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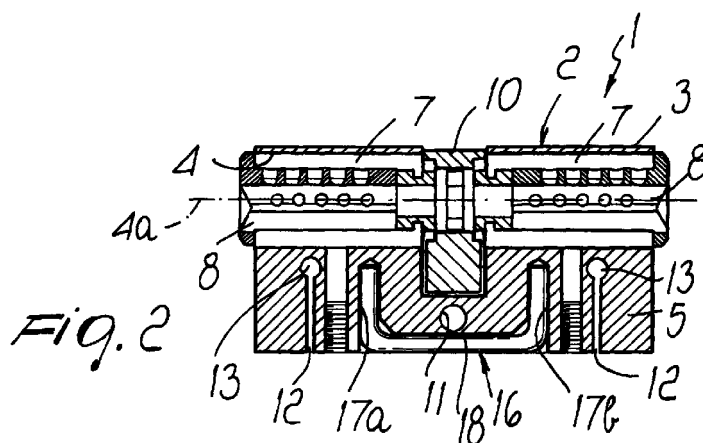
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(54) **High security plug for cylinder-type secure locks**

(57) A plug for cylinder-type secure locks with high security against the risk of effractions comprising a plug body (2) inside which there is a cylindrical seat (4) and which is provided with a wing (5) which lies on a plane passing through the axis (4a) of the cylindrical seat (4). The body (2) has, in an intermediate region of its extension, parallel to the axis (4a) of the cylindrical seat (4), a recess (6) provided at the region of the body (2) in which the cylindrical seat (4) is formed and partially extending in the wing (5). The cylindrical seat (4) is suitable to accommodate an opening-closure mechanism with two

mutually opposite drums (7) and cylinders (8) which acts on an actuation element (10) interposed between the two drums (7) and accommodated in the recess (6). The body (2) has, on its wing (5), in the region between the recess (6) and an end of the body (2) along the axial extension of the cylindrical seat (4), a discontinuity (12) which runs from the side of the wing (5) that lies furthest from the cylindrical seat (4) toward the cylindrical seat (4).



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Description

[0001] The present invention relates to a plug for cylinder-type secure locks with high security against the risk of effractions.

[0002] It is known that in cylinder-type secure locks, the actuation element, by means of which the opening or closure movement of the bolt or bolts of the lock is achieved, is supported by an element commonly known as plug or interchangeable plug, which is stably fixed to the body of the lock.

[0003] The interchangeable plug generally has a body provided with a substantially cylindrical portion, inside which there is a cylindrical seat, and a wing-shaped portion extending along the lateral surface of the cylindrical portion on a plane that passes through the axis of the cylindrical seat. Said body has, in an intermediate region of its extension, in a direction which is parallel to the axis of the cylindrical seat, a recess which extends over the cylindrical portion and a region of said wing. The cylindrical seat is divided by said recess into two parts, each of which accommodates the mechanism for opening and closing the lock by means of the key. More particularly, each one of the two portions into which the cylindrical seat is divided by the intermediate recess accommodates a drum, which is likewise cylindrical and in turn accommodates a cylinder which has, starting from its axial end directed toward the outside of the cylindrical seat, a keyhole. The cylinder is connected to the drum by means of precisely sized pins having appropriately diversified lengths, which are orientated at right angles to the axis of the cylindrical seat and are pushed by suitable springs toward the axis of the cylinder.

[0004] Each cylinder is connected to the actuation element so that a rotation of the cylinder causes a rotation of the actuation element, which acts on the bolt or bolts of the lock.

[0005] In practice, if the key is not present inside the keyhole formed in the cylinder, the cylinder is locked, in its rotation about its axis, with respect to the drum, while the insertion of a suitable key causes the movement of said pins, releasing the cylinder and thus allowing to turn the cylinder, and therefore the actuation element, by means of said key with respect to the drum so as to open or close the lock.

[0006] These interchangeable plugs are generally fixed to the lock body by means of a screw which engages a threaded hole formed in the region of the wing of the plug in alignment with the recess that accommodates the actuation element.

[0007] The presence of the recess in which the actuation element is accommodated and the presence of the threaded hole at said region makes it the mechanically weakest region of the entire plug.

[0008] For this reason, if an axial end of the plug, during the assembly of the lock, protrudes even slightly from one face of the door, window or other element to

be locked by means of the lock, it is possible to break the plug at said region by clamping the protruding portion and acting on the plug with a force orientated at right angles to the plane on which the wing of the plug lies. By breaking the plug it is possible to remove the clamped portion of the plug and thus open the lock without the corresponding key.

[0009] In order to solve this possible effraction problem, it has been suggested to introduce reinforcement laminas fixed by means of pins or rivets to the remaining part of the plug body at said breakable region.

[0010] However, the application of said reinforcement laminas considerably affects the overall costs of production of these kinds of plug.

[0011] As an alternative, it has also been suggested to use a U-shaped reinforcement element to be inserted within an appropriately provided seat which is formed in the wing of the plug, so as to straddle the breakable region. Although this refinement hinders the separation of one portion of the plug, it is not able to prevent its breakage, also because the presence of the seat for the U-shaped element further reduces the resisting cross-section of the plug at said recess.

[0012] The aim of the present invention is to solve the above noted problems, providing a plug for cylinder locks which is highly secure against breakage in case of effraction attempts.

[0013] Within the scope of this aim, an object of the invention is to provide a plug for cylinder locks which effectively contrasts breakage at the region in which the recess for the actuation element of the lock is provided.

[0014] Another object of the invention is to provide a plug for cylinder locks which can be manufactured at competitive costs.

[0015] Another object of the invention is to provide a plug for cylinder locks which can be installed without problems in conventional locks as a replacement of currently commercially available plugs.

[0016] These and other objects which will become better apparent hereinafter are achieved by a plug for cylinder-type secure locks, comprising a plug body inside which there is a cylindrical seat, said plug body being provided with a wing which lies on a plane passing through the axis of said cylindrical seat and having, in an intermediate region of its extension parallel to the axis of said cylindrical seat, a recess provided at the region of said body in which said cylindrical seat is formed and partially extending in said wing; said cylindrical seat being suitable to accommodate an opening-closure mechanism with two mutually opposite drums and cylinders which acts on an actuation element interposed between the two drums and accommodated in said recess, characterized in that said body has, on said wing, in the region between said recess and an end of said body along the axial extension of said cylindrical seat, a discontinuity which runs from the side of said wing that lies furthest from said cylindrical seat toward said cylindrical seat.

[0017] Further characteristics and advantages of the invention will become better apparent from the description of a preferred but not exclusive embodiment of the plug according to the invention, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is a partially exploded perspective view of the plug according to the invention;

Figure 2 is a schematic longitudinal sectional view of the plug according to the invention;

Figure 3 is a lateral elevation view of the plug according to the invention.

[0018] With reference to the above figures, the plug according to the invention, generally designated by the reference numeral 1, comprises a plug body 2 which has a substantially cylindrical portion 3 inside which there is a cylindrical seat 4. The plug body 2 further has a wing 5 which protrudes from the lateral surface of the portion 3 on a plane which passes through the axis 4a of the cylindrical seat 4.

[0019] The body 2 has, in an intermediate region of its extension in a direction which is parallel to the axis 4a, a recess 6 which extends all over of the portion 3 and part of the wing 5.

[0020] The recess 6 divides the cylindrical seat 4 into two portions, each of which accommodates, in a per se known manner, a drum 7 and a cylinder 8.

[0021] The cylinder 8 has, starting from its axial end that is directed outward, a keyhole 9 inside which a key can be inserted.

[0022] Each cylinder 8 is connected to an actuation element 10 which in the illustrated case is constituted by a tooth designed to be connected to the bolt or bolts for closing the lock.

[0023] In a per se known manner, connecting pins are interposed between each cylinder 8 and the corresponding drum 7 and lock the cylinder 8 with respect to the drum 7 in the absence of the appropriate key and instead release the rotation of the cylinder 8 with respect to the drum 7 when an appropriate key is inserted in the keyhole 9.

[0024] A threaded hole 11 for the insertion of a screw can be formed in the region of the wing 5 that lies at the recess 6 but is not affected by said recess 6; said screw rigidly couples the plug 1 inside the body of a conventional lock, not shown for the sake of simplicity.

[0025] According to the invention, the body 2 has, on the wing 5, in the region between the recess 6 and one end of the body 2 along the direction of the axial extension of the cylindrical seat 4, a discontinuity 12 which runs from the side of the wing 5 that lies furthest from the cylindrical seat 4 toward said cylindrical seat 4.

[0026] Conveniently, the discontinuity 12 lies on a plane which is substantially perpendicular to the axis 4a of the cylindrical seat 4.

[0027] Preferably, the wing 5 has a discontinuity 12

in each one of the two regions of the wing 5 between the recess 6 and the two ends of the body 2 along the axial extension of the cylindrical seat 4.

[0028] The discontinuity 12 is preferably constituted by a slit in the wing 5.

[0029] Said discontinuity 12 ends, toward the cylindrical seat 4, with a radiused region 13 which can be simply and conveniently constituted by a hole whose axis is perpendicular to the plane on which the wing 5 lies and which has a larger diameter than the width of the slit that constitutes the discontinuity 12.

[0030] The radiused region 13 is designed to eliminate breakage initiation regions at the end part of the discontinuity 12.

[0031] Advantageously, the plug according to the invention further comprises a reinforcement element 16 which is U-shaped and is inserted, with its two mutually parallel end arms 16a and 16b, in two holes 17a and 17b which extend from the side of the wing 5 that lies furthest from the cylindrical seat 4 and are orientated substantially at right angles to the axis 4a of the cylindrical seat 4. The holes 17a and 17b are arranged laterally, on mutually opposite sides, with respect to the recess 6.

[0032] The intermediate portion 16c of the reinforcement element 16 is accommodated in a recessed channel 18 which is formed on the side of the wing 5 that lies furthest from the cylindrical seat 4. Said channel 18 mutually connects the holes 17a and 17b.

[0033] The reinforcement element 16 is designed to determine a connection between the two portions of the body 2 that protrude laterally on mutually opposite sides with respect to the recess 6 and to keep them connected even if breakage occurs at the region of the wing 5 affected by the recess 6.

[0034] In practice, if the body 2 is clamped at one of its longitudinal ends, i.e., one of its ends parallel to the axis 4a, and is subjected to a force which is directed at right angles to the plane on which the wing 5 lies, said force cannot be transmitted, except to a very limited extent, to the region of the wing 5 that lies at the recess 6. For this reason, said region is protected with adequate security against breakage in case of a effraction attempt.

[0035] In practice it has been observed that the plug for secure locks according to the invention fully achieves the intended aim, since it has adequate resistance to breakage in case of effraction.

[0036] The plug thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the inventive concept; all the details may also be replaced with other technically equivalent elements.

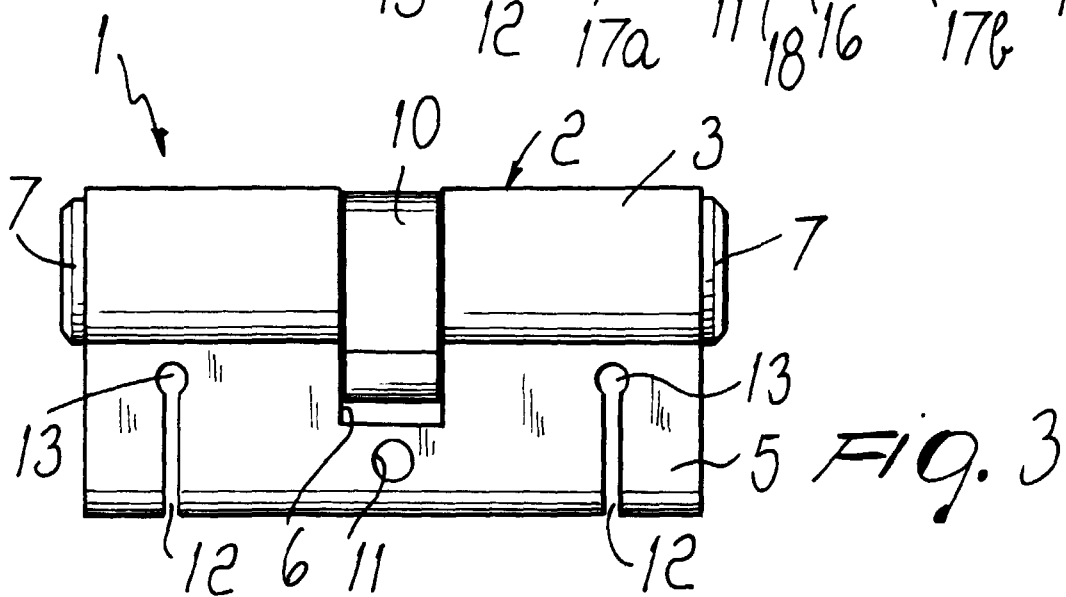
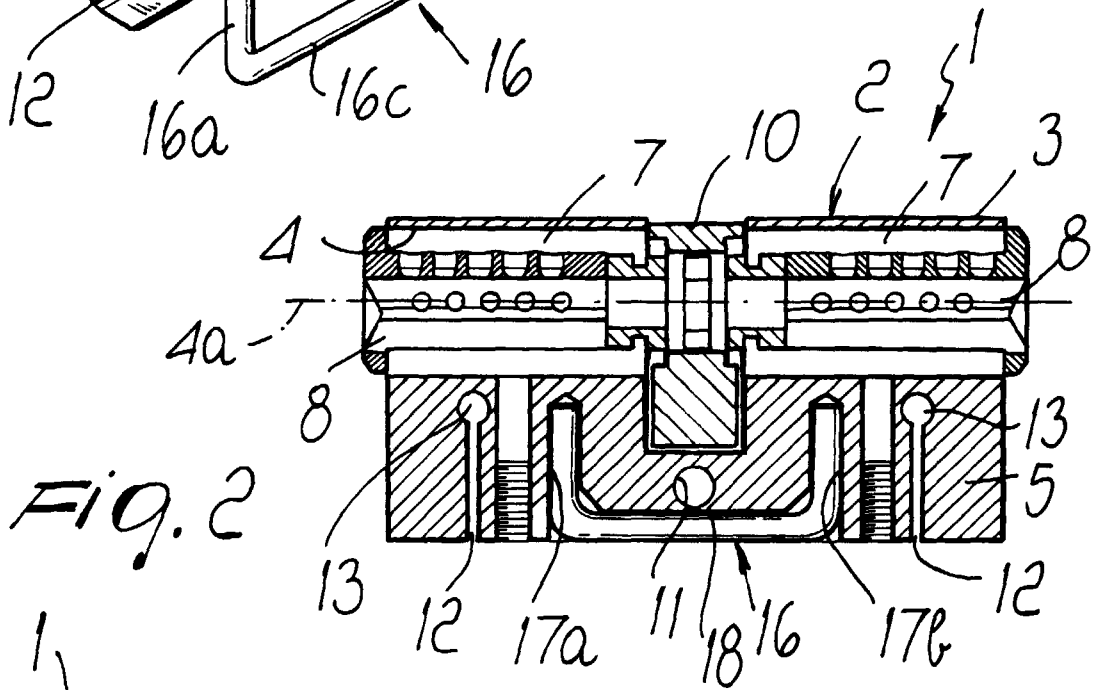
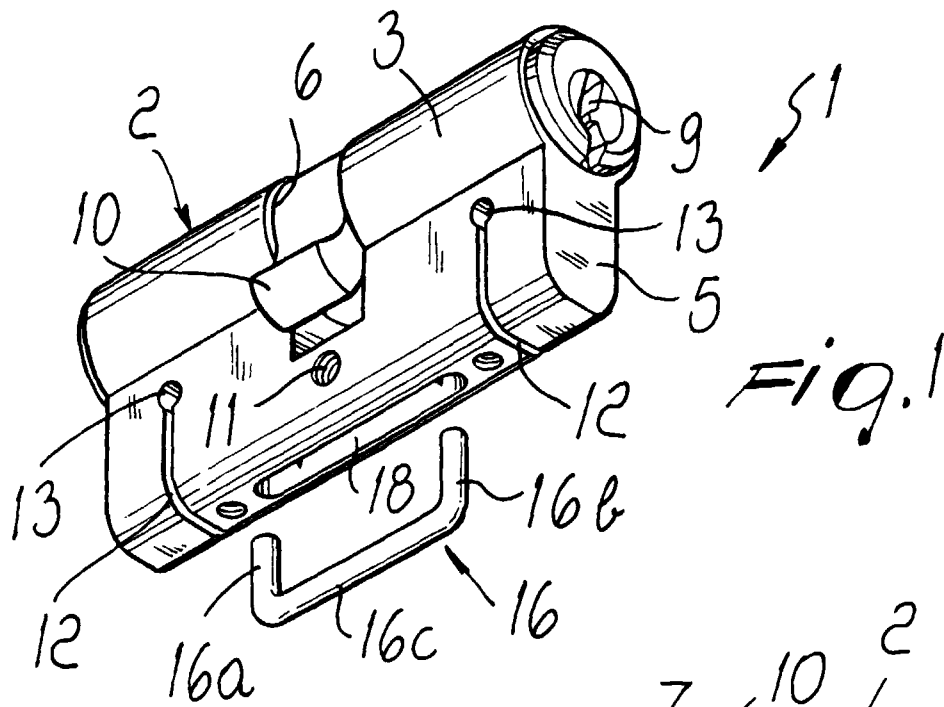
[0037] In practice, the materials used, as well as the dimensions, may be any according to requirements and to the state of the art.

[0038] The disclosures in Italian Patent Application No. MI99A001505 from which this application claims priority are incorporated herein by reference.

[0039] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly, such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

1. A plug for cylinder-type secure locks, comprising a plug body (2) inside which there is a cylindrical seat (4), said plug body (2) being provided with a wing (5) which lies on a plane passing through the axis (4a) of said cylindrical seat (4) and having, in an intermediate region of its extension, parallel to the axis (4a) of said cylindrical seat (4), a recess (6) provided at the region of said body (2) in which said cylindrical seat (4) is formed and partially extending in said wing (5); said cylindrical seat (4) being adapted to accommodate an opening-closure mechanism (7,8) with two mutually opposite drums (7) and cylinders (8) which acts on an actuation element (10) interposed between the two drums (7) and accommodated in said recess (6), characterized in that said body (2) has, on said wing (5), in the region between said recess (6) and an end of said body (2) along the axial extension of said cylindrical seat (4), a discontinuity (12) which runs from the side of said wing (5) that lies furthest from said cylindrical seat (4) toward said cylindrical seat (4).
2. The plug for locks according to claim 1, characterized in that said discontinuity (12) lies on a plane which is substantially perpendicular to the axis (4a) of said cylindrical seat (4).
3. The plug for locks according to claim 1, characterized in that said wing (5) has said discontinuity (12) in each one of the two regions of said wing (5) that lie between said recess (6) and the two ends of said body (2) in the direction of the radial extension of said cylindrical seat (4).
4. The plug for locks according to one or more of the preceding claims, characterized in that said discontinuity (12) is constituted by a slit in said wing (5).
5. The plug for locks according to one or more of the preceding claims, characterized in that said discontinuity (12) ends, toward said cylindrical seat (4), with a radiused region (13).
6. The plug for locks according to one or more of the preceding claims, characterized in that said radiused region (13) is constituted by a hole whose axis is perpendicular to the plane on which said wing (5) lies and which has a larger diameter than the width of the slit that constitutes said discontinuity (12).
7. The plug for locks according to one or more of the preceding claims, characterized in that it comprises a U-shaped reinforcement element (16) which is connected to said wing (5) and straddles the region where said recess (6) is provided.
8. The plug for locks according to one or more of the preceding claims, characterized in that said U-shaped reinforcement element (16) is inserted, with its two mutually parallel end portions (16a,16b), in two holes (17a,17b) which protrude starting from the side of the wing (5) that lies opposite said cylindrical seat (4) and are orientated substantially at right angles to the axis (4a) of said cylindrical seat (4); said holes (17a,17b) being arranged laterally, on mutually opposite sides, with respect to said recess (6); the intermediate portion (16c) of said reinforcement element (16) being accommodated in a recessed channel (18) formed in the side of said wing (5) that lies furthest from said cylindrical seat (4) and connects to each other said two holes (17a,17b).





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EUROPEAN SEARCH REPORT

Application Number
EP 00 11 3194

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
A	DE 28 22 132 A (KARRENBERG FA WILHELM) 22 November 1979 (1979-11-22) * page 3, paragraph 1 - page 5, paragraph 2; figure 1 *	1-8	E05B9/04 E05B15/16
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E05B
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 9 November 2000	Examiner Friedrich, A
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**ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 00 11 3194

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