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(54) **BREAK-IN RESISTANT LOCK**
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Description

Technical field

[0001] The present invention relates to a break-in resistant lock, particularly of the type which can be operated by means of double-web keys.

Background art

[0002] Locks associated with double-web keys are constituted by a main box-like body which is provided with a (substantially transverse) seat which is suitable for the insertion of the key.

[0003] The key, once inserted, is arranged so that its coded portion is aligned with a plurality of code plates (usually known as tumblers) which can perform a partial translational motion in preset directions.

[0004] The rotation of the key in the seat entails a movement of the plates (tumblers) which is matched by the disengagement of a rod (normally engaged by interference on the plates): such rod can thus be made to perform a translational motion by the rotary motion of the key in the seat.

[0005] The bolts are stably coupled on the front portion of the rod: the translational motion of the rod entails the protrusion of the bolts from the front edge of the lock, with a consequent stable engagement thereof in the receptacles of the jamb, ensuring correct closure of the door in which the lock is installed.

[0006] A lock according to the preamble of claim 1 is disclosed by EP 0943761 A1.

[0007] This type of lock ensures a good level of protection against destructive break-in actions, since the generous dimensions allow embodiments of the armored type.

[0008] However, this type is subject to break-in actions of the type normally known as lock picking.

[0009] These techniques adopt specific tools to be inserted in the seat which is adapted to accommodate the key: by means of these tools, by keeping the rod under tension in the direction that corresponds to the retraction of the bolts, the effractor can "lift" the plates individually until the rod is released and said rod retracts as a consequence of the applied mechanical tension.

[0010] Although these break-in techniques are rather complex, they have a distinctly high success rate and therefore make all double-web key locks substantially unsafe.

Disclosure of the invention

[0011] The aim of the present invention is to provide a break-in resistant lock which is provided with means adapted to contrast any break-in action which falls within the field of lock picking.

[0012] Within this aim, an object of the present invention is to provide a break-in resistant lock for double-web

keys of the type which can be recoded, provided with means adapted to contrast any break-in action which falls within the field of lock picking.

[0013] Another object of the present invention is to provide a break-in resistant lock which has low costs, is relatively simple to provide in practice and is safe in application.

[0014] This aim and these and other objects, which will become better apparent hereinafter, are achieved by the present break-in resistant lock, of the type that comprises a box-like body for accommodating a plurality of contoured plates provided with a respective portion which is suitable for detachable engagement on a corresponding area of a rod which can perform a translational motion and supports, at its free end, at least one bolt which can retract jointly with said rod, said plates being able to perform a vertical translational motion by way of the action of the key and releasing the translational motion, when they are lifted, of said rod and of said bolts for their retraction and protrusion, at least one of said plates being constituted by a respective rear plate and by a respective front tumbler, which are mutually coupled by means of a complementary contoured portion provided on their mutually facing edges, characterized in that said front tumbler comprises a protruding arm which is interposed between the front of the rear plate and a protective housing, said arm having a shape and dimensions which are complementary to the interspace provided between said plate and said housing to prevent the possibility to access the plate with break-in tools.

Brief description of the drawings

[0015] Further characteristics and advantages of the invention will become better apparent and evident from the following detailed description of a preferred but not exclusive embodiment of a break-in resistant lock, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a partially sectional perspective view of a lock according to the invention in an inclined configuration;

Figure 2 is an enlarged-scale view of a detail of the perspective view of Figure 1;

Figure 3 is a partially sectional perspective view of the lock according to the invention in the configuration in which it is inclined at different angle with respect to Figure 1;

Figure 4 is an enlarged-scale view of a detail of the perspective view of Figure 3.

Ways of carrying out the invention

[0016] With reference to the figures, the reference numeral 1 generally designates a break-in resistant lock.

[0017] The lock 1 comprises a box-like body 2 for accommodating a plurality of contoured plates 3 which are

provided with a respective portion (not visible in the figure) suitable for detachable engagement on a corresponding area of a movable rod 4, which supports, at its free end 5, at least one bolt 6 which can retract jointly with the rod 4.

[0018] With particular reference to the embodiment shown in the accompanying figures, the rod 4 supports (with its end 5) four bolts 6 arranged in a parallel configuration.

[0019] The plates 3 can perform a vertical translational motion by way of the action of the key (not visible in the figure), and are designed to release the translational motion, when they are lifted, of the rod 4 and accordingly of the bolt 6 for their retraction and protrusion.

[0020] At least one of the plates 3 is constituted by a respective rear plate 7 (a plate 7 which is adapted to cooperate directly with the rod 4 for the translational motion of the bolts 6) and a respective front tumbler 8 (the lower surface 8a of which constitutes the abutment against which the surface of the key acts during the actuation of the lock 1).

[0021] The plate 7 and the tumbler 8 are mutually coupled by means of a complementarily shaped contoured portion which is provided on their mutually facing edges 9: the contoured portion (which is zigzag-shaped in the accompanying figures) is designed to allow to mutually couple the plate 7 and the tumbler 8 according to a plurality of different configurations, ensuring the possibility to code the lock 1. The new coding must be performed according to the typical methods of the particular lock 1 being used, by using a suitable key or a specific tool.

[0022] The front tumbler 8 comprises a protruding arm 10, which is interposed between the front of the rear plate 7 and a protective housing 11.

[0023] The arm 10, in order to ensure the best possible resistance against break-in actions, has a shape and dimensions which are complementary to the interspace provided between the plate 7 and the housing 11 in order to prevent accessibility to the plate 7 with break-in tools.

[0024] In traditional locks it is possible to interpose a break-in tool between the housing 11 and the traditional tumblers: in this manner, the tool can come into contact with the plates 7, producing their translational motion. This translational motion releases the rod 4 and therefore allows the retraction of the bolts 6.

[0025] The presence of the arm 10 of the tumbler 8 makes it impossible to access the plates 7 and therefore thwarts any break-in attempt.

[0026] The protruding arm 10 is arranged downward and laterally with respect to the front tumbler 8.

[0027] It should be noted that according to an embodiment which is particularly interesting in terms of application, at least two of the various tumblers 8 that are present in the respective contoured plates 3 have a protruding arm 10.

[0028] According to a particular embodiment which is adapted to ensure maximum safety of the lock 1 according to the invention with respect to break-in actions, all

the tumblers 8 of the contoured plates 3 have a respective protruding arm 10.

[0029] The portion 12 of the protective housing 11 faces and lies proximate to the end 13 of the arm 10 which is jointly connected to the tumbler 8.

[0030] The portion 12 tapers toward the end 13 and its tip 14 rests against (or faces and is proximate to) the end 13.

[0031] More particularly, the end 13 comprises an abutment 15 (constituted by a small substantially flat step) for stable resting with a complementary arrangement of its surface with respect to the surface of the tip 14 of the housing 11.

[0032] The abutment 15, according to an alternative embodiment, can simply face and be proximate to the surface of the tip 14.

[0033] According to a possible embodiment, the arm 10 can be rigidly coupled to the tumbler 8 at the end 13 by way of suitable anchoring means. It should be noted that the tumbler 8 generally comprises the arm 10: accordingly, they are formed monolithically.

[0034] It has thus been shown that the invention achieves the proposed aim and objects.

[0035] The invention thus conceived is susceptible of numerous modifications and variations, as defined by the appended claims.

[0036] 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 break-in resistant lock, of the type comprising a box-like body (2) for accommodating a plurality of contoured plates (3) provided with a respective portion which is suitable for detachable engagement on a corresponding area of a rod (4) which can perform a translational motion and supports, at its free end (5), at least one bolt (6) which can retract jointly with said rod (4), said plates (3) being able to perform a vertical translational motion by way of the action of the key and releasing the translational motion, when they are lifted, of said rod (4) and of said bolts (6) for their retraction and protrusion, at least one of said plates (3) being constituted by a respective rear plate (7) and by a respective front tumbler (8), which are mutually coupled by means of a complementary contoured portion provided on their mutually facing edges (9), **characterized in that** said front tumbler (8) comprises a protruding arm (10) which is interposed between the front of the rear plate (7) and a protective housing (11), said arm (10) having a shape and dimensions which are complementary to the inter-

space provided between said plate (7) and said housing (11) to prevent the possibility to access the plate (7) with break-in tools.

2. The lock according to claim 1, **characterized in that** said protruding arm (10) is arranged downward and laterally with respect to said front tumbler (8). 5
3. The lock according to claim 1, **characterized in that** at least two of said tumblers (8) of respective contoured plates (3) have a protruding arm (10). 10
4. The lock according to claim 1, **characterized in that** all of said tumblers (8) of said contoured plates (3) have a respective protruding arm (10). 15
5. The lock according to claim 1, **characterized in that** the portion (12) of said protective housing (11), the portion (12) which faces and is proximate to the end (13) of the arm (10) jointly connected to the tumbler (8) tapers toward said end (13) and its tip (14) is arranged substantially proximate to said end (13). 20
6. The lock according to the preceding claim, **characterized in that** said end (13) comprises a substantially flat abutment (15) for the close alignment, in a complementary arrangement, of its surface with respect to the surface of the tip (14) of the housing (11). 25
7. The lock according to one or more of the preceding claims, **characterized in that** said arm (10) is jointly connected to said tumbler (8) at said end (13) by way of suitable anchoring means. 30

Patentansprüche

1. Ein einbruchssicheres Schloss von der Art, die einen kastenartigen Körper (2) zur Aufnahme einer Vielzahl konturierter Platten (3) umfasst, ausgestattet mit einem entsprechenden Abschnitt, der geeignet ist, für einen lösbaren Eingriff in einen entsprechenden Bereich einer Stange (4), die eine Translationsbewegung durchführen kann und an ihrem freien Ende (5) mindestens einen Bolzen (6) hält, der sich gemeinsam mit der Stange (4) zurückziehen kann, wobei die Platten (3) in der Lage sind, durch das Drehen des Schlüssels eine vertikale Translationsbewegung durchzuführen und die Translationsbewegung wieder zu lösen, wenn sie angehoben werden von der Stange (4) und den Bolzen (6), wobei für ihr Zurückziehen und Herausfahren mindestens eine der Platten (3) aus einer entsprechenden hinteren Platte (7) und einem entsprechenden vorderen Kipp-Zuhalter (8) besteht, die miteinander durch einen komplementär geformten Abschnitt gekoppelt sind, der an ihren einander gegenüberliegenden Kanten (9) bereitgestellt ist, **dadurch gekennzeichnet** 40 45 50

net, dass der vordere Kipp-Zuhalter (8) einen vorstehenden Arm (10) umfasst, der zwischen der Vorderseite der hinteren Platte (7) und einem Schutzgehäuse (11) angebracht ist, wobei der Arm (10) eine Form und Maße hat, die komplementär zu dem Zwischenraum sind, der zwischen der Platte (7) und dem Gehäuse (11) bereitgestellt ist, um die Möglichkeit auszuschließen, auf die Platte (7) mit Einbruchwerkzeugen zuzugreifen.

2. Das Schloss gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der vorstehende Arm (10) abwärts und seitlich zu dem vorderen Kipp-Zuhalter (8) angeordnet ist.
3. Das Schloss gemäß Anspruch 1, **dadurch gekennzeichnet, dass** mindestens zwei der Kipp-Zuhalter (8) entsprechender konturierter Platten (3) einen vorstehenden Arm (10) haben.
4. Das Schloss gemäß Anspruch 1, **dadurch gekennzeichnet, dass** alle Kipp-Zuhalter (8) der konturierten Platten (3) einen entsprechenden vorstehenden Arm (10) haben.
5. Das Schloss gemäß Anspruch 1, **dadurch gekennzeichnet, dass** der Abschnitt (12) des Schutzgehäuses (11), der dem Ende (13) des Arms (10) gegenüberliegt und daran angrenzt, wobei der Arm (10) mit dem Kipp-Zuhalter (8) zusammenwirkend verbunden ist, zu dem Ende (13) hin spitz zuläuft und seine Kuppe (14) im Wesentlichen angrenzend an das Ende (13) angeordnet ist.
6. Das Schloss gemäß dem vorstehenden Anspruch, **dadurch gekennzeichnet, dass** das Ende (13) ein im Wesentlichen flaches Widerlager (15) für die enge Ausrichtung, in einer komplementären Anordnung, seiner Oberfläche im Verhältnis zur Oberfläche der Kuppe (14) des Gehäuses (11) umfasst. 35 40
7. Das Schloss gemäß einem oder mehreren der vorstehenden Ansprüche, **dadurch gekennzeichnet, dass** der Arm (10) an dem Ende (13) durch geeignete Verankerungsmittel zusammenwirkend mit dem Kipp-Zuhalter (8) verbunden ist. 45 50

Revendications

1. Serrure résistant à l'effraction, du type comprenant un corps en forme de boîte (2) pour recevoir une pluralité de plaques ayant un certain contour (3) munies d'une partie respective qui est appropriée pour une prise détachable sur une zone correspondante d'une tige (4) qui peut effectuer un mouvement de translation et qui supporte, à son extrémité libre (5), au moins un pêne (6) qui peut se rétracter conjointement 55

tement à ladite tige (4), lesdites plaques (3) étant susceptibles d'effectuer un mouvement de translation vertical à l'aide de l'action de la clef et relâchant le mouvement de translation, lorsqu'elles sont soulevées, de ladite tige (4) et desdits pènes (6) pour leur rétraction et leur saillie, au moins l'une desdites plaques (3) étant constituée par une plaque arrière respective (7) et par une gorge avant respective (8), qui sont mutuellement couplées à l'aide d'une partie ayant un contour complémentaire disposée sur leurs bords mutuellement en vis-à-vis (9), **caractérisée en ce que** ladite gorge avant (8) comprend un bras saillant (10) qui est interposé entre l'avant de la plaque arrière (7) et un boîtier protecteur (11), ledit bras (10) ayant une forme et des dimensions qui sont complémentaires à l'espace intermédiaire situé entre ladite plaque (7) et ledit boîtier (11) de façon à empêcher la possibilité d'accéder à la plaque (7) avec des outils d'effraction.

2. Serrure selon la revendication 1, **caractérisée en ce que** ledit bras saillant (10) est disposé vers le bas et latéralement par rapport à ladite gorge avant (8). 20
3. Serrure selon la revendication 1, **caractérisée en ce qu'**au moins deux desdites gorges (8) de plaques respectives (3) ayant un certain contour comportent un bras saillant (10). 25
4. Serrure selon la revendication 1, **caractérisée en ce que** toutes lesdites gorges (8) desdites plaques ayant un certain contour (3) comportent un bras saillant respectif (10). 30
5. Serrure selon la revendication 1, **caractérisée en ce que** la partie (12) dudit boîtier protecteur (11), la partie (12) qui fait face à l'extrémité (13) du bras, (10) conjointement relié à la gorge (8), et qui est proche de celle-ci, s'effile vers ladite extrémité (13) et **en ce que** sa pointe (14) est disposée sensiblement à proximité de ladite extrémité (13). 35 40
6. Serrure selon la revendication précédente, **caractérisée en ce que** ladite extrémité (13) comprend une butée sensiblement plate (15) pour l'alignement étroit, en un agencement complémentaire, de sa surface par rapport à la surface de la pointe (14) du boîtier (11). 45
7. Serrure selon l'une ou plusieurs des revendications précédentes, **caractérisée en ce que** ledit bras (10) est conjointement relié à ladite gorge (8) à ladite extrémité (13) à l'aide de moyens d'ancrage appropriés. 50 55

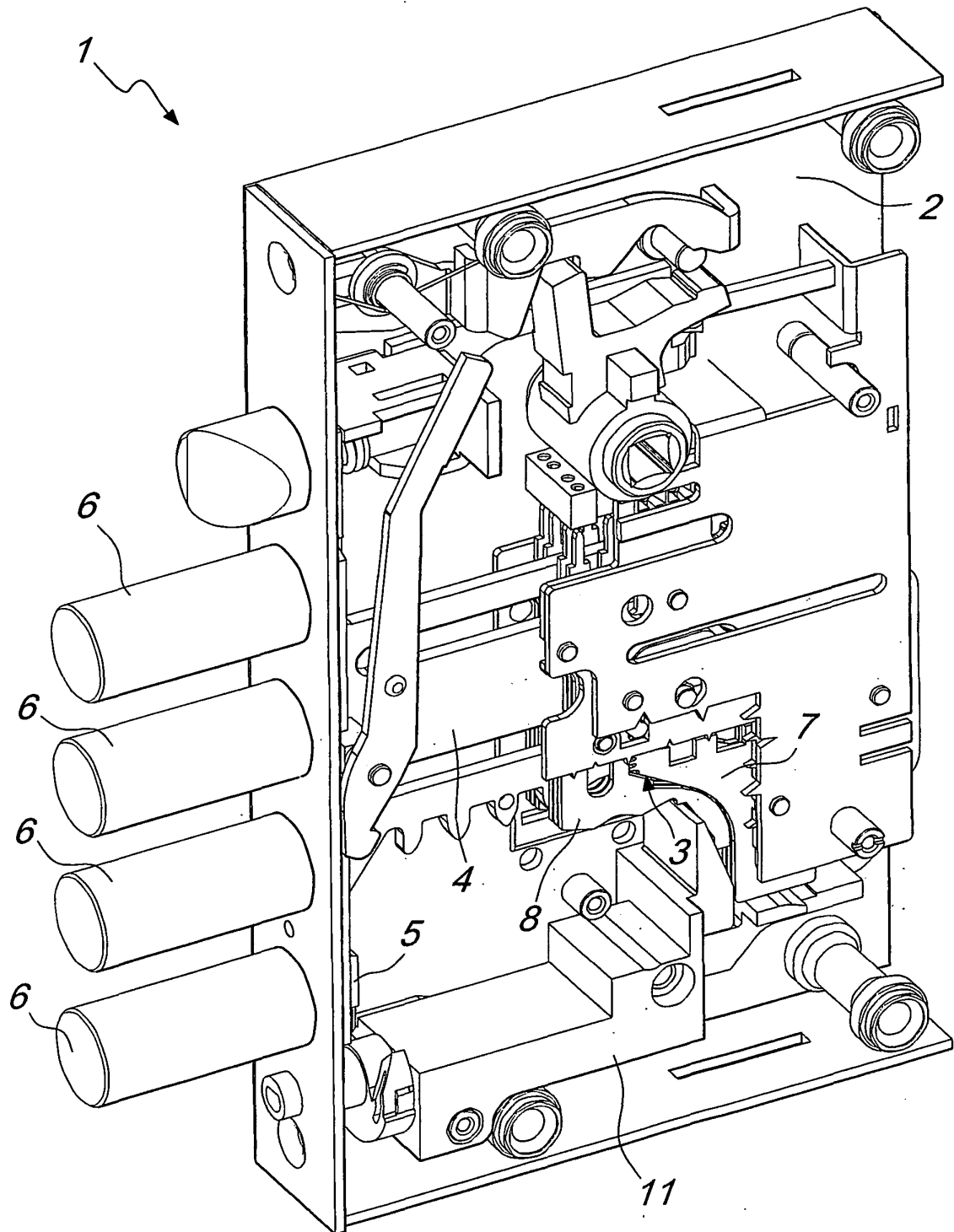


Fig. 1

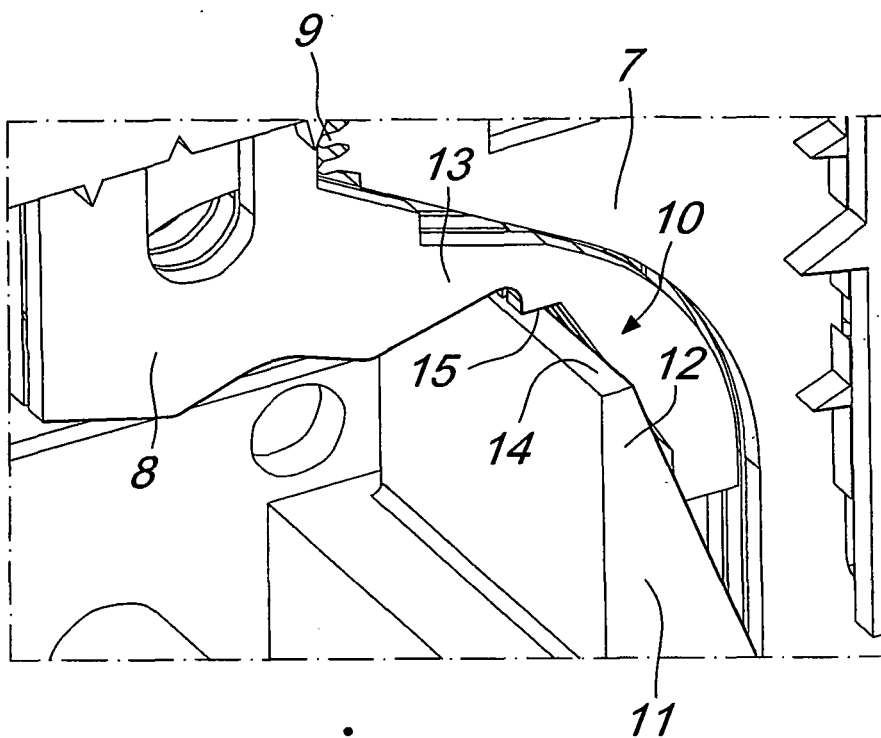


Fig. 2

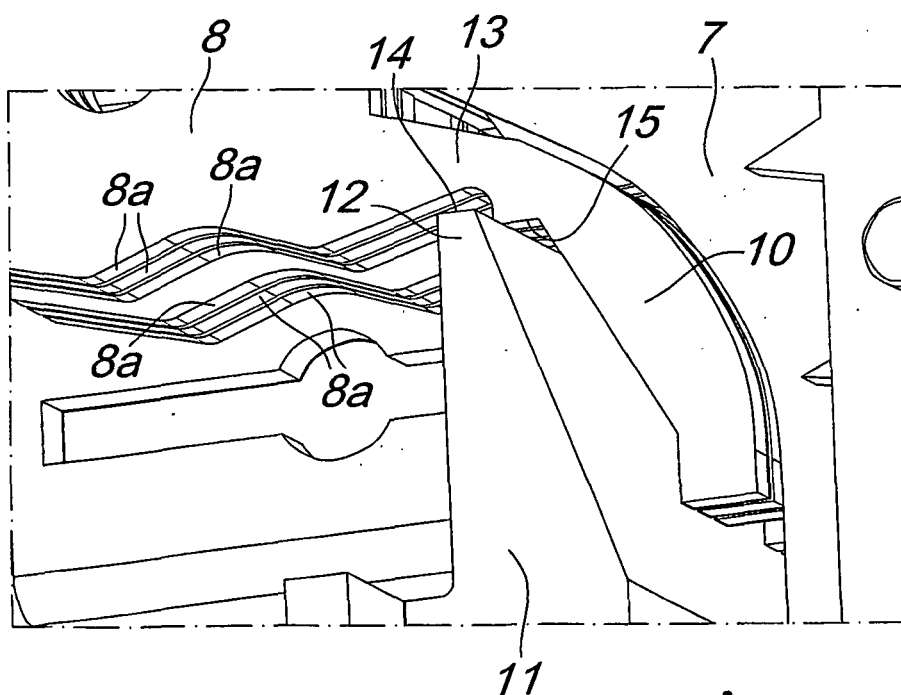


Fig. 4

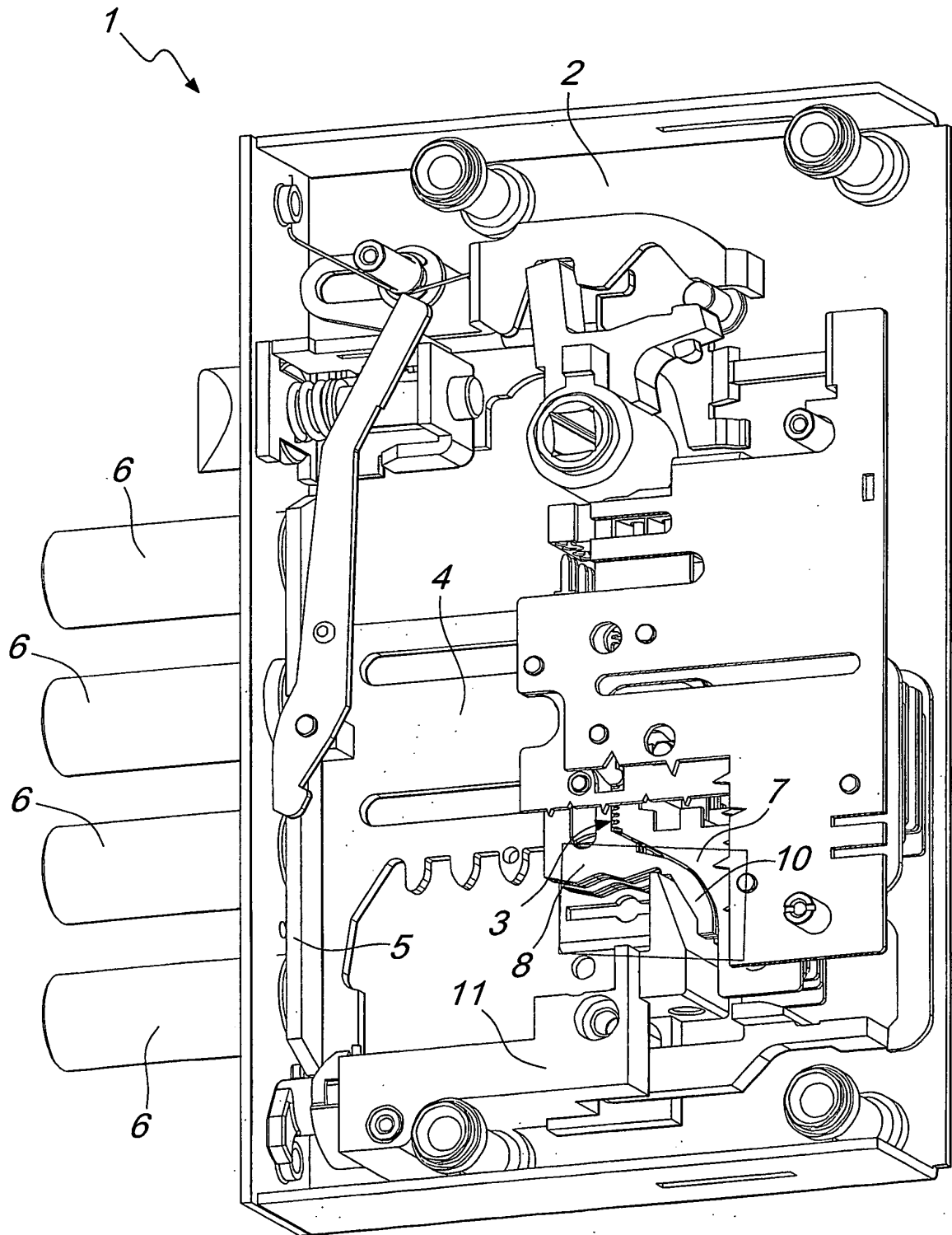


Fig. 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 0943761 A1 [0006]