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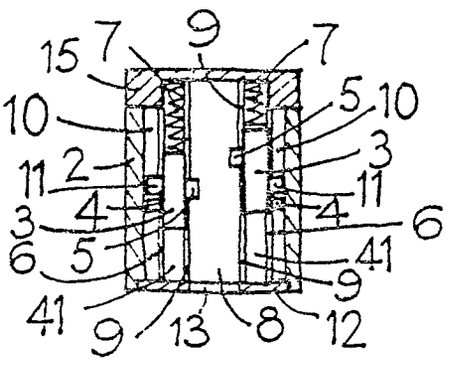
(54) Cylindrical locks.

(57) A cylindrical lock has a barrel (1) turnable in a cylinder (2), the barrel (1) carrying 5 longitudinally orientated rods (3) in slotted holes (41), each rod (3) having a stop (4) at a selectable position to establish a combination and a tab (5) at a further selectable position to establish a further combination, the rods (3) slideable in the slotted holes (41) and spring loaded (7), the stops (4) entering longitudinally arranged grooves (10) in the inner surface of the cylinder (2) to normally lock the barrel (1) irrotationally in the cylinder (2) but moveable on application of a key (16) with correct combination to bring the stops (4) in line with a single circumferentially arranged groove (11) in the inner surface of the cylinder (2) to free the barrel (1) and allow its rotation in the cylinder (2) in an unlocked state. A front plate (12) with a slotted hole (13) retains the key (16) in the lock until it is turned to the position in which it was initially inserted.

FIG. 7



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CYLINDRICAL LOCKS

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to locks, more particularly to locks of the barrel and cylinder type.

Thieves today have acquired the lock picking tools and the skills for use of them on a sufficiently wide scope to create a significant demand for locks of enhanced security. Such thieves are able to pick a barrel and cylinder type lock very quickly. In particular this type of lock is commonly used for motor vehicle doors and ignition switches and motor vehicle thefts are now increasingly commonly carried out in this manner.

2. Description of the related art.

U.S. 4100777, P.A.G. Fredon, discloses a lock and key combination, the key having a series of axially arranged pegs co-operating with holes in the lock as well as a central blade co-operating with a similar shaped aperture in the lock.

U.S. 3992907, A. Pilvet, discloses a lock in which cylindrical spring-loaded pin members are located in a rotatable barrel on axes parallel with but spaced from the central axis of rotation, a key having rods of appropriate lengths to displace the pins axially and compress the springs to bring the waists of the pins into registration with a clutch control plate.

U.S. 3817066, R.S. Pearson, discloses a cylinder type lock having two coaxial cylinders, and a rotatable cylinder slideably mounting a plurality of tumblers. The inner wall of the outer cylinder has a radial opening as a terminal for the tumblers when a key inserted into the lock contacts various pusher elements and positions all the associated tumblers at the terminal simultaneously.

G.B. 1503526, Danilin et al, discloses a lock and key combination, the lock having a plurality of different length pins located in bores of the housing co-operating with a key having pins of varying length, the combined length of each key pin in the bore together with the tumbler pin being equal to the length of the through bore thereby displacing the pins in the housing and of the through bores in the drum and allowing the drum to be rotated to unlock the lock mechanism.

SUMMARY OF THE INVENTION

A lock in accordance with this invention comprises a barrel turnable in a cylinder, a plurality of rods with rod formations at selected positions establishing a combination, the rods slideably located in slotted holes arranged longitudinally in the barrel, the rod formations projecting through the slots of the slotted holes into the inner surface of the cylinder and movable by application of the appropriate combination to coincide with a circumferentially disposed cylinder formation in the inner surface of the cylinder and permit rotation of the barrel in the cylinder, the rods including tabs located at selected positions establishing a further combination and acted on by a suitable key of the appropriate combination.

Preferably the tabs project radially inwardly through slots of the slotted holes into the key hole.

A further preferred or alternative feature is that the lock includes a key retaining plate, preferably a front plate, having a slotted hole adapted to retain the key in the lock except when the key is rotated to the insertion and withdrawal position.

The rods must be predisposed to adopt a position in which the rod formations do not coincide with the circumferentially disposed cylinder formation until the correct combination is applied, for example, by means of a key. For example, the rods are preferably spring loaded axially.

The rod formations may comprise stops which project through the slots into longitudinally disposed grooves in the inner surface of the cylinder and the circumferentially disposed cylinder formation a circumferentially disposed groove in the inner surface of the cylinder.

As an alternative to the use of stops on the rods which co-operate with a circumferentially disposed groove in the cylinder a mechanical inversion can be employed thus in place of each stop a gap in a wing where a stop would be, the wing longitudinally slideable in a longitudinal slot in a circumferentially disposed notch in the inner surface of the cylinder when the circumferentially disposed groove would be. The mechanical locking and unlocking effect is the same.

The barrel is in an optional security enhanced embodiment provided with radially oriented tumblers of conventional kind operated on by a key having conventional formations simultaneously with the key operating on the rods with stops.

The number of rods may be varied as well as their disposition in the barrel thereby increasing the effective number of different combinations. Although the rods may be round, non circular cross sectional shapes will also allow an increase in the effective number of combinations.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be more fully described by way of examples with reference to the accompanying drawings in which :

Figure 1 is an isometric view of a lock and key in accordance with the preferred embodiment of the invention,

Figures 2, 3 and 4 are rear elevation, plan view and front elevation respectively of the lock,

Figure 5 is a cross sectional plan view on Section V - V shown in figure 6,

Figure 6 is a cross sectional elevation of the lock on section VI - VI shown in figure 5,

Figure 7 is a cross sectional plan view on Section VII - VII shown in figure 6,

Figure 8 is an elevation of the key, and

Figure 9 is a plan view of the key.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

As shown in the drawings the lock comprises a barrel 1 turnable in a cylinder 2 and five rods 3 each carrying a stop 4 at selected positions establishing a combination. Each rod 3 furthermore comprises tabs 5 further establishing combinations. The rods 3 are slideably located in holes 41 arranged longitudinally in the barrel 1 with the stops 4 projecting through slots 6 which communicate with the holes 41 thus establishing slotted holes. The rods 3 are spring loaded by springs 7 so as to normally take up the advantages of having both the stops 4 and tabs 5 in accordance with combinations unique to each lock are two-fold, firstly that the number of potential combinations is increased and secondly that the distance of the tabs 5 down the keyhole 8 of the lock is variable in the lock position, thus further increasing the difficulty of the lock picker to estimate what must be done in order to pick the lock. The holes 41 are thus slotted not only outwardly by the slot 6 but also inwardly by slots 9 which permit the tabs 5 to extend from the rods 3 into the keyhole 8. The cylinder 2 has longitudinally running grooves 10 in which the stops 4 run and which will hold the barrel in the cylinder in a locked irrotational state until the correct combination key is applied. A circumferential groove 11 runs around the inside of the cylinder 2 and when the correct combination is applied all of the stops 4 coincide with the groove allowing the lock to be unlocked and rotated freely by the key. The cylinder 2 has a front plate 12 fixed to it having a hole 13 with slot 14 to receive the key. The barrel 1 has fitted to its end terminal a portion 15 which rotates with the barrel 1 when the lock is unlocked and to this portion can be attached operative components such as a tab, flange, plate or other component to be controlled by the lock. The key 16 has a longitudinally running ridge 17 which is broken at 18 short of the boss 19 of the key. When the key is inserted it cannot be rotated because of the front plate 12 until the ridge 17 is entirely within the front plate and the gap 18 then allows the key to be rotated and it then cannot be withdrawn until it is turned back again to the position in which it was first inserted. The distal end of the key has a number of grooved formations 20 formed in it which correlate to the combination of the lock which the key is to open. The length of each groove along the key shaft relates to the combination and is selected to push the tab 5 of each rod 3 just the right amount to bring the stop 4 in each case into line with the circumferential groove 11.

Claims

1. A lock which comprises a barrel turnable in a cylinder, a plurality of rods with formations at selected positions establishing a combination, the rods slideably located in slotted holes arranged longitudinally in the barrel, the formations projecting through the slots of the slotted holes into recesses in the inner surface of the cylinder the rods movable by application of a key of the appropriate combination for the formations to coincide with a circumferentially disposed formation in the inner surface of the cylinder and permit rotation of the barrel in the cylinder.

2. A lock as claimed in claim 1, in which the formations on the rods are stops which project through the slots into longitudinally disposed grooves in the inner surface of the cylinder and the circumferentially disposed formation in the inner surface of the cylinder is a groove.

3. A lock as claimed in claim 1, in which the formations on the rods are gaps in wings which project through the slots into recesses in the inner surface of the cylinder and the circumferentially disposed formation in the inner surface of the cylinder is a circumferential ridge, the wings intercepting the ridge in longitudinally disposed slots.

4. A lock as claimed in claim 1, in which the rods carry radially inwardly directed tabs movable in longitudinally directed slots, which tabs penetrate the front surface of the lock to be acted on by combination established by longitudinally directed formations of a key.

5. A lock as claimed in claim 4, with a key which comprises a rod having pins formed around its surface, the pins being of variable axial length establishing a combination and adapted to engage the tabs to release the lock when the rod of the key is inserted into the lock.

6. A lock as claimed in claim 4, with a key which comprises a rod having grooves around its surface of variable axial length establishing a combination and adapted to engage the tabs to release the lock, which tabs project for this purpose into a hole in the lock into which the rod of the key is inserted.

7. A lock as claimed in claim 1, in which the barrel is provided with radially oriented tumblers of conventional kind operated on by a key simultaneously with the key operating on the rods with stops.

FIG.

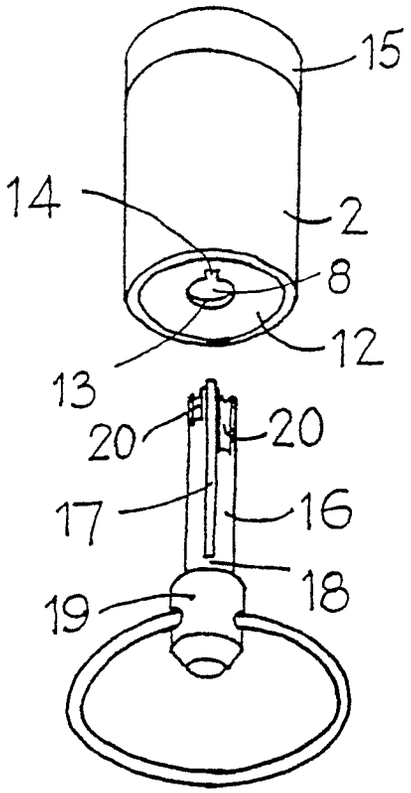


FIG. 2

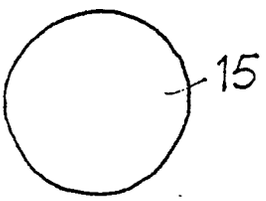


FIG. 3

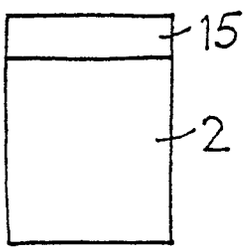


FIG. 4

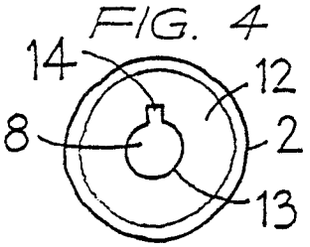


FIG. 5

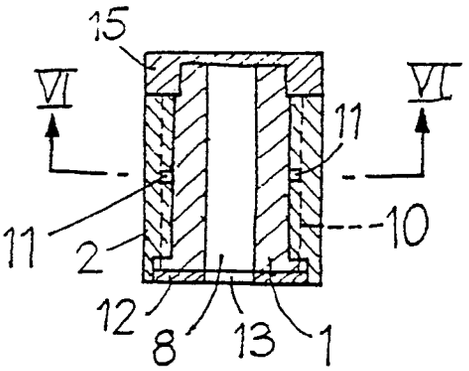


FIG. 6

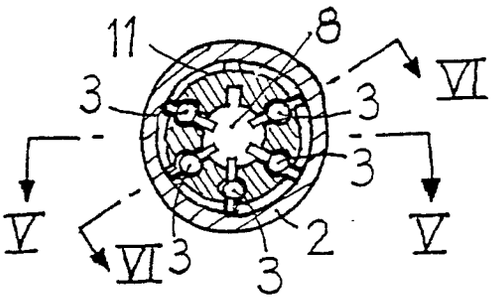


FIG. 7

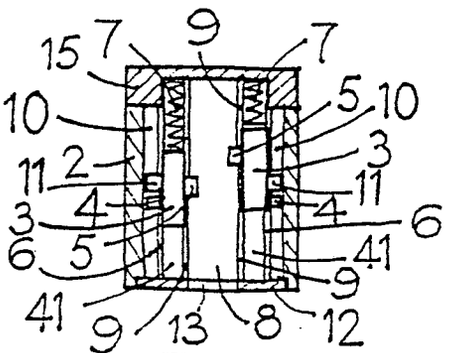
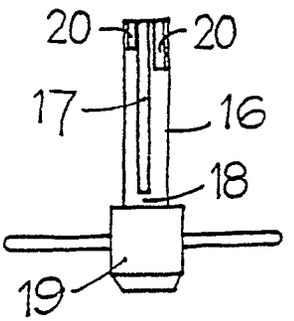


FIG. 8

FIG. 9



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EUROPEAN SEARCH REPORT

Application Number

EP 88 30 7564

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.4)
X	DE-A-2 800 374 (B.R. PERKUT) * complete document *	1,2,4-7	E 05 B 27/08
X	FR-A-2 343 107 (INITIAL) * figure 10; page 18, lines 22-38; page 19, line 1 *	1,3	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

E 05 B 27/00

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
BERLIN	29-03-1989	KRABEL A.W.G.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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