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Amended claims in accordance with Rule 86 (2) EPC.

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(54) **Non-destructible cylinder lock**

(57) The present invention relates to an improvement in non destructible cylinder locks. A reinforcing system comprising two reinforcing members in the form of pins (18,19) are embedded in a flat portion (13). Said reinforcing members, located at opposite sides of the bridge-like screw hole portion (16), are connected to each other by means of a non-extensible hollow fixing device (20), fixedly attached to the pin heads and extending in the

form two arms (21) around each pin head. Additionally, an extensible element (23) is laid in the form of a high tensile strength structure in between the two pin heads and across the surface defined by said non-extensible hollow fixing device (20). The positions at which the two pins (18,19) are located fall outside the space defined by the projection lines of the notch in which the pawl is situated.

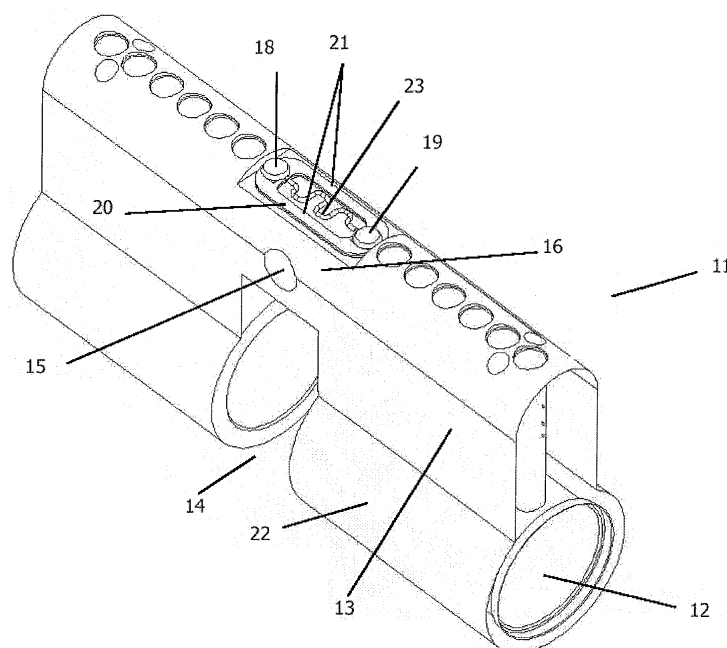


Fig. 1

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Description

Technical Field of the Invention

[0001] The present invention relates to a lock cylinder designed to be more reliable against breaking attempts where the improvement proposed by the invention prevents complete separation of the two cylinder parts in case of an unauthorized attempt to release the door lock or break the lock into pieces.

Background of the Invention

[0002] In a standard locking assembly, a lock cylinder accommodates the most basic yet the most crucial elements of the system, to ensure reliability against burglary. Someone who is involved in an unauthorized attempt to open a locked door may incidentally destruct cylinder lock and break the same into pieces for acting freely around the locking pawl or the bolt. In the event that he/she could be able to do so, the lock assembly becomes practically non-functional since the slot into which the pawl engages is accessible by simple means. On the other hand, in the event that the two half cylinder are broken from around the lock mounting hole in the middle, but not yet separated from each other due to any reinforcing structure, effecting rotation of the pawl will still prove to be difficult since the pawl slot is not directly accessible and since pin profiles in the cylinder, which are only suitable for special key combinations, are still functional in the manner to prevent a false key or any other sharp object to enable rotation of the pawl so as to catch its slot.

[0003] In a lock case, typically two mutually located cylinder parts, between which a notch and a rotatable lock pawl are situated on a bridge-like region with a screw hole in the center, are present. Said bridge-like region exists in almost every lock assembly due to manufacturing standards set to enable a given lock to fit into a given door assembly by the regulations. To this end, in an attempt to break the cylinder case, the small region, in the center of which a fixing screw is located on said bridge-like portion, constitute the weakest line of the case.

[0004] In a locking system, beside all security measures taken to prevent a burglary, one of the key factors determining whether a lock will perform its duty or not, is the length of the duration a thief has to struggle to unlock a door. Experiences in the circles of lock manufacturers and surveys from different sources show that the time elapsed to pull a lock out of its base is inversely proportional to the number of thieves insisting on the same lock. In other words, it is widely suggested in the sector that lesser number of thieves continues their efforts as time elapses. It is indicated by a statistical data in the country of the applicant that the burglars do not attend to break into if they think that the door can be unlocked or the lock can be destructed in more than 10 seconds.

[0005] There are quite a few patents/patent applications in the technical field of the present invention. One

of those is EP 1 091 058 B1. According to the disclosure provided therein, two cylindrical half-housings comprise reinforcing members, a part of which is within a flange extending on one side of the cylinder lock and another part is in the region of said bridge-like portion so as to surround said lock fixing hole. The most apparent drawback of this arrangement is that it further weakens the bridge-like portion by necessarily enlarging the screw hole so as to comprise the reinforcing elements therein. In this respect, it eases a rupture in the region at which said reinforcing elements surround the fixing hole.

[0006] As is explained in EP 1 091 058 B1, the reinforcing elements are not for preventing a flexural rupture of the lock body at the bridge-like portion. Rather, this rupture is considered as inevitable and the device is arranged so that once the lock body has been broken at the bridge-like portion, the two half-housings in which it is divided cannot be separated from each other. Said reinforcing elements might indeed prove difficult to be separated from each other. This, however, does not signify that said elements can not be separated from the cylindrical half-housing on the lateral surface of which they are embedded. Indeed this can be easily done by applying a lateral force, as experience has shown, by a lever rod or a charging bar. When one of the two parts of the lock is bent, then said elements are likely to disengage and the two parts of the lock come apart once the weakest line is broken. Needless to mention, the worst case is that the two lock not only breaks into two pieces but said two pieces on the inner and outer side of the door fall respectively inside and outside of the door and the burglar has the chance to freely rotate the locking pawl with a simple tool.

[0007] Additionally, in case one of the reinforcing elements is detached from the half-housing it is embedded in, said cylindrical half-housing may then be easily removed out of its base and although the other half-housing and both of the reinforcing elements are still in place and are still attached to each other, the slot in which the pawl resides to operate the door lock may easily be accessible by means of any sharp tool, such as a screwdriver or a strong wire for instance, to completely release the lock.

[0008] The reinforcing system, which consists of two reinforcing members according to the present invention, is advantageous in that said members can be removed neither from the half-housings to which they are fixedly attached nor from each other due to a high tensile strength element in between. In case a rupture takes place in said bridge-like screw hole portion, connection structure between two reinforcing members on separate half-housings serves to the purpose of substantially retarding separation of the two members due to the elastic and energy dissipating structure of said connection.

Objects of the Invention

[0009] In view of the problems with regard to the prior art disclosed above, one of the objects of the present

invention is to prevent separation of the two half-housings of the cylinder assembly without causing further weakening of the already fragile bridge-like screw hole portion so as to the same as least as possible.

[0010] Another object of the present invention is to provide a cylinder assembly comprising a reinforcing system with two reinforcing members which can not be separated from the half-housings.

[0011] Further an object of the present invention is to provide a cylinder assembly comprising a reinforcing system with two reinforcing members which can not be separated from each other.

Summary of the Invention

[0012] The objects of the invention are achieved through use of a reinforcing system comprising two reinforcing members in the form to incorporate pins embedded in the bottom surface of the lock assembly. Said reinforcing members, located at opposite sides of the bridge-like screw hole portion, are connected to each other by means of a non-extensible and hollow fixing device, fixedly attached to the pin heads and extending in the form of two arms around each pin. Additionally, an extensible element is laid in the form of a high tensile strength structure in between the two pin heads and within the empty surface encircled by said non-extensible hollow fixing device. The positions at which the two pins are located fall outside the space defined by the projection lines of the vertical borders of the notch within which the pawl is situated.

Brief Description of the Figures

[0013] Accompanying drawings are given solely for the purpose of exemplifying a cylinder assembly whose advantages over prior art were outlined above and will be explained in detail hereinafter:

Fig. 1 demonstrates a perspective side view of the lock cylinder assembly in which the reinforcing system with the two pin heads, the non-extensible hollow fixing device and the high tensile strength connection structure are shown.

Fig. 2 demonstrates the same view in Fig. 1 with the pins being shown in the body of the lock.

Fig. 3 is a side view of the lock assembly.

Fig. 4 is a top view of the lock assembly.

Fig. 5 demonstrates the reinforcement elements in the form apart from the lock assembly.

Detailed Description of the Invention

[0014] Referring now to the figures outlined above, the

lock assembly (11) typically comprises a longitudinally extending cylindrical portion (12) in the form of two divisions or cylindrical half-housings (22), to receive keys from the inside and the outside of the door and a flat portion (13) extending parallel to the upper cylindrical portion with a notch (14) in the middle, through which a pawl is rotatably movable between said divisions, to operate the lock. Said cylindrical portion (12) contains the cylindrical core in which a series of ciphering pins extend in the conventional manner.

[0015] A standard lock is conventionally secured to a door assembly by a screw that is fixed at a hole (15) which is located in a bridge-like portion (16) under said notch (14) and which is perpendicular to the key axis of the cylinder lock. This region constitutes both vertically and horizontally the weakest line across the entire length of the lock assembly (11) and is potentially to be the first portion to be broken in case a burglar exerts a force e.g. via a lever rod to break the lock into pieces. It is well known in the art that the bodies of these locks are generally made of brass. Separation of the two half-housings (22) will simply permit a thief to pull one of those out of the lock hole and reach the slot into which the pawl engages to unlock the door. To prevent this, the reinforcing structure according to the present invention takes advantage of an improved design and provides a two-pin reinforcement structure supported by two separate connection components having different material characteristics and connecting the two pin heads in the manner that one of the components resides on the inside of the other to form a multi-function connection.

[0016] The pins (18, 19), made out of steel, are vertically embedded in the bottom surface of the lock assembly (11). To avoid further weakening of the weakest line and to effect this region inadvertently as least as possible, the two pins (18, 19), which are at opposite sides of the screw hole (15) portion (16), are placed outside the space defined by the projection lines of the vertical borders of the notch within which the pawl is situated.

[0017] The pins (18, 19) are connected to each other by means of a non-extensible fixing device (20) in form of a substantially elliptical, closed and hollow body, fixedly attached to the pin (18, 19) heads and extending in the form of two arms around each pin head so as to cover the surface around the contour of the head portions. Contrary to the rest of the lock assembly (11), the fixing device is made out of steel, which is much stronger than brass. Each of the arms (21) of the elliptical fixing device (20) extends parallel to the longitudinal axis of the bottom surface of said flat portion (13). In case a burglar exerts e.g. laterally using a charging rod, a force sufficient to brake said bridge-like region (16) both in the upper and the lower part of said screw hole (15), then the security of the system will solely rely on the reinforcement elements.

[0018] A force sufficient to detach two cylindrical half-housings (22) may cause the two arms (21) of the fixing device (20) to be twisted. Despite probable deformation at the arms (21), depending on the force exerted, it will

not be possible to uproot the pins (18, 19) since they are entirely embedded in the brass body with the exception of their head portions.

[0019] In other words, any deformation, even including a total rupture of the fixing device (20), will not cause the pins (18, 19) and the region around the pin heads, to get damaged and hence the two half-housing will still be attached to each other since a second connection element remains functional independent from the status of the fixing device (20).

[0020] Said second connection element is an extensible spring element (23), made out of steel and laid in between the two pin heads and within the surface defined by the arms (21) of said non-extensible fixing device (20), in the form of a high tensile strength structure. In case a rupture takes place first in the bridge-like region (16) and second in said fixing device (20) in turn, said extensible element (23), which is fixedly attached to both pin heads still keeps two half-housings joined. To this end, said extensible element (23) absorbs the forces exerted and do not let the housings detach completely, substantially retarding separation of the two reinforcement members due to the elastic and energy dissipating structure of the connection.

[0021] The positions at which the two pins are located falls outside the space defined by the projection lines of the vertical borders of the notch (14) within which the pawl is situated. This design is helpful in that it avoids further weakening of the bridge-like portion (16) and keeps the pins (18, 19) outside the notch (14) line and thereby within the fully solid line to ensure a strong design. The uppermost portions of the pin (19, 19) heads, the fixing device (20) and the extensible spring element (23), which lies within the surface defined by the arms (21) of said non-extensible fixing device (20), lie all at the same plane. The steel pins (18, 19) are riveted to the lock body.

Claims

1. A lock assembly (11) especially suitable for doors, comprising a longitudinally extending cylindrical portion (12) in the form of two divisions or cylindrical half-housings (22), each containing a cylindrical core in which a series of ciphering pins extend to receive keys from the inside and the outside, said lock assembly (11) also comprising a flat portion (13) extending parallel to the upper cylindrical portion with a notch (14) in the middle, through which a pawl is rotatably movable between said divisions **characterized in that** said assembly (11) further comprises; two reinforcing members at the opposite sides of said notch (14) in the form of pins (18, 19) vertically embedded in the bottom surface of the lock assembly (11), a non-extensible fixing device (20) in form of a closed body fixedly attached to the pin (18, 19) heads and

extending in the form of two arms (21) around each pin (18, 19) head,
a high tensile strength extensible spring element (23) fixedly attached in between the two pin (18, 19) heads.

2. A lock assembly (11) as set forth in Claim 1 wherein said pins (18, 19) are placed outside the space defined by the projection lines of the vertical borders of the notch (14) within which the pawl is situated.
3. A lock assembly (11) as set forth in Claim 1 wherein said fixing device (20) cover the surface around the contour of the pin (18, 19) heads.
4. A lock assembly (11) as set forth in Claim 1 wherein said fixing device (20), said extensible spring element (23) and said pins (18, 19) are made out of steel.
5. A lock assembly (11) as set forth in Claim 1 wherein said high tensile strength extensible spring element (23) lies within the surface defined by the arms (21) of said non-extensible fixing device (20).
6. A lock assembly (11) as set forth in Claim 1 wherein the uppermost portion of said pin heads, said fixing device (20) and said extensible spring element (23) lie at the same plane.
7. A lock assembly (11) as set forth in Claim 1 wherein said a non-extensible closed fixing device (20) is in a substantially elliptical form.

Amended claims in accordance with Rule 86(2) EPC.

1. A lock assembly (11) especially suitable for doors, comprising a longitudinally extending cylindrical portion (12) in the form of two divisions or cylindrical half-housings (22), each containing a cylindrical core in which a series of ciphering pins extend to receive keys from the inside and the outside, said lock assembly (11) also comprising a flat portion (13) extending parallel to an upper part of the cylindrical portion with two half-housings (22) and a notch (14) in between, through which a pawl is rotatably movable between said divisions **characterized in that** said assembly (11) further comprises; two reinforcing members at the opposite sides of said notch (14) in the form of pins (18, 19) vertically embedded in the part of said flat portion (13) that is opposite to the cylindrical portion, a non-extensible fixing device (20) in form of a closed body fixedly attached to the pin (18, 19) heads and extending in the form of two arms (21) around each pin (18, 19) head,
a high tensile strength extensible spring element (23)

fixedly attached in between the two pin (18, 19) heads.

2. A lock assembly (11) as set forth in Claim 1 wherein said pins (18, 19) are placed outside the space defined by the projection lines of the vertical borders of the notch (14) within which the pawl is situated. 5

3. A lock assembly (11) as set forth in Claim 1 wherein said fixing device (20) cover the surface around the contour of the pin (18, 19) heads. 10

4. A lock assembly (11) as set forth in Claim 1 wherein said fixing device (20), said extensible spring element (23) and said pins (18, 19) are made out of steel. 15

5. A lock assembly (11) as set forth in Claim 1 wherein said high tensile strength extensible spring element (23) lies within the surface defined by the arms (21) of said non-extensible fixing device (20). 20

6. A lock assembly (11) as set forth in Claim 1 wherein the uppermost portion of said pin heads, said fixing device (20) and said extensible spring element (23) lie at the same plane. 25

7. A lock assembly (11) as set forth in Claim 1 wherein said a non-extensible closed fixing device (20) is in a substantially elliptical form. 30

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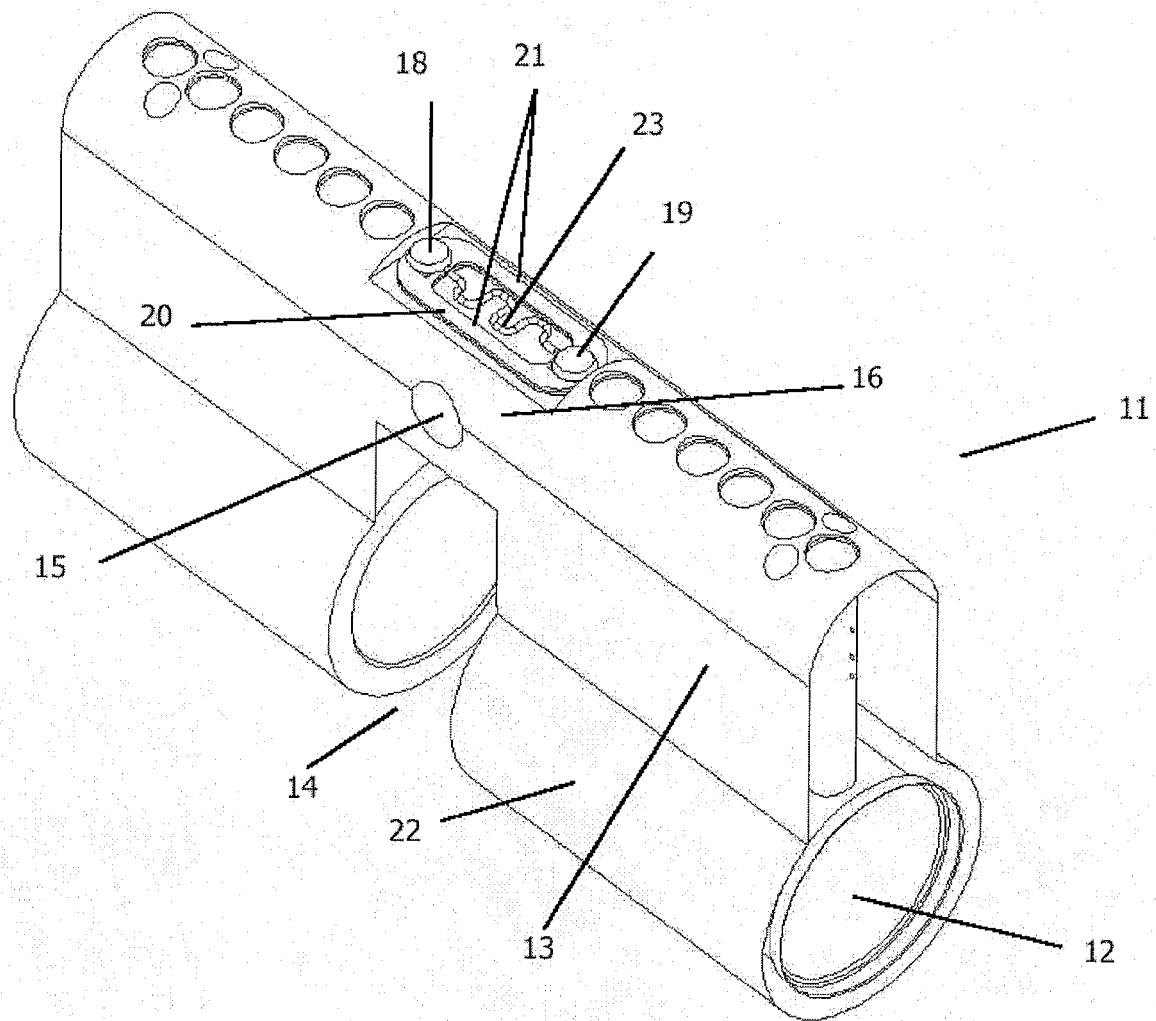


Fig. 1

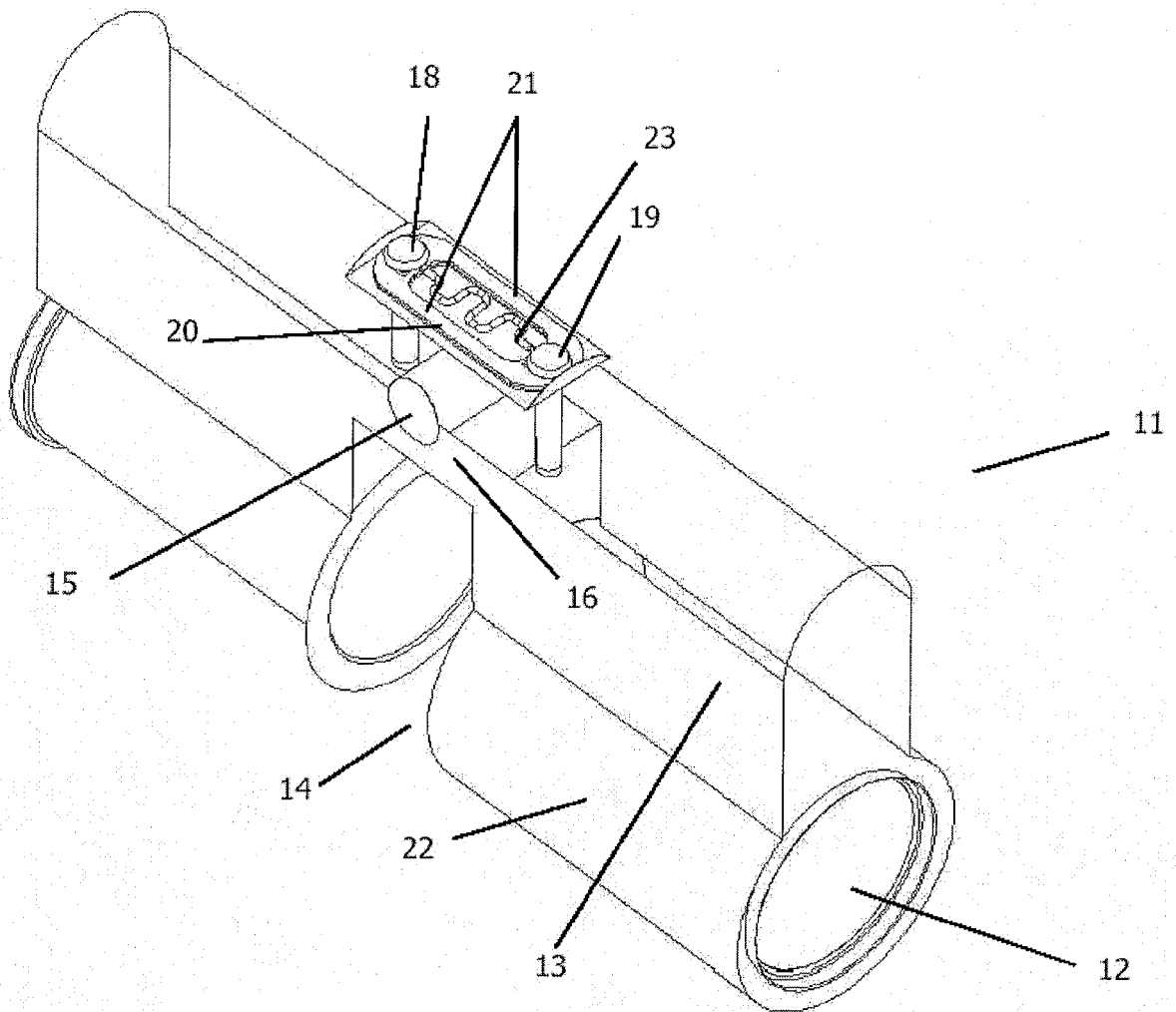


Fig. 2

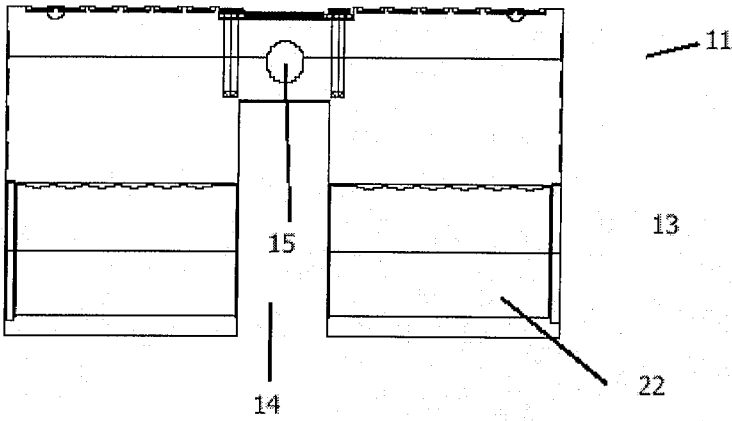


Fig. 3

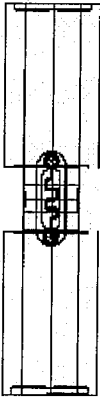


Fig. 4

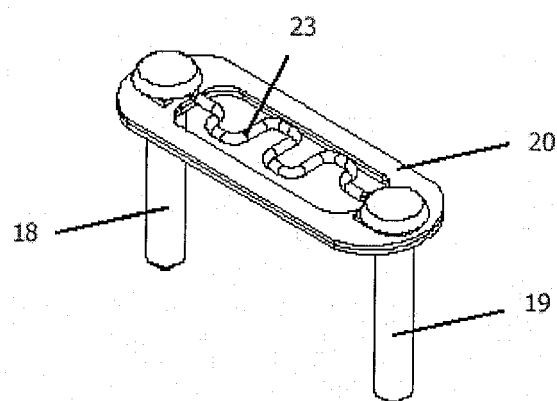


Fig. 5



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EUROPEAN SEARCH REPORT

Application Number
EP 05 10 2507

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 25 54 593 A1 (FA.AUG.WINKHAUS) 8 June 1977 (1977-06-08) * figures *	1	E05B9/04 E05B9/10
A	DE 201 00 325 U1 (AUG. WINKHAUS GMBH & CO. KG) 29 March 2001 (2001-03-29) * figures *	1	
A	DE 23 43 720 A1 (ZEISS IKON AG) 13 March 1975 (1975-03-13) * page 4, paragraph 2; figures *	1	
A	EP 1 067 258 A (MG SERRATURE S.P.A) 10 January 2001 (2001-01-10) * figures *	1	
			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E05B
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 31 August 2005	Examiner Westin, K
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**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 05 10 2507

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31-08-2005

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
DE 2554593	A1	08-06-1977	AT 342453 B	10-04-1978
			AT 809976 A	15-07-1977

DE 20100325	U1	29-03-2001	NONE	

DE 2343720	A1	13-03-1975	NONE	

EP 1067258	A	10-01-2001	IT M1991505 A1	08-01-2001
			AT 269469 T	15-07-2004
			DE 60011518 D1	22-07-2004
			DE 60011518 T2	25-08-2005
			EP 1067258 A1	10-01-2001
			ES 2222137 T3	01-02-2005

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1091058 B1 [0005] [0006]