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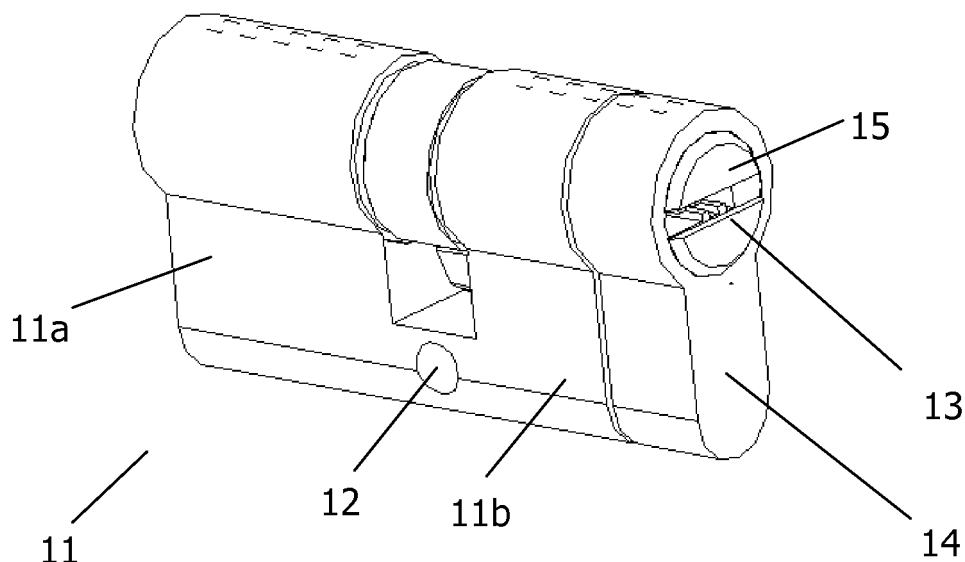
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(54) **High security lock cylinder with pre-determined breaking line**

(57) The present invention proposes a lock cylinder conventionally having two cylinder halves with respective cylinder cores and housings accommodating core pins and housing pins for sensing a key inserted into the key slot within said cylinder core. The lock cylinder core's pins being conventionally aligned to allow rotation of the plug to effect locking and unlocking by a correct key, said

core pins are spring tensioned by respective housing pins. The outer half-cylinder according to the present invention is arranged in the form of an outer part and a longitudinally longer inner part the connection between those parts being mechanically weakened and therefore firstly breakable in response to twisting forces applied by the periphery of outermost surface of said outer part.



**Fig. 1**

## Description

### Technical Field of the Invention

[0001] The present invention relates to an improved lock mechanism having a cylinder specially designed to break along a pre-determined line whereby the remaining cylinder can still prevent unauthorized access.

### Background of the Invention

[0002] The present invention is aimed at preventing unauthorized access to lock holders' premises in the manner to break lock cylinders. Lock breaking is generally accomplished by use of a hand tool suitable for engaging with the outer face of the cylinder and in the form to grasp said outer contour of the cylinder in order for applying pressure on the cylinder by twisting the same. These instruments specially adapted for the specific purpose of breaking the cylinder effect breaking along the most vulnerable part of the cylinder; that is around the bridge part in between two cylinder halves wherein the cylinder is mounted to the door by a mounting screw.

[0003] The present invention overcomes the above-mentioned shortcomings by way of providing a special breaking line along the cylinder, said line being mechanically weakened to be ruptured in response to a breaking force applied by a suitable hand tool.

[0004] The lock cylinder according to the present invention is therefore not fully detached from the door with the exception of the outer cylinder part which can be removed upon rupture along the pre-determined mechanically weakened line, the remaining cylinder still being operational. The remaining cylinder part can hence still be operated by an authorized user having the correct key.

[0005] The present invention therefore provides a lock cylinder which is still operational in terms of preventing unauthorized access after a part of the cylinder is detached.

### Objects of the Invention

[0006] One of the prominent objects of the present invention is to provide a lock cylinder having a special breaking line along which breaking occurs in response to twisting forces applied on the outer contour of the cylinder by a special tool.

[0007] Another object of the present invention is to provide a lock cylinder which is still operational in terms of preventing unauthorized access after a pre-determined part of the cylinder is detached.

### Summary of the Invention

[0008] The present invention proposes a lock cylinder conventionally having two cylinder halves with respective cylinder cores and housings accommodating core pins and housing pins for sensing a key inserted into the key

slot within said cylinder core. The lock cylinder core's pins being conventionally aligned to allow rotation of the plug to effect locking and unlocking by a correct key, said core pins are spring tensioned by respective housing pins. The outer half-cylinder according to the present invention is arranged in the form of an outer part and a longitudinally longer inner part the connection between those parts being mechanically weakened and therefore firstly breakable in response to twisting forces applied on the periphery of the outermost surface of said outer part.

### Brief Description of the Figures

[0009] Accompanying drawings are given solely for the purpose of exemplifying a cylinder whose advantages over prior art were outlined above and will be explained in detail hereinafter:

Fig. 1 demonstrates a general perspective side-view of the lock cylinder according to the present invention.

Fig. 2 demonstrates a planar side view of the lock cylinder according to the present invention.

Fig. 3 demonstrates the cross-section B-B of Fig. 2.

### Detailed Description of the Invention

[0010] As is widely known to the person skilled in the art, pin tumbler key lock cylinders generally comprise a cylinder core provided with a plurality of longitudinally spaced pinholes extending radially of the key slot being in communication with the cylinder housing. The pinholes line up with a similar set of pinholes in the cylinder housing. A shear line exists between the rotating cylinder and the cylinder housing. Cylinder core pinhole and housing pinhole receive pins referred to lower and upper pins.

[0011] When a proper key is inserted into the cylinder, the various bittings or cuts in the key will be aligned with the pins in the respective pinholes. When a properly bitted key is received in the appropriate cylinder, the ends of each of the lower pins and the bottom end of the respective upper pin will be aligned along the shear line and the cylinder will be able to be rotated by rotating the key. When an improperly bitted key is in question, one or more of the pins will not be moved against the spring pressure to the proper distance and therefore either the upper pin or the lower pin will extend across the shear line preventing rotation of the cylinder.

[0012] Referring now to the figures outlined above, the cylinder assembly (11) of the invention conventionally comprises two cylinder halves (11a, 11b) connected to each other by a bridge region where a mounting screw is mounted through a screw hole (12). A key slot (13) extends along the cylinder core (15) and when a proper key is introduced thereto, pins in the core (15) and in the cylinder housing (14) respectively in each consecutive

pinhole (18) are so aligned along the shear line (17) that rotation of the key is possible.

**[0013]** According to the present invention, the outer cylinder half (11b), that is the cylinder half (11b) facing outside the door in which the cylinder is installed, is arranged in the form of two parts divided by a mechanically weakened line positioned on a transversal cross-section of said outer cylinder half (11b). Mechanical weakening is carried out in the manner to form partly emptied vertical planes in between two consecutive pinholes (18 and 19) and core (15) portions as shown in Fig. 2.

**[0014]** According to the present invention, Fig. 3 demonstrates the cross-section of the mechanically weakened region in Fig. 2. As can be seen in Fig. 3, mechanical weakening is effected in the manner to provide emptied spaces around two central connection parts 20 and 21, which are respectively located along the cylinder housing (14) and core (15). Emptying can be carried out by a suitable cutting tool to obtain a semi-cut region. All regions outside the hatched regions 20 and 21 in Fig. 3 are emptied to provide a pre-determined line that is breakable at first in response to twisting forces applied on the periphery of the outermost surface of said outer cylinder half (11b). A key introduced to the key slot (13), on the other hand, can be advanced in its entirety as the key slot (13) is not interrupted by the upper connection part (21).

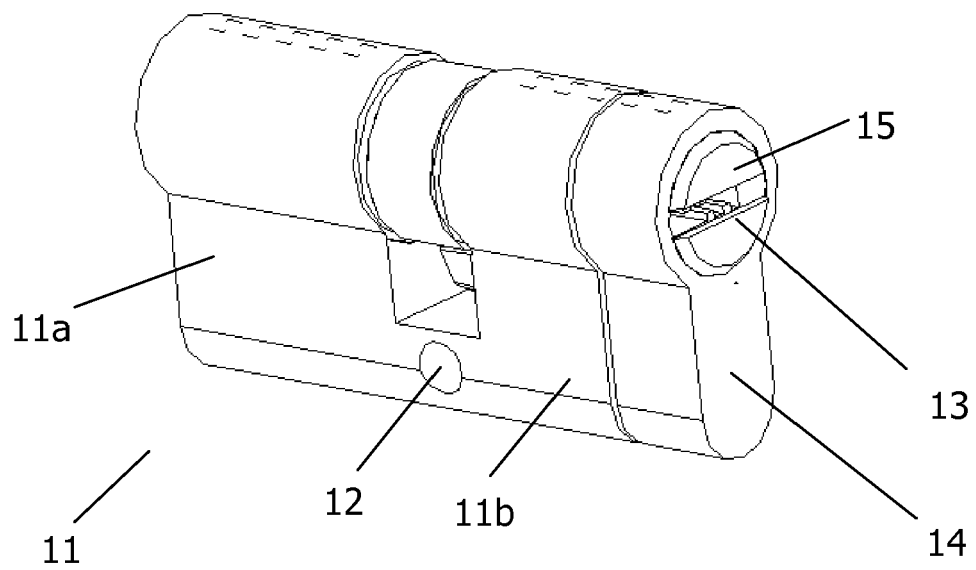
**[0015]** The upper connection part (21) according to the present invention is actually located within the rotatable plug and is therefore rotatable as the key is rotated. As twisting forces are applied on the outermost surface of said outer cylinder half (11b), said upper connection part (21) and the lower connection part (20) are broken in sequence and the outer part of the outer cylinder half (11b) becomes freely removable. Said outer part being taken out, the cipher pins within the remaining inner part of said outer cylinder half (11b) are still intact and operational so that the proper key holder can open the door even the cylinder (11) is now broken and partly taken out.

**[0016]** In a nutshell, the present invention proposes a lock cylinder (11) comprising a housing (14) and a core (15) in the form of two cylinder halves (11a, 11b) divided by a bridge region having a screw hole (12) for mounting said lock cylinder (11) to a door. One of said cylinder halves (11b) is arranged in the form of two parts divided by a mechanically weakened line positioned on a vertical cross-section of said outer cylinder half (11b) and said mechanically weakened line being provided in the form of emptied spaces around two central connection parts 20 and 21, respectively located along the cylinder housing (14) and core (15).

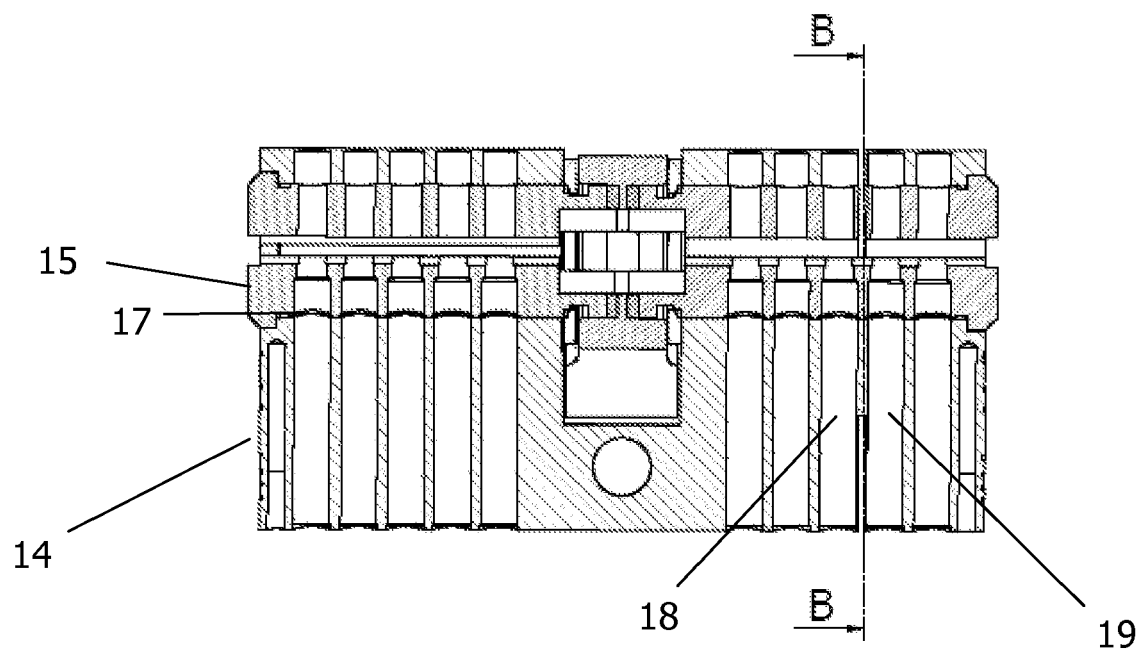
region having a screw hole (12) for mounting said lock cylinder (11) to a door, one of said cylinder halves (11b) being arranged in the form of two parts divided by a mechanically weakened line positioned on a transversal cross-section of said outer cylinder half (11b) and said mechanically weakened line being provided in the form of emptied spaces around two central connection parts 20 and 21, respectively located along the cylinder housing (14) and core (15) of said outer cylinder half (11b).

## Claims

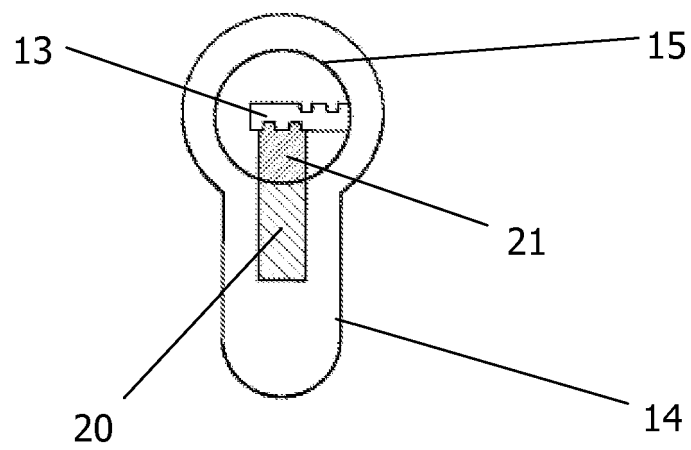
1. A lock cylinder (11) comprising longitudinally extending housing (14) and core (15) portions in the form of two cylinder halves (11a, 11b) divided by a bridge



**Fig. 1**



**Fig. 2**



**Fig. 3**



## EUROPEAN SEARCH REPORT

Application Number  
EP 09 15 0679

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	AT 8 244 U1 (KABA GMBH [AT]) 15 April 2006 (2006-04-15) * the whole document *	1	INV. E05B17/00 E05B27/00
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E,X	WO 2009/055881 A (MAUER LOCKING SYSTEMS LTD [BG]; KOLEV KOLIO MITEV [BG]) 7 May 2009 (2009-05-07) * the whole document *	1	
			TECHNICAL FIELDS SEARCHED (IPC)
			E05B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 19 May 2009	Examiner Geerts, Arnold
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons &amp; : member of the same patent family, corresponding document</p>			

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EPO FORM 1503 03.82 (P04G01)

**ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.**

EP 09 15 0679

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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