison part and serve for the comparison between the actual information and the required information (FIG. 16). If the informations coincide, the saddle point of the catching curve 2b of the sensing element 1, 2 has, in direction of the sensing, the same position as the sensing point 10a of the storage element 10. The sensing point 10a may in this case dip to the complete depth while the storage elements 10 and thus also the storage element actuator 14 may perform the maximum possible relative movement against the sensing element 1, 2 and the lock opening is only possible after this maximum movement has been performed.

FIG. 6 shows the lock in the same representation as in FIG. 5 (60° position), wherein, however, in this Case 2 the actual information (key information) and the required information (lock information) do not coincide. It is sufficient for this that only one single sensing element position does not coincide with the position of the associated storage element 10 so that the sensing point 10a of the latter cannot penetrate into the base or deepest position of the catching curve 2b and thereby the rocking of the common storage element actuator 14 in an inward direction is prevented. Upon further rotation of the lock, the contact cam R2, which is connected with the actuator 14, then engages at the lock obstruction SP2 (column II, 60° position, Case 2 of FIG. 15) and the lock cannot be opened.

These procedures in the lock opening phase of 45°-60° are diagrammatically indicated in FIG. 16.

In column or line (a) (Case 1) the required and actual informations are coinciding (locking rails 6b and 12 are engaged in corresponding notches). By the action of the spring F2, the sensing point 10a dips to the maximum, to wit to the saddle point, into the V-shaped catching curves 2b of the sensing elements 1, 2. In this manner the contact cam R2, which is connected with the storage lever actuator 14, reaches outside the blocking range of the obstruction SP2 and the lock can be opened.

In columns b and c (Case 2) the required and actual informations are unequal and the sensing point 10a cannot perform the maximum dipping movement but rather projects from one of the flanks of the catching curve 2b. The contact cam R2 thus remains blocked in the range of action of the closure obstruction SP2 and the opening of the lock is thus blocked.

FIG. 7 shows the lock in opened condition (180° position). The sensing element locking mechanism is rocked outwardly, the sensing elements 1, 2 are drawn out from the range of the key and the key 9 can be inserted. The storage element actuator 14 is rocked outwardly, the storage element locking mechanism 12 is released and the storage elements 10 are freely movable.

FIG. 8 shows the lock in a position which is turned backwardly about 45° from the open position (135° position) in direction of closure. The sensing elements 1, 2 have sensed or scanned the key 9 and are locked by

means of the sensing element locking mechanism. If the sensing element locking mechanism, due to a defective key, would be situated on a tooth between the notches (see FIG. 4), then the closure movement could not be further continued.

If the closure movement is continued, then during the angular path of 135° – 120° , the storage element actuator 14 is pressed inwardly, to wit in FIG. 16 in an upward direction. Since all the storage elements 10 are freely movable in axial direction, the storage sensing points 10a are moved along the V-shaped catching curves 2b until they have completely dipped into the base or lowermost region of the catching curves 2b. In doing so, they are moved in axial direction in such a manner that they take over the axial position of the sensing elements (key information). Thus, for example, during this phase the storage element 10 shown in FIG. 16, column c, would be moved into the position of column a.

The memory phase lasts from the 135° to the 120° movement during the closure procedure, during which time all the storage elements can take over the key information sensed from the key 9 directly through the sensing elements 1, 2. It is thus possible with an open lock to insert a new key 9 and to take over its key information automatically during the closure procedure by the storage elements 10, to wit directly through the sensing elements 1, 2.

FIG. 9 shows the lock during the closure procedure in the angular position 105° (Case 1 of FIG. 15).

The key information, which has been transmitted from the sensing elements 1, 2 to the storage elements 10, has been locked by the storage elements locking mechanism and forms the new lock information. The memory procedure is also clear from FIG. 16.

If, in column c, the storage elements locking mechanism 12 (required storage means locking) is released, then, by the action of the spring F2, the storage elements actuator 14, and thus the storage element 10, is lifted. At the same time the storage element 10 is moved in the sensing direction towards the left until the sensing point (comparison point) dips into the base or deepest portion of the catching curve 2b. The locking member 12 will again engage in this position during closure, and required and actual informations are now the same.

Thus, the required information (lock information) of the storage element 10 has been taken over by the actual information, to wit the information sensed from the key 9, and the information condition is changed from that indicated in column c to that indicated in column a of FIG. 16. The entire memory procedure takes place during the closing phase between 135° and 105° .

The inclined flanks of the catching curve 2b make it possible to set the storage elements 10 to a different, changed actual information (memory procedure). This is accomplished by movement of the comparison points of the unlocked storage elements 10 by means of storage element actuator 14 substantially transverse to the sensing direction against the sensing elements 1, 2.

FIG. 10 shows the lock in the same angular position (105°) as in FIG. 9, however for Case 2. Here it is assumed that the storage element lockage mechanism has not properly engaged in the notches and strands on a tooth between the notches. In this manner, the storage element 10, and thus also the storage element actuator 14, are pressed outwardly and the sliding cam R2 pre-

vents further rotation of the lock by engagement with the obstruction or blockage SP2.

This means that the lock can only be closed if both the lockage mechanism for the sensing elements and also the lockage mechanism for the storage elements are properly engaged in the notches and there is certainty that the lock can be opened again with the same key 9.

FIG. 17 shows an embodiment of the information comparison portions in reverse arrangement, to wit a reversed arrangement of catching curve and sensing points (comparison points). The catching curve, which is here indicated with 10f, is arranged at the storage element 10 and the comparison point, here indicated with 2f, is arranged at the sensing element 1, 2. The effect is, of course, the same as in the embodiment of FIG. 16.

FIG. 18 shows a still further variation for the information-comparison parts of the sensing elements 1, 2 and the storage elements 10. The V-shaped catching curves are replaced by comparison gaps 2b with vertical flanks into which the comparison points can dip when the respective informations coincide.

The automatic transmission of the actual information (key information) to the required information (lock information) in a memory phase is not possible in this embodiment. The lock storage locking mechanism 12 is not controlled during operation and the storage elements 10 are constantly locked. A change of the lock information is accomplished in manual manner by releasing the locking mechanism, setting the storage elements 10 anew and again-locking.

The sensing direction is indicated in FIG. 18 by the double arrow AR, while the rocking direction of the storage elements 10 is made clearer by the double arrow SR.

FIG. 19 shows an embodiment which has the same manner of action as in FIG. 18, however the comparison gaps and comparison points are interchanged between sensing element 1, 2 and storage element 10.

In all the variations described hereinabove, the catching curves, the comparison points and the comparison gaps form the information-comparison parts of sensing elements and storage elements.

Not all storage elements have to be changeable. Of 16 storage elements, for example, 8 may be permanent and 8 may be changeable. The lockings of the permanent storage elements are then always engaged and not controllable.

In FIGS. 12 through 14 an embodiment of a key on somewhat enlarged scale with four exchangeable inserts 9b is shown. The inserts may, for example, be of plastics. The inserts are inserted into a metal tube 9c and are scannable through the openings 9d or 9e.

Each of the four portions 9b of plastics has four information scanning areas 9a, which are scannable or sensible through the pins 1 of the sensing elements 1, 2. Each sensing area (information area) has three possible levels, in such a manner that $3^4 = 81$ different parts of plastics are possible. This means that with four of 81 exchangeable plastics portions per key, $81^4 = 40 \cdot 10^6$ possible key combinations are feasible.

The grip or handle of the key 9f is detachable in order to be able to insert the inserts 9b into the metal tube 9c.

A portion of the key 9, for example eight information areas, may be constructed of metal and may be perma-

ment, to wit not variable. Due to the centrically symmetrical arrangement of identical key information 9a' and the openings 9e, the key is also insertable in a position which is offset by 180°. Of course, it is within the scope of the invention to make the key of a single metal piece so that it is not variable.

The nose 9g at the handle or grip of the key permits removal of the key 9 only in the terminal positions of the lock rotation.

Instead of three, the key informations may also have, for example, two (binary informations) or four different levels. Key sensing elements and storage elements are then correspondingly provided with two, respectively four, locking notches.

Lock cylinders and lock plates may be constructed with thicker walls than indicated in the drawings, in order to increase the security of the lock. Thus, the lock is more difficult to destroy.

Unauthorized mechanical scanning or sensing of the required information from the keyhole is impossible since the mechanical contact between the required information storage means and the sensing elements can be accomplished in locked condition only.

Further, acoustical sensing is not possible since, for example with binary information, it is not possible acoustically to determine on which flank of the catching curve the sensing point impinges (see FIG. 16) and the engagement during the lock rotation takes place simultaneously.

In the two terminal positions of the rotatable lock portion, which are separated from each other by 180°, the portion may be held by a suitable mechanism, such as groove mechanism, not shown.

What is claimed is:

1. In a mechanical, key-operated lock, in which the actual information of the key is scanned by means of a mechanical scanner having a sensing element for each area of information and wherein the positions of the sensing elements are compared with the required information for opening the lock, which required information is contained in the lock in a mechanical storage means, and wherein the lock can be opened when the actual information and the required information coincide, the improvement which comprises a locking mechanism for said sensing elements, said locking mechanism locking said sensing elements after each sensing movement in their relative positions for a period of time, which is at least as long as the time required for the subsequent comparison of the sensed actual information with the stored required information.

2. The improvement as claimed in claim 1, wherein means are provided for mechanically setting different required information conditions at said required information storage means, and a storage means locking mechanism for locking such different required information conditions in said required information storage means.

3. The improvement as claimed in claim 2, wherein means are provided which operate in such a manner that, after insertion of a new key into the keyhole of the lock in unlocked condition and after sensing of the key and locking of the actual information of the new key transmitted to said lock, said actual information, during the course of the closure movement of the lock, is mechanically and automatically transmitted to the temporarily unlocked required information storage means and, after transmission, is locked as new required infor-

mation by said locking mechanism for said storage means.

4. The improvement as claimed in claim 1, wherein information-bearing comparison elements for said actual information and information-bearing comparison means for the required information storage means are provided, said actual information-bearing comparison elements and required information-bearing comparison means being relatively movable to each other until mechanical contact between them is established, the relative movement reaching a maximum when said actual information and said required information coincide, said lock being capable of being opened only when said maximum relative movement has been obtained.

5. The improvement as claimed in claim 4, wherein each of said sensing elements is associated with a storage element of said required information storage means and the actual information condition transmitted to the lock consists in the locked position of all sensing elements (1, 2) in sensing direction while the required information condition consists in the locked position of all storage elements (10) in the sensing direction (AR), while the relative movement of the information-bearing comparison parts of the storage elements is effected in a direction transverse to the sensing direction (AR) relative to the sensing elements (1, 2).

6. In a mechanical, key-operated lock, in which the actual information of the keys is scanned by means of a mechanical scanner having a sensing element for each area of information and wherein the positions of the sensing elements are compared with the required information for opening the lock, which required information is contained in the lock in a mechanical storage means, and wherein the lock can be opened when the actual information and the required information coincide, the improvement which comprises a locking mechanism for said sensing elements, said locking mechanism locking said sensing elements after each sensing movement in their relative positions for a period of time, which is at least as long as the time required for the subsequent comparison of the sensed actual information with the stored required information, a stationary lock cylinder (15), the lock having a lock body rotatably arranged within said stationary lock cylinder, said lock body containing the lock elements of the lock, the axis of the keyhole of the lock extending parallel to the axis (5) of the lock cylinder while, by means of the inserted key (9), said lock body is rotatable by at least 180° about the axis (5) of the lock cylinder, said sensing elements (1, 2) are arranged in the direction of the axis (5) of the lock cylinder in a row and adjacent each other and comprise axially movable sensing pins (1) and sensing members (2) secured to said pins (1), the axes of the pins and the planes of the sensing members (2), extending in planes perpendicular to the axis (5) of the lock cylinder, while the sensing members (2), in relation to the axis of the pins, have on one side locking notches (2a), and on the other side parts (2b) for comparing the informations.

7. The improvement as claimed in claim 6, wherein the storage elements (10) comprise flat plates extending in the plane of the associated sensing members (2), which plates contain the information-bearing comparison portions (10a) at one end, said plates being movable with their information-bearing comparison portions, thereby that the other ends of the plates are rotatable about an axis (11) which extends parallel to the

axis (5) of the lock cylinder, the tangent of the circular arcs about said axis (11) extending at least approximately perpendicular to the sensing direction (AR) in the vicinity of the information-bearing comparison portions, said storage elements (10) being provided with locking notches (10b) and having slot guides (10c), whereby the storage elements (10) are movable at least approximately parallel to the sensing direction (AR) on the shaft (11a) of the storage elements.

8. The improvement as claimed in claim 7, wherein a storage element actuator (14), common for all the storage elements (10), is provided, said actuator (14) being rockably mounted on the shaft (11a) for the storage elements, said actuator causing the pressing of the information-bearing comparison portions of the storage elements (10) against the information-bearing comparison portions of the sensing elements (1, 2) in elastic manner by spring means (F2).

9. The improvement as claimed in claim 8, wherein at least one locking rail (12) for storage elements is secured on the rotatable shaft (11a) of the locking elements, which rail is provided with locking ends (12a) engageable into said locking notches (10b).

10. The improvement as claimed in claim 9, wherein the locking mechanism for the sensing elements comprises a rockable locking rail (6b) engageable with a locking edge (6c) into said notches (2a), and an edge (6d), said rail (6b) being fixed on a rotatable shaft (6a) parallel to the axis (5) of the lock cylinder and that in one of the rocking positions of the rail (6b) the sensing elements (1, 2) are locked, while in the other rocking position the sensing elements are lifted.

11. The improvement as claimed in claim 10, wherein the rocking movements are transmittable by the rotation of the lock body by stationary cam or curve discs (K₁, K₂, K₃) and contact cams (R1, R2, R3), associated with said cam discs, said cams (R1, R2, R3) being mounted on lever arms, said rocking movements being transmittable onto three lock elements, which rotate together with the lock body and which consist of the rockable sensing element locking shaft (6a), the storage element actuator (14) as well as the storage element lock mechanism (12).

12. The improvement as claimed in claim 11, wherein stationary obstructions (SP1, SP2 and K'3) are provided in the lock, and wherein the lock can be actuated from locked position to open position, and in the reverse, only if both the sensing elements (1, 2) are locked and also the storage element actuator (14) has performed the maximum possible relative movement against the sensing elements (1, 2) and the storage elements (10) are locked, said stationary obstructions preventing opening of the lock in other positions of the sensing elements and storage elements.

13. The improvement as claimed in claim 12, wherein one of the information-bearing comparison portions (2b or 10f) consists of catching curves and the associated information-bearing comparison portions (10a or 2f) consist of comparison points and that the actual information of the sensing elements (1, 2) is transmittable during the closure movement to the storage elements (10) in automatic manner.

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