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(71) Applicant: **SERRATURE MERONI S.p.A.**
I-20054 Nova Milanese (Milan) (IT)

(72) Inventor: **Meroni, Gersam**
I-20040 Capriano Di Briosco (IT)

(74) Representative: **Siniscalco, Fabio et al**
c/o JACOBACCI & PERANI S.p.A.
Via Visconti di Modrone, 7
20122 Milano (IT)

(54) A cylinder security lock, particularly for a cabinet or for items of furniture in general

(57) A cylinder security lock for locking a movable portion to a fixed portion of a structure to be locked comprises a mechanical closure device (3) fixed to one of the movable portion and the fixed portion, a drum (4) associated with the mechanical closure device (3) and a locking cylinder (5) housed in the drum (4) and rotatable therein by means of a key (39) in order to operate the mechanical closure device (3) to engage it with the other of the said movable and fixed portions. Advanta-

geously, the drum (4) containing the entire locking-unlocking mechanism of the lock is coupled releasably with a bush (22) fixed to the mechanical closure device (3) to enable the drum (4) to be engaged with/released from the remaining parts of the lock quickly and easily even after these have been fitted on the movable portion or on the fixed portion of the structure to be locked.

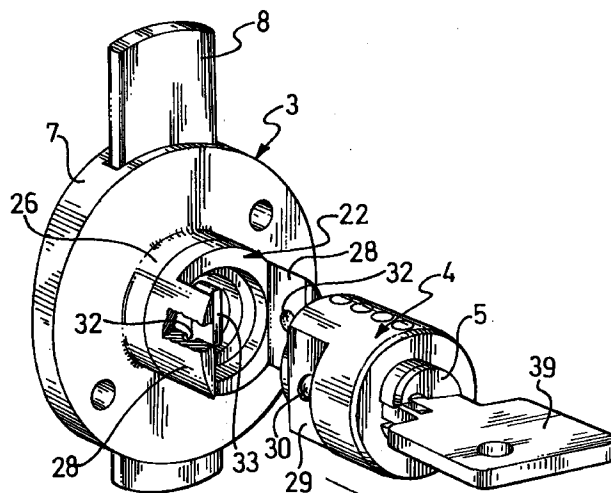


FIG. 2

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Description

The present invention relates to a cylinder security lock for locking a movable portion to a fixed portion of a structure to be locked, particularly for a cabinet or for items of furniture in general, of the type comprising a mechanical closure device fixed to one of the fixed portion and the movable portion, a drum associated with the mechanical closure device and a locking cylinder housed in the drum and rotatable therein by means of a key in order to operate the mechanical closure device to engage it with the other of the said portions.

The use of security locks for preventing the opening of a door or a drawer of a cabinet is known. With known locks, the rotation of a key inserted in a keyhole of a locking cylinder in fact operates a mechanical closure device with a bolt or another equivalent system which locks a movable portion such as, for example, a door or a drawer in position relative to the fixed portion of a cabinet or of another item of furniture in general.

Locks are preferably fitted on the above-mentioned items of furniture during the manufacture thereof since the rationalization of the fitting operations, in combination with the use of tooling dedicated to this purpose, considerably reduces their fitting times and costs and achieves significant economies in large-scale production.

A requirement experienced in the field of the supply of office furniture and the like is that of providing, according to the customers' requirements, sets of furniture which are intended to be located in the same area with security locks having locking-unlocking mechanisms which can be operated by the same key.

This requirement involves the need for the producer of the items of furniture to plan the precise purposes and the precise locations of the various items of furniture at the time of manufacture so as to provide them with appropriate locks, clearly with logistical complications and the possibility of errors in the delivery of the items of furniture.

On the other hand, the solution of fitting the locks on the items of furniture only after they have finally been put in position has the disadvantage of requiring the use of more labour and longer installation times with a consequent increase in costs for the producers of the furniture, particularly when large quantities are supplied.

To satisfy the aforementioned requirement, it is known to use cylinder security locks of type with disks, in which the cylinder on which the disks are mounted can be associated with the remaining portions of the lock after they have been fitted on the items of furniture.

The solution of the use of this type of lock, however, is not satisfactory from the point of view of the protection of the integrity of the locking-unlocking mechanism of the lock. In fact, the disks constitute the most delicate part of the aforesaid mechanism and may be subject to damage such as to compromise the good operation of the lock as a result of knocks and the like during the handling of the locking cylinder and/or during its fitting.

Moreover, this solution cannot be applied to cylinder security locks of the type with pins, for which the removal of the lock cylinder from the drum causes the pins and springs to come out of the locking-unlocking mechanism of the lock, and the use of which is often requested in supply orders as a technical specification, owing to their greater resistance to forcing.

The object of the present invention is to devise a security lock having structural and functional characteristics such as to satisfy the aforesaid requirement and at the same time to overcome the disadvantages of the prior art referred to.

This object is achieved by a cylinder security lock of the type specified above, characterized in that it comprises releasable coupling means between the drum and the mechanical closure device.

The concept upon which the present invention is based is that of rendering the drum, with the entire locking-unlocking mechanism of the lock, quickly and easily engageable with and releasable from the remaining parts of the lock even after these have been fitted on the movable portion or on the fixed portion of a structure to be locked such as, for example, a cabinet or an item of furniture in general.

Further characteristics and the advantages of the lock according to the present invention will become clear from the following description of an embodiment thereof, given by way of non-limiting example, with reference to the appended drawings, in which:

- Figure 1 is an exploded perspective view of a security lock according to the invention,
- Figure 2 shows the lock of Figure 1 assembled and with a part for engagement,
- Figure 3 is a cross-section of the lock of Figure 2 with the part engaged,
- Figure 4 shows a detail of the lock of Figure 3,
- Figure 5 shows the lock of Figure 1 with a different key inserted, and mounted on a structure to be locked,
- Figure 6 is a longitudinal section of the lock of Figure 5,
- Figure 7 is a cross-section of the lock of Figure 5, taken on the line VII-VII of Figure 6,
- Figure 8 is a cross-section of a detail of the lock of Figure 5 in a different stage of operation, and
- Figure 9 is a view of the lock of Figure 1 mounted on a cabinet with drawers.

With reference to the drawings, a cylinder security lock according to the invention intended for use, by way

of example, with a cabinet 2 with drawers, is generally indicated 1.

The lock 1 comprises a mechanical closure device 3 and a drum 4 having a predetermined axis X-X and housing a locking cylinder 5 and a locking-unlocking mechanism 6 of the lock 1.

The closure device 3 comprises a disc-shaped bolt support 7 fixed to a drawer 42 of the cabinet 2 and a bolt 8 slidable in the bolt support 7 between a retracted position and a projecting position in which it is intended to engage a corresponding bolt seat 10 in a fixed portion 44 of the cabinet 2, as will become more clear from the following description.

The locking cylinder 5 is inserted coaxially in the drum 4 until its head 11 abuts a corresponding face of an end 12 of the drum 4. An end portion 14 of the cylinder 5 projects from the other end 13 of the drum 4, a resilient sealing ring 15 being mounted thereon and preventing the cylinder 5 from coming out of the drum 4. The continuity of the lateral surface 16 of the cylinder 5 is interrupted by a keyhole notch 18. A plurality of radial through-holes 19 suitably aligned in a direction parallel to the axis X-X is formed in the thickness of the cylinder 5 in a position diametrically opposite that of the keyhole notch 18. The plurality of holes 19 in the cylinder 5 corresponds to a plurality of radial through-holes 20 formed in the thickness of the drum 4, aligned in a direction parallel to the axis X-X and positioned axially so as to coincide with the radial holes 19 of the cylinder 5.

The locking-unlocking mechanism 6 of the lock 1 is of the known cylinder type and comprises a plurality of pairs of pins 21, each pair of pins 21 being inserted head-to-tail for sliding inside a respective radial duct defined by a hole 19 in the cylinder 5 aligned with a hole 20 in the drum 4, and a spring 17 which acts resiliently on each pair of pins 21 in a direction such as to urge them towards the axis X-X. As a result of the action exerted by the springs 17, the radially outermost pins 21 of the pairs of pins 21 are positioned partially in the holes 19 of the cylinder 5 and their remaining portions are positioned in the holes 20 of the drum 4 so that they act as tongues to prevent relative rotation between the cylinder 5 and the drum 4. As is known, in mechanisms of this type, the cylinder 5 is in fact rotated relative to the drum 4 by the insertion and rotation in the keyhole 18 of a key which has a notched profile such as to move the pins 21 against the action exerted thereon by the springs 17 until all of the radially outermost pins 21 of each pair of pins 21 are housed in the thickness of the drum 4 and all of the radially innermost pins 21 of each pair of pins 21 are housed in the thickness of the cylinder 5.

The closure device 3 and the drum 4 are connected by means of a bush 22 aligned with the drum 4 on the axis X-X. An end 23 of the bush 22 comprises an external circumferential profile 24 snap-engaged in a corresponding internal groove 25 of a collar 26 projecting from the bolt support 7; this collar 26 is disposed adjacent holes 9 in the bolt 8. The other end 27 of the bush

22 has two opposed projecting parallel arms 28 between which a corresponding mating portion 29 of the drum 4 with a reduced cross-section and opposed flat shoulders is inserted forming a male and female connection of known type.

The drum 4 comprises releasable coupling means which enable the drum 4 to be engaged with/released from the bush 22 fixed to the bolt support 7.

The releasable coupling means preferably comprise a ball 30 inserted slidably in a radial through-hole 31 in a shoulder of the mating portion 29 of the drum 4. The hole 31 has an end portion adjacent the outer surface of the drum 4 with a diameter d smaller than the diameter D of the ball 30 so as to prevent the ball from coming out of the drum 4 completely. The ball 30 is forced by the lateral surface 16 of the cylinder 5 to a position in which it projects from the drum 4. Each of the arms 28 has a corresponding seat 32, in one or other of which the portion of the ball 30 which projects from the drum 4 is engaged (Figure 7) so as to prevent the release of the drum 4 from the bush 22.

According to a preferred embodiment, the collar 26, the bush 22 and the drum 4 are shaped externally in a manner such that, when they are joined together as described above, they form a cylindrical body 35 (Figure 5).

The locking cylinder 5 and the bolt 8 are connected by a connection element 33 which has a fork-shaped end 34 inserted in the holes 9 in the bolt 8 and a second, key-shaped end 43 engaged in a corresponding frontal key seat in the end 14 of the cylinder 5.

The bush 22 advantageously keeps the connection element 33 in position with the end 34 inserted in the holes 9 in the bolt even when the drum 4 is released from the bush 22, as will become clearer from the following description.

The lock 1 is mounted with the cylindrical body 35 inserted in a hole formed in the thickness of a front wall 37 of the drawer 42 so that the bolt support 7 is in abutment with the wall 37. A plurality of fixing screws then fix the bolt support 7 to the wall 37 and hence the lock 1 to the drawer 42.

When the lock 1 is in operation, the locking cylinder 5 is rotated in the drum 4 by the insertion and rotation in the keyhole 18 of a key 38 having, as stated above, a notched profile such as to move the pins 21 against the action exerted thereon by the springs 17 until all of the radially outermost pins 21 of each pair of pins 21 are housed in the thickness of the drum 4 and all of the radially innermost pins 21 of each pair of pins 21 are housed in the thickness of the cylinder 5 (Figure 6). During the rotation of the cylinder 5 in the drum 4, the ball 30 is constantly urged into the projecting position by the lateral surface 16 of the cylinder 5 so as to prevent the release of the drum 4 from the bush 22 (Figure 7). It is important to underline that, when the keyhole notch 18 is positioned angularly facing the hole 31 in the drum 4, the ball 30 is nevertheless forced into the aforesaid projecting position by the back 36 of the key 38 (Figure 8).

The rotation of the cylinder 5 is transmitted to the connecting element 33 which, by rotating in the holes 9 in the bolt 8, moves the bolt 8 from the retracted position to the projecting position in which it engages the corresponding bolt seat 10 formed in the drawer 2 so as to prevent the opening of the drawer 42, and vice versa.

The lock 1 is also equipped with a release key 39 having a notched profile such as to enable the locking cylinder 5 to be rotated in the drum 4 in exactly the same way as described for the key 38. A recess 40 is advantageously formed in the back 41 of the release key 39 for housing the ball 30 in a retracted position inside the drum 4 when the keyhole notch 18 is positioned angularly facing the hole 31 in the drum 4 (Figure 3). The drum 4 containing the locking cylinder 5 and the entire locking-unlocking mechanism 6 of the lock 1 can thus be released from the bush 22 which is fixed to the drawer 42.

The drum 4 advantageously enables the locking-unlocking mechanism 6 of the lock to be kept intact even when it is released from the remaining parts of the lock 1 (Figure 2).

Similarly, in order to engage the drum 4 with the bush 22, it is necessary to insert the release key 39 in the keyhole 18, to rotate the cylinder 5 in the drum 4 until the keyhole notch 18 is facing the hole 31 in which the ball 30 is inserted, to insert the mating portion 29 of the drum 4 between the arms 28 of the bush 22 until the key-shaped end 43 of the connection element 33 is inserted in the key seat in the cylinder 5, to rotate the cylinder 5 in the drum 4 so that the ball 30 is urged into its projecting position for engaging the corresponding seat 32 in the bush 22 by the lateral surface 16 of the cylinder 5 and to remove the release key 39 from the keyhole 18.

The engagement/release of the drum with/from the bush 22 is substantially equivalent to a normal operation of the lock 1 except that, instead of a normal operating key 38, it is necessary to use a release key 39. The release key 39 is preferably a universal key or passe-partout and has a notched profile such as to enable fitted locks with different locking-unlocking mechanisms to be operated so that drums having different locking-unlocking mechanisms can be engaged/released with a single release key.

The parts of the lock such as the bolt closure device, the connection element and the bush can advantageously be fitted to the drawer during the manufacture of the drawer, whereas the drum can be engaged on the bush after the cabinet has been positioned in its final appointed place, together with the other items of furniture. This enables drums comprising locking-unlocking mechanisms operable by the same key to be fitted on all those items of furniture for which they are required by the customer, without the need to worry about this problem during their manufacture.

As can be appreciated from the description, the cylinder security lock according to the invention satisfies the requirements referred to in the introductory portion

of the present description and at the same time overcomes the disadvantages mentioned with reference to the prior art.

Another advantage of the security lock according to the invention lies in the fact that it enables the locking-unlocking mechanism of the lock to be kept intact even when the drum is released from the remaining parts of the lock.

A further advantage of the security lock according to the invention lies in the fact that it enables the drum of the lock to be replaced easily and quickly even after a prolonged period of use.

Yet another advantage of the security lock according to the invention lies in the fact that it is structurally and functionally simple so that it can be expected to have a life at least equal to that of the locks of the prior art.

Naturally, in order to satisfy specific and contingent requirements, an expert in the art may apply many modifications and variations to the security lock described above, all of which, however, are included within the scope of protection of the invention as defined by the following claims.

Thus, for example, the lock could be of the cylinder type with disks, in this case enabling the entire drum to be removed in order to overcome the problem referred to in relation to the prior art.

The coupling means which enable the drum to be engaged with/released from the remaining parts of the lock may be replaced by other means structurally and/or functionally equivalent to those described, and the bush may be formed integrally with the bolt support.

The bolt may be replaced by other known closure systems such as, for example, those with rods and hooks used for locking cabinet doors.

Moreover, the lock described above could be used for locking a movable part to a fixed part of a structure to be locked other than an item of furniture, such as, for example, doors on motor-car dashboards or doors of letter boxes in blocks of flats.

Claims

1. A cylinder security lock for locking a movable portion (42) to a fixed portion (44) of a structure (2) to be locked, particularly of a cabinet or of items of furniture in general, of the type comprising a mechanical closure device (3) fixed to one (42) of the movable portion (42) and the fixed portion (44), a drum (4) associated with the mechanical closure device (3) and a locking cylinder (5) housed in the drum (4) and rotatable therein by means of a key (38; 39) in order to operate the mechanical closure device (3) to engage it with the other (44) of the said movable portion (42) and fixed portion (44), characterized in that it comprises releasable coupling means between the drum (4) and the mechanical closure device (3).

2. A lock according to Claim 1, characterized in that the coupling means comprise at least one engagement element (30) movable between a retracted position inside the drum (4) and a projecting position in which the engagement element (30) projects from an end portion (29) of the drum (4) and engages corresponding means associated rigidly with the mechanical closure device (3). 5

3. A lock according to Claim 2, characterized in that the corresponding means comprise a bush (22) having a first end (23) fixed to the mechanical closure device (3) and a second end (27) in which the end portion (29) of the drum (4) is inserted forming a male and female connection and in which a seat (32) is formed for housing the at least one engagement element (30) in the projecting position. 10
15

4. A lock according to Claim 2 or Claim 3, characterized in that the engagement element (30) is housed slidably in a through-hole (31) formed in the thickness of the lateral wall of the end portion (29) of the drum (4) and is forced into the projecting position by the locking cylinder (5). 20
25

5. A lock according to Claim 4, characterized in that it comprises a first key (38) which is inserted in a keyhole (18) of the locking cylinder (5) in order to rotate the locking cylinder (5) in the drum (4), and which is adapted to force the engagement element (30) into the projecting position by means of a back portion (36) when the keyhole notch (18) in the lateral surface (16) of the locking cylinder (5) is positioned facing the engagement element (30). 30
35

6. A lock according to Claim 4, characterized in that it comprises a second key (39) which is inserted in a keyhole (18) of the locking cylinder (5) in order to rotate the locking cylinder (5) in the drum (4), and which has a recess (40) formed in a back portion (41) for housing the engagement element (30) in the retracted position when the keyhole notch (18) in the lateral surface (16) of the locking cylinder (5) is positioned facing the engagement element (30). 40
45

7. A lock according to Claim 4, characterized in that the engagement element is a ball (30).

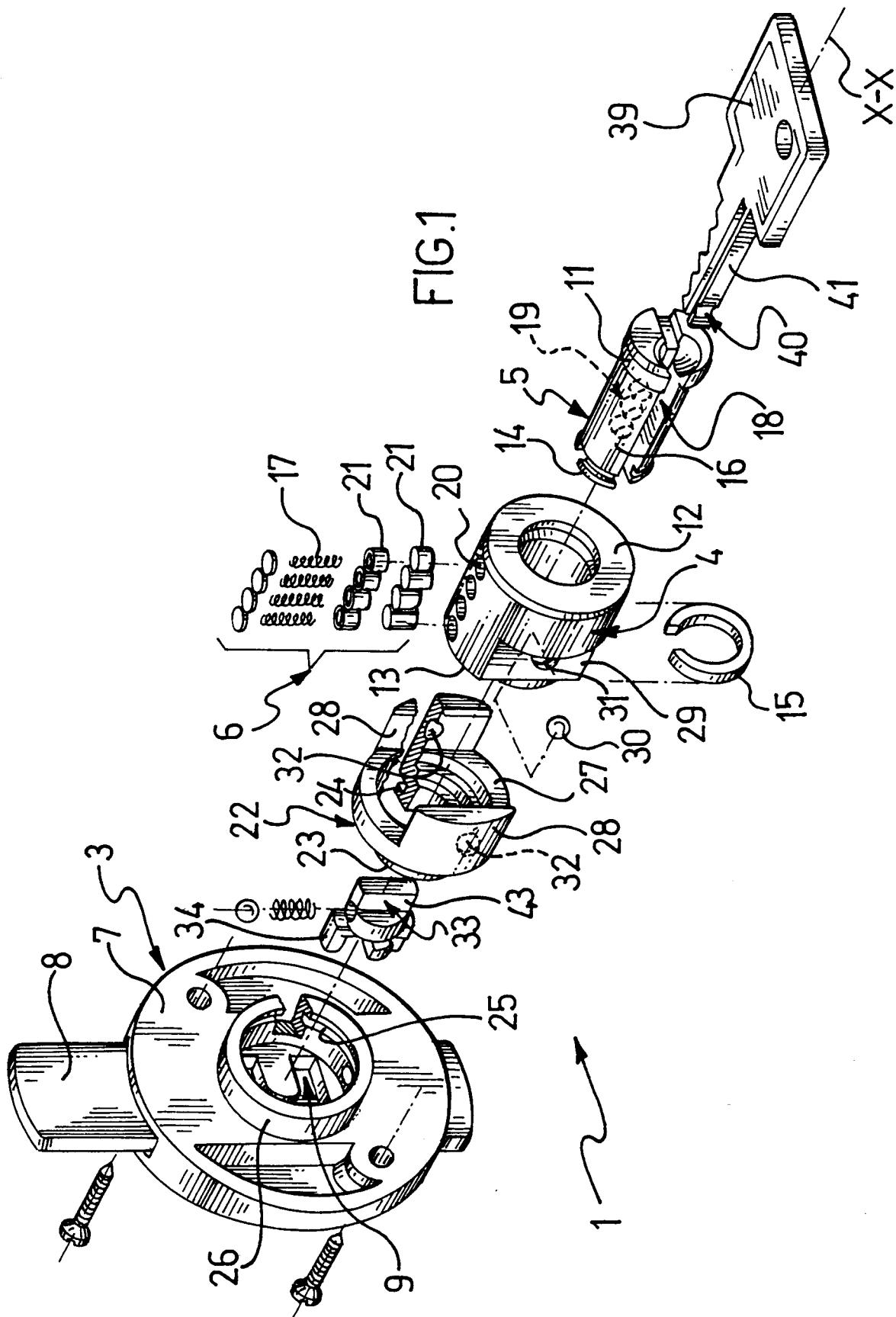
8. A lock according to Claim 7, characterized in that the through-hole (31) comprises a portion adjacent the external surface of the drum (4) having a cross-section (d) smaller than the diametral section (D) of the ball (30). 50

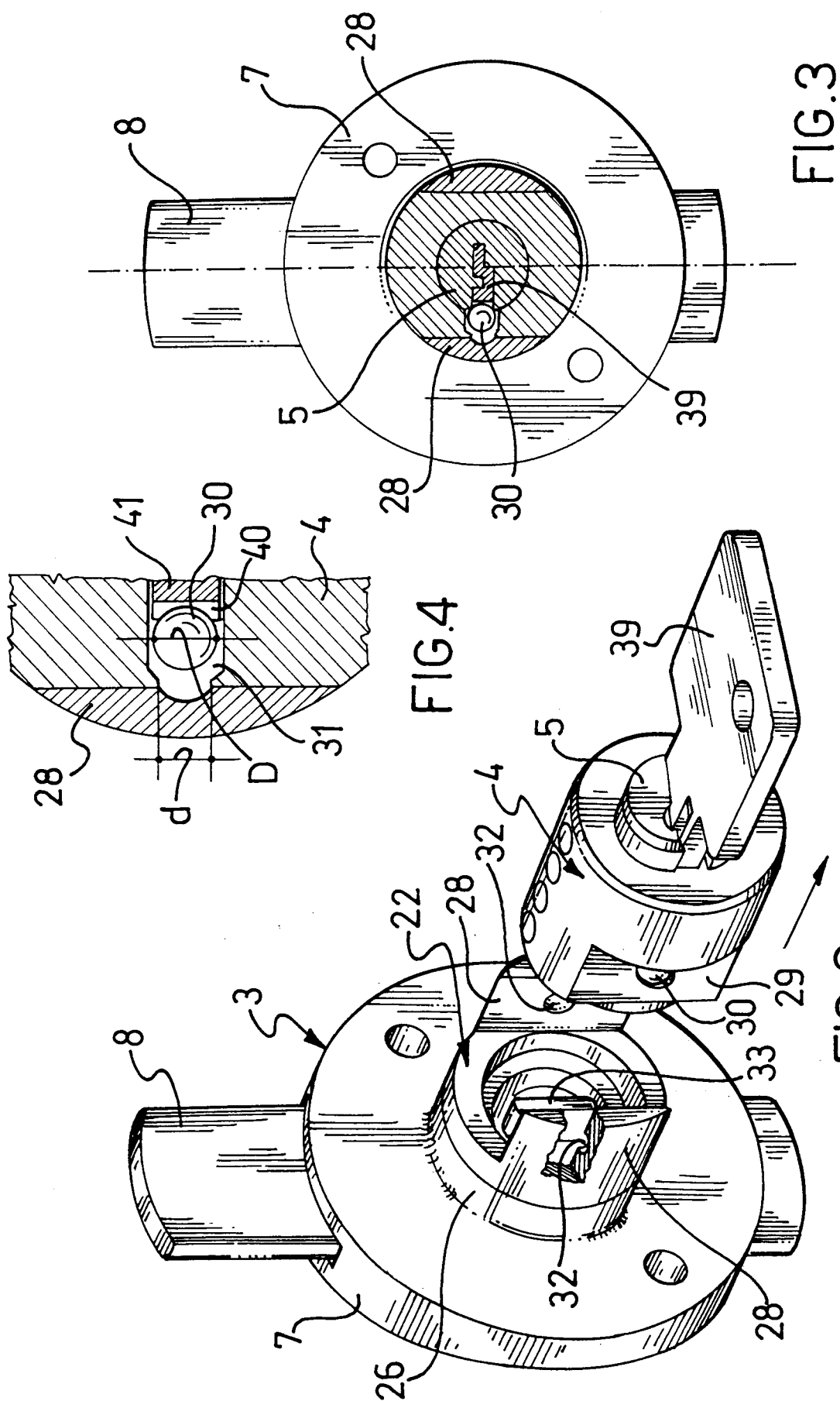
9. A lock according to Claim 1, characterized in that the mechanical closure device (3) comprises a bolt (8) supported for sliding in a bolt support (7) fixed to the said one (42) of the movable portion (42) and the fixed portion (44). 55

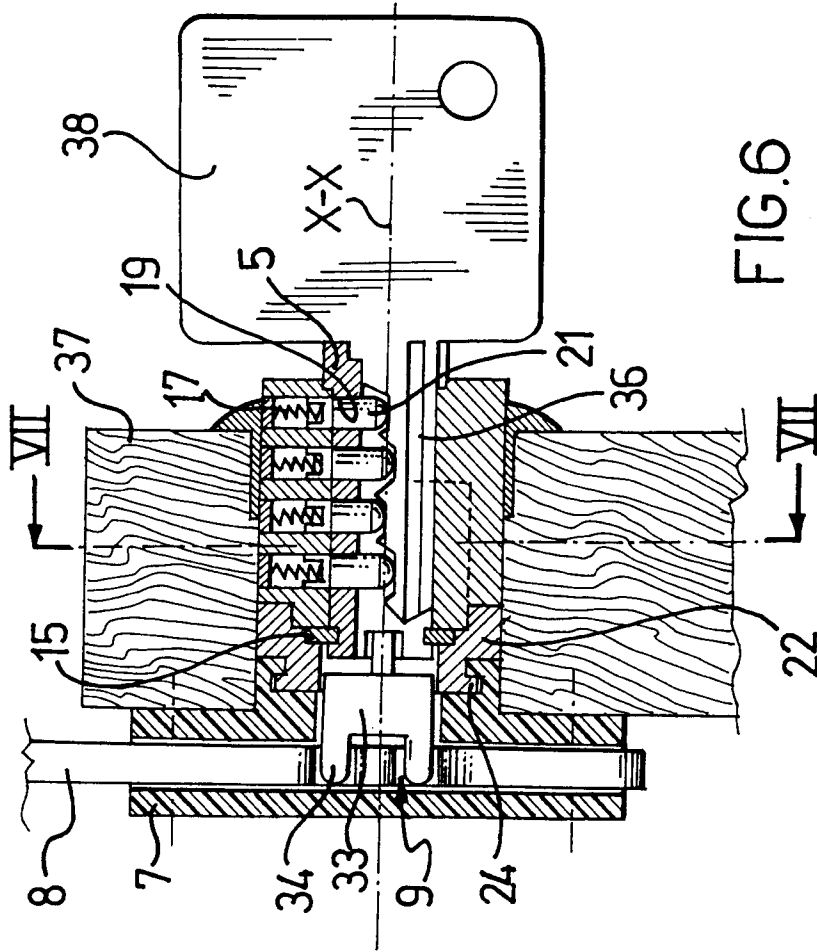
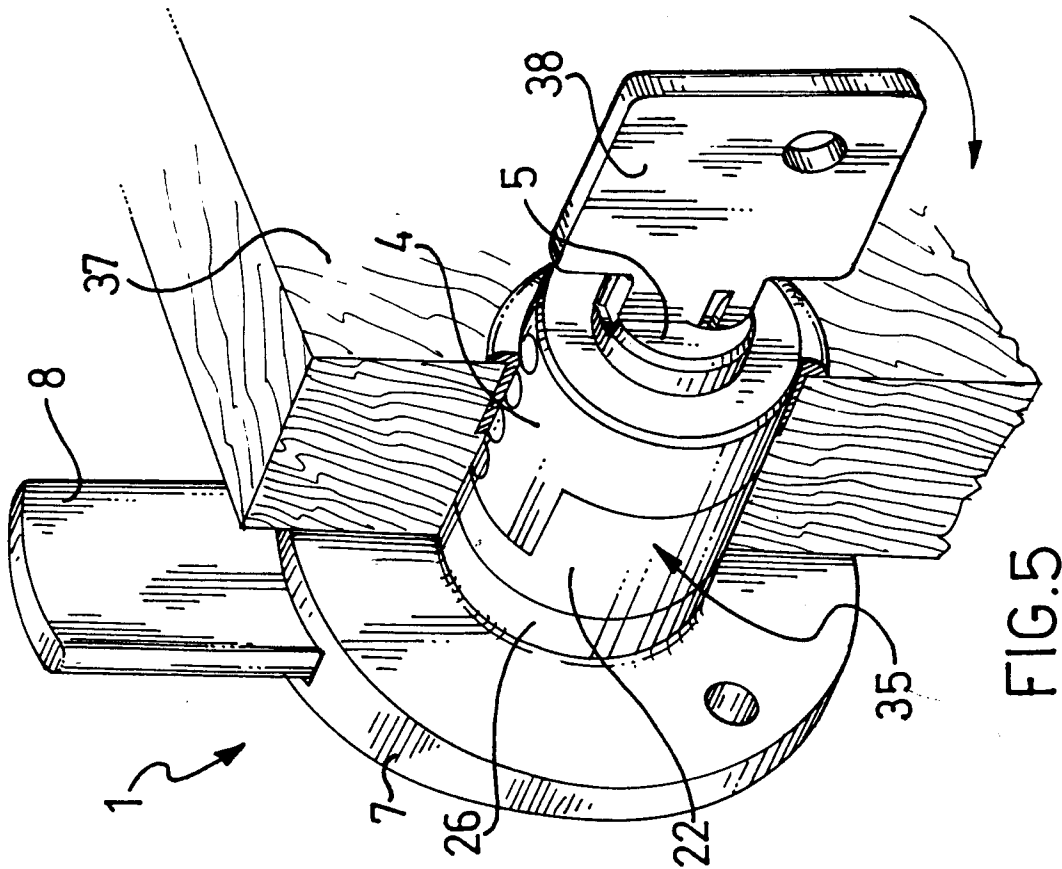
10. A lock according to Claims 3 and 9, characterized in that the first end (23) of the bush (22) is snap-engaged on a collar (26) of the bolt support (7).

11. A lock according to Claim 9, characterized in that the mechanical transmission comprises a connection element (33) having a first fork-shaped end (34) engaged in holes (9) in the bolt (8) and an opposite, key-shaped end (43) engaged in a corresponding frontal key seat in the locking cylinder (5).

12. A lock according to any one of the preceding claims, characterized in that the lock is of the cylinder type with pins (21).







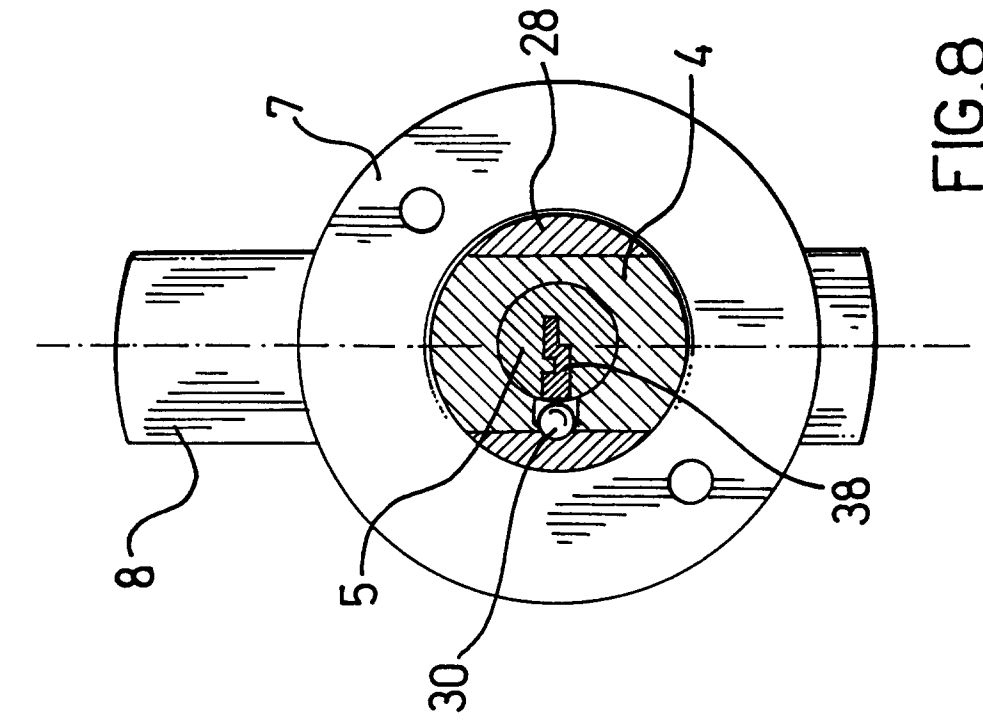


FIG. 7

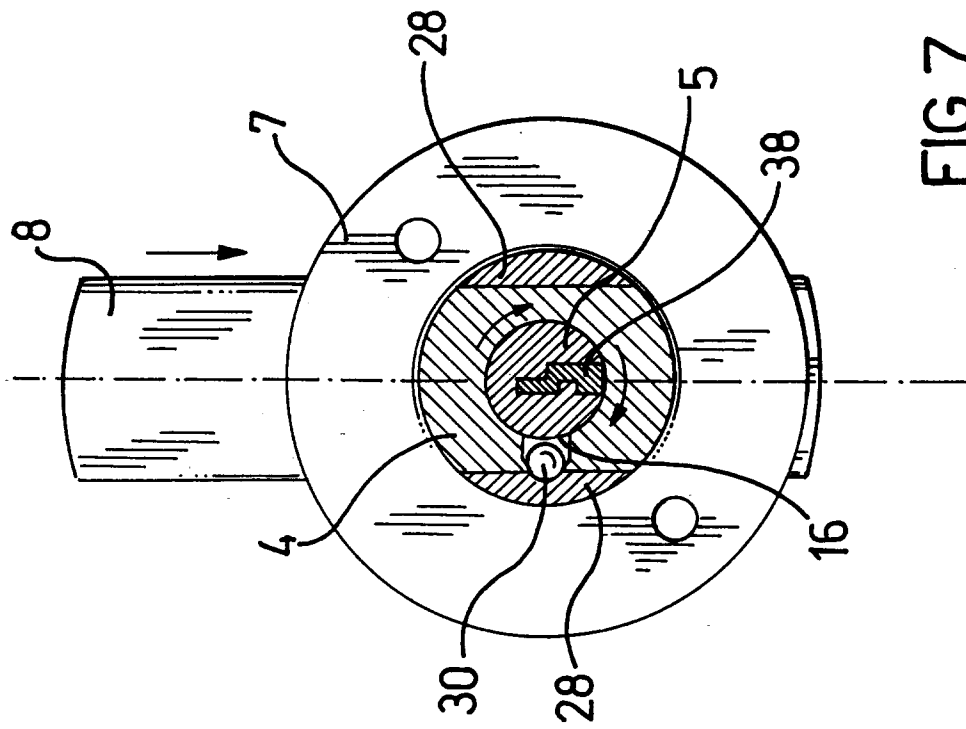


FIG. 8

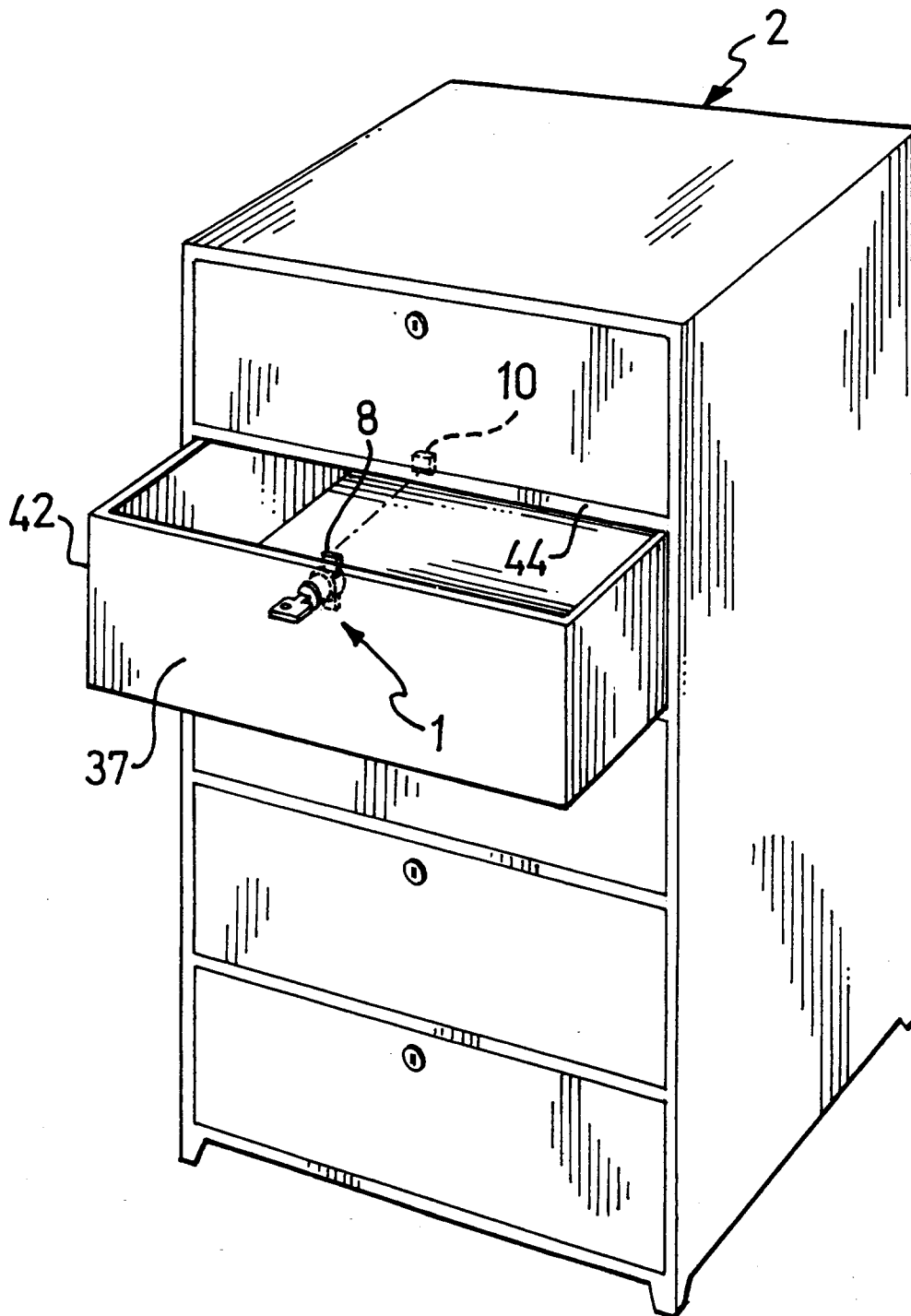


FIG.9



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EUROPEAN SEARCH REPORT

Application Number
EP 95 83 0469

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	AT-B-340 269 (FRANZ GEISENBERGER & SÖHNE) * the whole document * ---	1	E05B65/44
A	DE-U-16 15 392 (H. WACKERMANN) * claim 3; figures 1,2 * ---	1,12	
A	US-A-1 599 150 (C. A. TAILLEFER) * the whole document * ---	1,12	
A	US-A-4 306 431 (C. E. CRAIG) * the whole document * -----	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E05B
The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
BERLIN		11 April 1996	Krabel, A
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