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(54) **MODULAR LOCK CYLINDER**

MODULARER SCHLIESSZYLINDER

CYLINDRE DE SERRURE MODULAIRE

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Description

FIELD OF THE INVENTION

[0001] This invention relates to a modular lock cylinder, in particular a modular cylinder containing at least one front module and one rear module to receive the cylinder lock rotor.

PRIOR ART

[0002] At present and with regard to the state of the art it is common and known to use at least one front module and one rear module in modular lock cylinders, which are joined by means of a bolt or plate introduced in a direction that coincides with the axis of the lock cylinder, which bolt or plate is introduced in full or in part into both modules. These solutions that are in the market have the following disadvantages, however.

[0003] Firstly, many systems for connecting modules use threaded bolts, associated with threaded holes existing in the lock cylinder modules. The need to have the modules machined in order to create the threaded holes increases the costs of production of these modules. It is also normal for these threaded bolts to be threaded at just one end with other methods needing to be used to secure the other end, such as pins. Secondly, there are solutions that use bolts or plates with holes, via which a bolt or pin is introduced which holds them in position within the lock cylinder module. These solutions are less robust, since by making one or more holes in a part with small dimensions, the stress concentration within this part is increased and therefore it is more likely that it will fracture when the pins are introduced with tools such as hammers, used because these pins require pressure to be applied. Another disadvantage that this type of connection between lock cylinder modules has is that it is normal for the connection point to be far away from the axis of the cylinder, favouring the torque generated in the fixing bolt during a fraudulent attempt to open the lock.

[0004] EP2436855A2 discloses a lock cylinder with the modules fastened by a radially arranged threaded bolt.

[0005] EP2525022A2 discloses a lock cylinder with modules coupled with one another by connection screws.

[0006] DE3738832A1 discloses a modular lock cylinder comprising a front module, a rear module and an intermediate module. Each module contains two chambers for allocating a fixing bolt in each one, the axial displacement of said fixing bolts being avoided introducing a fastening pin between both fixing bolts, said fixing bolts having a little recess at each end for allocating the corresponding fastening pin.

EXPLANATION OF THE INVENTION AND ADVANTAGES

[0007] In view of this state of affairs, the present invention refers to a modular lock cylinder according to claim 1.

[0008] Thanks to this configuration the various modules of the lock cylinder can be successfully connected in a simple manner. The fixing bolts, to be introduced coaxially with regard to the axis of the cylinder, can be introduced into the parallel chambers disposed in the various modules via either of their ends, because both ends are the same and no specific position is required. In addition, to secure these fixing bolts and prevent them from leaving their position within the chamber parallel to the axis of the cylinder, fastening pins are arranged transversally which connect with the circumferential recesses of semi-circular section existing in these fixing bolts, preventing their axial displacement. As a second method of securing the modules to one another bushings are used which are positioned between the various modules, accommodated in the recesses existing at the ends of the chambers accommodating the lock rotor, such that this chamber is properly aligned. Furthermore, the distance from the axis of the cylinder to the parallel chamber accommodating the fixing bolt is reduced to avoid the torque occurring when an attempt is made to force the modular lock cylinder being sufficiently great to lead to it fracturing.

[0009] It is necessary to stress the importance of creating the circumferential recesses in the fixing bolt with a semi-circular section as opposed to other designs, since these increase the resistance of the modular lock cylinder and its security against attempts to force the lock.

DRAWINGS AND REFERENCE NUMERALS

[0010] For a better understanding of the nature of the invention the attached drawings show an industrial embodiment which has the character of a merely illustrative and non-limiting example.

Figure 1 is an isometric exploded view of the modular lock cylinder (1), showing the various constituent elements, and with enlarged details to illustrate the relationship between the fixing bolts (7) and the fastening pins (9).

Figure 2a is a sectional view along the vertical axis of the modular lock cylinder (1), showing the position adopted by the fixing bolts (7) in the axial chambers (5).

Figure 2b is a sectional view transversal to the axis of the cylinder (6), showing the relationship between the fixing bolt (7) and the fastening pins (9).

1.- Modular lock cylinder.
2.- Front module.
3.- Rear module.
4.- Intermediate module.
5.- Parallel chamber.
6.- Cylinder axis.
7.- Fixing bolt.
8.- Circumferential recess.

9.- Fastening pin.
10.- Transversal chamber.
11.- Bushing.
12.- Recess.

DESCRIPTION OF A PREFERRED EMBODIMENT

[0011] With reference to the drawings and reference numerals listed above, the attached diagrams illustrate a preferred mode of carrying out the subject matter of the invention, relating to a modular lock cylinder, containing the cylinder lock rotor, in which both the front module (2) and the rear module (3) contain a chamber (5) parallel to the cylinder axis (6) distinctly separated from this and capable of receiving partially a fixing bolt (7) via either of its ends, whereby each of these ends of the fixing bolt (7) comprises a circumferential recess (8) of semi-circular section at these ends, said circumferential recesses (8) accommodating two fastening pins (9) of matching semi-circular section introduced transversally to the cylinder axis (6) which act against the fixing bolt (7), both the front module (2) and the rear module (3) having a recess (12) at the end of their chamber of the housing of the rotor capable of receiving a bushing (11).

[0012] Figure 1 shows the various elements in the composition of an embodiment of this modular lock cylinder (1), comprising a front module (2), a rear module (3) and two intermediate modules (4), which employ two fixing bolts (7) and three bushings (11) to connect them.

[0013] The various modules of the modular lock cylinder (1) in Figure 1 are secured to one another in the following way. Taking one of the connections, for example the connection between the front module (2) and the intermediate module (4), firstly the fixing bolt (7) is introduced via either of its ends into the chamber (5) parallel to the cylinder axis (6) of one of the modules to be connected. It should be pointed out that the fixing bolts (7) are reversible, since the method of connection is the same at both ends. Once the fixing bolt (7) reaches the maximum depth in the axial chamber (5) of the module into which it has been introduced, the fastening pins (9) are used by introducing them into the respective transversal chambers (10). As shown in Figure 2b, these fastening pins (9) prevent the axial displacement of the fixing bolt (7) as they are positioned in the circumferential recesses (8) disposed at the ends of this fixing bolt (7). Then, once one end of the fixing bolt (7) has been located in one of the modules, a bushing (11) is positioned in the recess (12) corresponding to this module, such that this bushing (11) is partially introduced into the chamber accommodating the rotor. Once this action has been taken, the other end of the fixing bolt (7) and the remainder of the bushing (11) are introduced into the parallel chamber (5) and into the recess (12), respectively, of the adjacent module. Finally, it is again necessary to prevent the fixing bolt (7) from being movable axially within the parallel chamber (5), so that fastening pins (9) are once again used, which are introduced via the transversal chambers (10) of the module in which it is desired to perform the fastening and accommodated in the corresponding circumferential recesses (8).

[0014] The remaining modules are connected in the same way as described for the above connection.

[0015] As can be seen from the section of Figure 2a, both the fixing bolt (7) and the bushing (11) have been fully introduced between the various modules forming the modular lock cylinder (1). The main function of these fixing bolts (7) is to keep the front module (2), the rear module (3) and the intermediate modules (4) connected. The bushings (11) disposed in the chamber accommodating the rotor, have the function of providing a second way of fastening and also to provide the correct alignment of the chamber accommodating the rotor.

[0016] By means of the connections made between the lock modules a modular lock cylinder (1) is arrived at which is able to be used on doors of differing thickness, with high resistance to any fraudulent attempt to open them, since their connection is close to the cylinder axis (6), meaning that greater force is required to fracture it.

[0017] It should be pointed out that the semi-circular design of the circumferential recesses (8) lends greater resistance to the connection, due to a reduction in the stress concentration in these areas, avoiding a possible fracture in these areas of the fixing bolt (7).

[0018] The essence of this patent is not altered by any variation in materials, shape, size and arrangement of the constituent elements, which are described in a non-limiting manner.

Claims

1. A modular lock cylinder comprising at least one front module and one rear module containing a cylinder lock rotor, both the front module (2) and the rear module (3) containing a chamber (5) parallel to the cylinder axis (6) distinctly separated from said cylinder axis (6) and configured for receiving partially a fixing bolt (7) of the modular lock cylinder via either end of the fixing bolt (7), whereby each end of the fixing bolt (7) comprises a circumferential recess (8) of semi-circular section and each of said circumferential recesses (8) accommodating two fastening pins (9) of matching semicircular section introduced transversally to the cylinder axis (6) via transversal chambers (10) of the respective module, whereby said fastening pins (9) act against the fixing bolt (7), the front module (2) and the rear module (3) having a recess (12) at the end of their chamber accommodating the lock rotor, said recess (12) being capable of receiving a bushing (11) of the modular lock cylinder.

2. The modular lock cylinder according to claim 1, comprising at least one intermediate module (4) containing a chamber (5) at each end parallel to the cylinder axis (6) distinctly separated from said cylinder axis

(6) and configured for receiving partially a fixing bolt (7) via either of its ends, and having a recess (12) at the ends of their chamber accommodating the lock rotor, said recess capable of receiving a bushing (11).

Patentansprüche

1. Modularer Schließzylinder, umfassend mindestens ein Vordermodul und ein Rückmodul, die eine Zylinderschlosstrommel enthalten, wobei sowohl das Vordermodul (2) als auch das Rückmodul (3) parallel zur Zylinderachse (6) eine Kammer (5) enthalten, die deutlich von der genannten Zylinderachse (6) getrennt ist, und zur teilweisen Aufnahme eines Fixierriegels (7) des modularen Schließzylinders über jedes der beiden Enden des Fixierriegels (7) ausgestaltet ist, wobei jedes Ende des Fixierriegels (7) eine umlaufende Aussparung (8) mit halbkreisförmigem Querschnitt umfasst und jede der genannten umlaufenden Aussparungen (8) zwei Befestigungsstifte (9) mit passendem halbkreisförmigem Querschnitt aufnimmt, die über Querkammern (10) des jeweiligen Moduls quer zur Zylinderachse (6) eingeführt sind, wobei die genannten Befestigungsstifte (9) gegen den Fixierriegel (7) wirken, wobei das Vordermodul (2) und das Rückmodul (3) am Ende ihrer Kammer eine Aussparung (12) aufweisen, die die Schlosstrommel aufnimmt, wobei die genannte Aussparung (12) eine Buchse (11) des modularen Schließzylinders aufnehmen kann.

2. Modularer Schließzylinder nach Anspruch 1, umfassend mindestens ein Zwischenmodul (4), das an jedem Ende parallel zur Zylinderachse (6) eine Kammer (5) enthält, die deutlich von der genannten Zylinderachse (6) getrennt und zur teilweisen Aufnahme eines Fixierriegels (7) über eines seiner Enden ausgestaltet ist und das an den Enden ihrer Kammer eine Aussparung (12) zur Aufnahme der Schlosstrommel aufweist, wobei die genannte Aussparung eine Buchse (11) aufnehmen kann.

Revendications

1. Cylindre de serrure modulaire comprenant au moins un module avant et un module arrière contenant un rotor de serrure cylindrique, le module avant (2) comme le module arrière (3) contenant une chambre (5) parallèle à l'axe du cylindre (6) distinctement séparée dudit axe du cylindre (6) et configurée pour recevoir partiellement un vis d'attachement (7) du cylindre de serrure modulaire à travers une extrémité quelconque du vis d'attachement (7), selon lequel chaque extrémité du vis d'attachement (7) comprend un retrait en circonférence (8) d'une section semi-circulaire et chacun desdits retraits en circonférence (8) logeant deux boulons de fixation (9) de section semi-circulaire correspondante introduits transversalement à l'axe du cylindre (6) à travers des chambres transversales (10) du module respectif, selon lequel lesdits boulons de fixation (9) agissent à l'encontre du vis d'attachement (7), le module avant (2) et le module arrière (3) ayant un retrait (12) dans l'extrémité de leur chambre logeant le rotor du serrure, ledit retrait (12) étant capable de recevoir un douille (11) du cylindre de serrure modulaire.

2. Cylindre de serrure modulaire, selon la revendication 1, comprenant au moins un module intermédiaire (4) contenant une chambre (5) dans chaque extrémité parallèle à l'axe du cylindre (6) distinctement séparée dudit axe du cylindre (6) et configurée pour recevoir partiellement un vis d'attachement (7) à travers une quelconque de ses extrémités, et ayant un retrait (12) dans les extrémités de leur chambre logeant le rotor du serrure, ledit retrait étant capable de recevoir un douille (11).

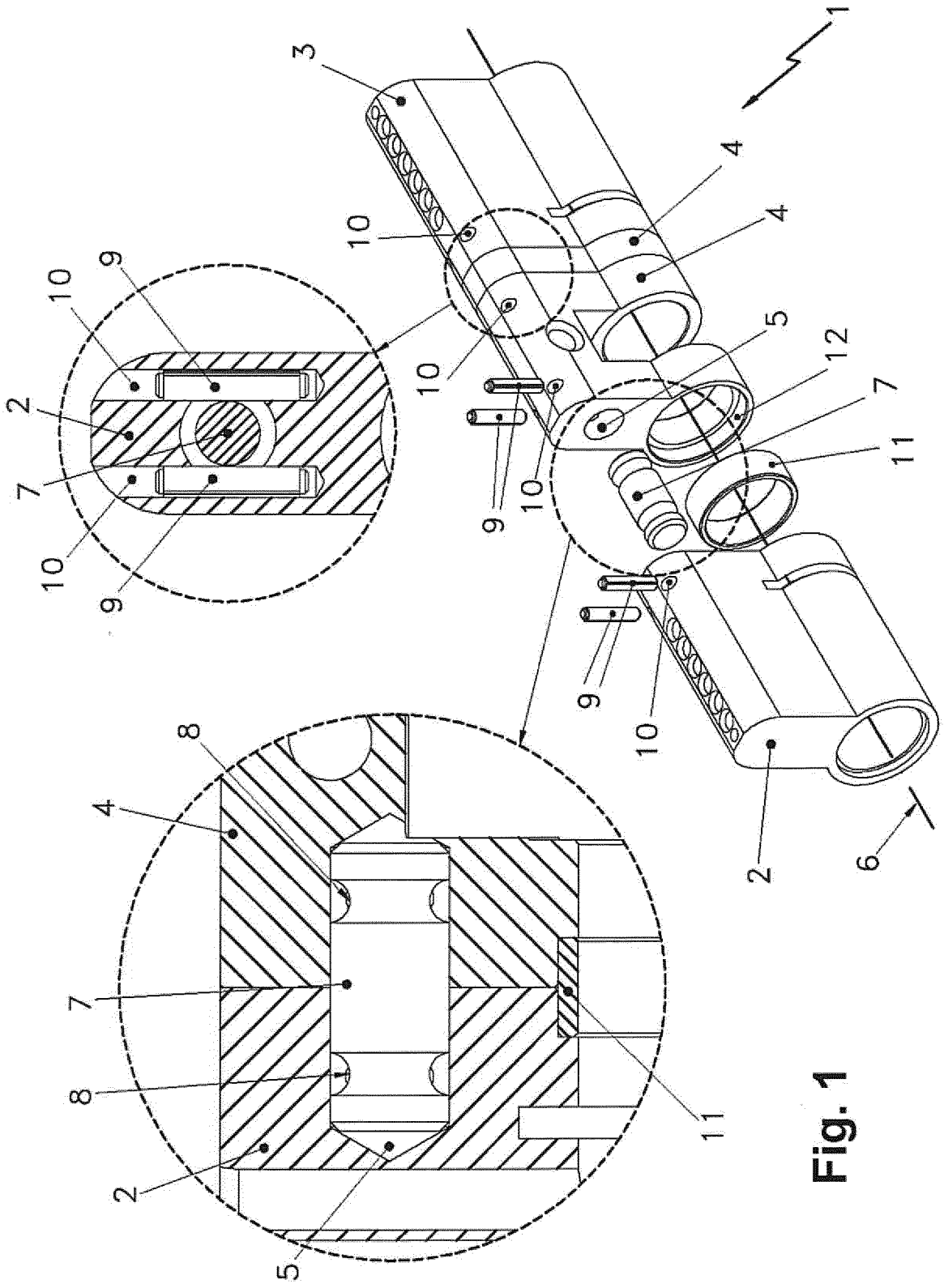

Fig. 1

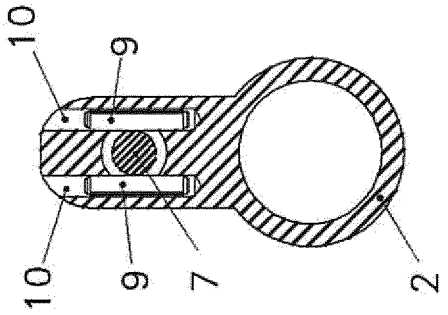

Fig. 2b

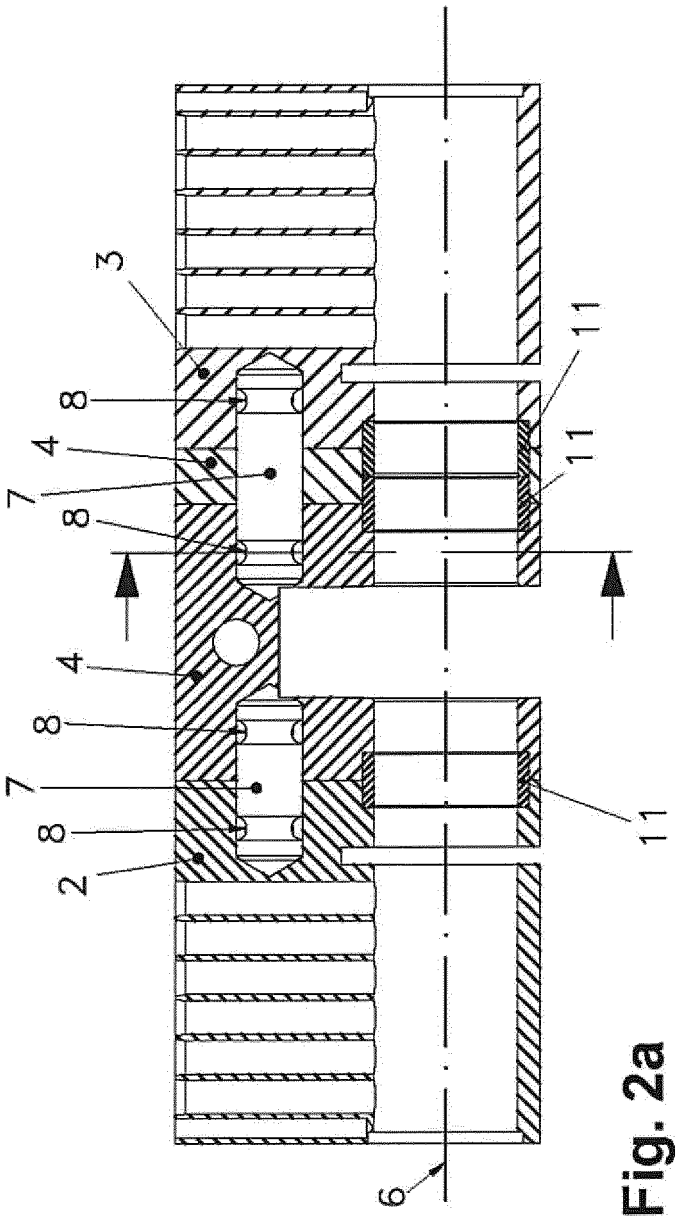

Fig. 2a

REFERENCES CITED IN THE DESCRIPTION

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- DE 3738832 A1 **[0006]**