

Description

[0001] The present invention relates to a padlock.

[0002] Today, padlocks are known that are constituted by a metal body, with a typical substantially parallelepiped conformation, the top surface of which is provided, along two axes that are approximately mutually parallel, with a first and a second seat, that are substantially cylindrical, within which a substantially cylindrical first arm and second arm respectively, of an upside-down U-shaped metal bow are slidingly associated.

[0003] The first arm of the bow is longer than the second arm, in such a way that the second arm can be inserted or extracted axially from the second seat, while simultaneously maintaining the first arm inserted in the first seat.

[0004] The first arm of the metal bow further rotates into the first seat, and can translate longitudinally to the first seat between an internal end position and an external end position, delimited when reaching an adapted end tooth, which protrudes from the internal surface of the first seat, with the transversal ends of a suitable groove that is provided longitudinally on the lateral surface of the first arm.

[0005] A first spring is usually interposed between the bottom of the first seat and the first arm and is adapted to force such first arm towards the external end position.

[0006] In the condition with the first arm at the internal end position and the second arm inserted in the second seat, such second arm can be retained within the second seat by way of an adapted locking tooth that is slidingly accommodated within a cavity that is provided, transversally to the second seat, in the metal body.

[0007] The locking tooth is forced toward the second arm by the action of a second spring that is interposed between the locking tooth and the bottom of the cavity; such locking tooth, when pushed by the second spring, is inserted within a suitable third seat formed in the facing lateral surface of the second arm, thus preventing its removal from the second seat, and therefore maintaining the padlock in the closed condition.

[0008] The locking tooth is connected to an eccentric that is made to move by way of the reel of a lock inserted in the metal body and is actuated by way of an adapted key.

[0009] It is possible to make the reel rotate, and thus the eccentric, by rotating the key in the appropriate direction, with the subsequent translational movement of the locking tooth, in contrast to the second spring, and the coming out of such locking tooth from the third seat; the second arm of the bow may thus be removed from the respective second seat by the action of the thrust of the first spring on the first arm of such bow.

[0010] The first arm of the bow may then be inserted, for example, in two links of a chain to be mutually joined, and may thus be fixed again in the first seat, thus coupling detachably such links to each other and to such arm.

[0011] Such padlock of a known type has, however, a

drawback; in fact the lock is accessible from the outside, and therefore is exposed to possible tampering or acts of vandalism including, for example, the introduction, through the key access slit, of glue or other substances that could damage the reel.

[0012] Further, the lock is exposed to atmospheric agents such as, for example, rain or snow that put the lock at risk of oxidation and/or deterioration.

[0013] The aim of the present invention is to solve the technical problems mentioned, eliminating the drawbacks of the known cited art, by providing a padlock that reduces the risk of its unauthorized opening and tampering.

[0014] Within this aim, an object of the invention is to provide a padlock that can be exposed to atmospheric agents such as, for example, rain or snow reducing the risk of becoming damaged or deteriorating.

[0015] Another object of the invention is to provide a padlock that is structurally simple and with low manufacturing costs.

[0016] This aim and these and other objects that will become better apparent hereinafter, are achieved by a padlock comprising a body in which a first seat is provided, to which a pivot is slidingly associated, said body and pivot being shaped in such a way so that together they form a ring that can be selectively opened and closed by way of the sliding of the pivot with respect to the body, characterized in that in said body a cavity is formed, that is arranged transversally to said first seat and communicates with it, to which a pin is slidingly associated which is adapted to abut against a first groove, that is formed within said pivot, to temporarily block the sliding of said pivot with respect to said first seat in the condition in which the padlock is closed, one or more appendages protruding approximately radially from the lateral surface of said pin and interacting with one or more cams that are rotatably associated within said body and that selectively interact with magnetic means that are adapted to selectively modify the position of said cams in order to either lock or allow said pin to slide within said cavity, and respectively block or unblock the sliding of said pivot with respect to said first seat.

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

Figure 1 is a perspective view of a padlock according to the invention in the closed condition;

Figure 2 is a perspective view of the padlock of Figure 1 in the open condition;

Figure 3 is an exploded perspective view of the padlock of the preceding Figures;

Figure 4 is a partially sectional perspective view of the padlock of the preceding Figures;

Figures 5 and 6 are cross-sections taken along a

vertical median plane of the padlock according to the invention, respectively in the closed and open conditions;

Figures 7 and 8 are cross-sections taken along a vertical median plane of another embodiment of the padlock according to the invention, respectively in the closed and open conditions.

[0018] In the exemplary embodiments that follow, individual characteristics, given to specific examples, may actually be interchanged with other different characteristics that exist in other exemplary embodiments. Moreover, it is noted that anything found to be already known during the patenting process is understood not to be claimed and to be the subject of a disclaimer.

[0019] With reference to the figures, the reference numeral 1 designates a padlock comprising a body 2, made of metal, in which a first seat 3 is provided with which a pivot 4, advantageously made of steel, is slidingly associated.

[0020] The body 2 and the pivot 4 are shaped in such a way so that together they form a ring, which can be selectively opened and closed by way of the sliding of the pivot 4 with respect to the body 2.

[0021] In the embodiment shown in Figures 1 through 6, the body 2 is, advantageously, in a front view, almost U-shaped, with a first base 5 that is preferably approximately parallelepiped and from which a first branch 6 and a second branch 7 respectively protrude that are substantially parallelepiped and about mutually parallel.

[0022] In this case, the first seat 3 is provided within the first branch 6, beginning from the surface of the first branch which faces the second branch 7, and is blind and preferably approximately cylindrical.

[0023] The second branch 7 is provided with a second seat 8 that has, in a transverse section, the same shape as the first seat 3, and is provided according to the same axis: in the embodiment shown in Figures 1 through 6, the second seat 8 is thus substantially cylindrical and is further completely open.

[0024] In the embodiment shown in Figures 1 through 6, the pivot 4 is substantially rectilinear, has a length that exceeds the distance between the first and second branches of the body 2 and, in a transverse section, is substantially shaped to complement the first and second seats, and is therefore substantially cylindrical in shape; the pivot 4 can therefore be arranged in the second seat 8 and, simultaneously inserted with its front end 4a in the first seat 3, thus forming along with the body 2, a closed ring, as shown for example in Figure 1.

[0025] The pivot 4 can further be made to slide longitudinally with respect to the second seat 8, until its front end 4a comes out of the first seat 3 so as to form, along with the body 2, an open ring, as shown for example in Figure 2.

[0026] In the embodiment shown in Figures 7 and 8, the body 2 is instead provided with a substantially parallelepiped conformation, and is provided, on its top sur-

face, with a first seat 3 and a second seat 8, both of which are substantially cylindrical in shape and about mutually parallel.

[0027] The pivot 4, in this case, has a transverse section that is substantially circular in shape, has a diameter that is slightly inferior to those of the first and second seats, and has in plan view an approximately upside-down U shape, so as to form a bow that is provided with a second base 9, with an arched profile, from which a first arm 10 and a second arm 11 protrude, which are substantially mutually parallel, and are slidingly and rotatably associated respectively within the first and second seats of the body 2.

[0028] Advantageously, the first arm 10 has a length higher than the second arm 11 so that the second arm can be inserted or axially extracted from the second seat 8, while simultaneously maintaining the first arm 10 inserted in the respective first seat 3.

[0029] The pivot 4 and the body 2 together constitute, also in this case, a ring that can be selectively opened and closed by way of the sliding of the pivot 4 with respect to the body 2.

[0030] Advantageously, with reference to both the embodiment shown in Figures 1 through 6 and the embodiment shown in Figures 7 and 8, the body 2 is provided with a cavity 12 that is arranged transversally to the first seat 3 and communicates therewith, and to which a pin 13 is slidingly associated that is adapted to abut an adapted first groove 14 provided within the pivot 4 in order to temporarily block the sliding movement of the pivot with respect to the first seat 3, in the condition in which the padlock is closed.

[0031] Advantageously, the cavity 12 has a substantially cylindrical conformation; the pin 13 is substantially shaped to complement the cavity 12, and therefore such pin has also a substantially cylindrical conformation, with the front end 13a, which faces the first seat 3, suitably rounded.

[0032] The pin 13 is forced towards the first seat 3 by way of first elastic means constituted, for example, by a first helical spring 15 interposed between the pin 13 and the bottom of the cavity 12, or an adapted first cap 16 for closing such cavity.

[0033] In the embodiment shown in the Figures, the first groove 14 is annularly provided within the lateral surface of the pivot and has, in a cross-section taken along a longitudinal median plane with respect to such pivot, a flared conformation that is preferably about an isosceles trapezium or an isosceles triangle in shape, so as to form a first inclined plane 17 that is adapted to push the pin 13 away from the pivot 4 during the sliding of the pivot in the direction of its coming out from the first seat 3.

[0034] Advantageously, the front end 4a of the pivot 4, beginning from the first groove 14, is substantially troncoconical in shape, so as to form a second inclined plane 18, that is adapted to push the pin 13 away from the pivot 4 during the sliding of such pivot in the direction of its insertion in the first seat 3.

[0035] One or more appendages 19 protrude approximately radially from the lateral surface of the pin 13, and are preferably cylindrical or prismatic in shape, and are substantially mutually parallel and are mutually aligned according to a generatrix of the pin 13.

[0036] The appendages 19 interact with one or more cams 20 that are substantially cylindrical in shape and are rotatably associated within the body 2 and selectively interact with magnetic means that are adapted to selectively modify the position of such appendages in order to block or allow the sliding movement of the pin 13 into the cavity 12, and thus to block or unblock respectively the sliding movement of the pivot 4 with respect to the first seat 3.

[0037] Advantageously, the cams 20 are rotatably accommodated within adapted third seats 21, which are substantially cylindrical in shape, and are provided on the bottom of a slot 22, that preferably has an approximately rectangular plan shape, and is provided within the body 2; advantageously, the third seats 21 are arranged so that their longitudinal axes are about mutually parallel and mutually aligned approximately according to the longitudinal median axis of the pin 13.

[0038] Advantageously, the cams 20 are kept within the respective third seats 21 by way of first caps 23 that at least partially have a plan shape that complements the third seats 21 in order to be fixed by pressure therein.

[0039] The first caps 23 are in turn covered by a second cap 24 that has a plan shape that complements the slot 22, and is fixed therein and positioned at the desired distance from the perimeter's edge of such slot.

[0040] Advantageously, a cut-out portion 25, that preferably but not necessarily has an approximately semi-circular plan shape, is provided on the lateral surface of the cams 20, along a generatrix and beginning from the surface of the cams which faces the pin 13, and one of the appendages 19 may be accommodated therein.

[0041] Advantageously, said magnetic means comprise one or more first magnets 26, which are associated in a suitable position with respect to the cams 20.

[0042] Such magnetic means, moreover, comprise an adapted magnetic key 27 comprising a plate 28, that at least partially has a plan shape that partially complements the slot 22, so that it can be positioned partially within such slot, resting on the second cap 24.

[0043] Advantageously, one or more small disks 29 are arranged on the plate 28 and one or more second magnets 30 are associated therewith that are adapted to magnetically interact with the first magnets 26 of the cams 20, in the condition in which the plate 28 is positioned on the second cap 24, so as to cause the desired rotation of such cams 20.

[0044] Advantageously, the mutual position of the first and second magnets is such that, in the condition in which the plate 28 is positioned on the second cap 24, the through holes 25 of the cams 20 are all facing towards the first seat 3 and are mutually aligned approximately along the longitudinal median axis of the pin 13, so that

the appendages 19 can be inserted in such through holes 25, and the pin 13 is free to slide within the respective cavity 12, thus freeing the sliding movement of the pivot 4 and allowing the padlock 2 to open.

[0045] The position of the first magnets 26 with respect to the cams 20 univocally defines the position where the second magnets 30 of the disks 29 should be positioned with respect to the plate 28 of the magnetic key 27 in order to allow the padlock 2 to be opened; therefore only one magnetic key 27 is associated with each configuration of the first magnets 26 and the cams 20.

[0046] Advantageously, the magnetic key 27 further comprises a third cap 31 that is hinged to the plate 28 and is adapted to close the disks 29.

[0047] Advantageously, the padlock 1 comprises retaining means that are adapted to prevent the separation of the pivot 4 from the body 2.

[0048] In the embodiment shown in Figures 1 through 6, such retaining means advantageously comprise a locking pin 32 that is slidingly associated with a fourth seat 33, formed within the body 2, transversally to the second seat 8 and communicating therewith; the locking pin 32 is forced against the lateral surface of the pivot 4 by way of second elastic means that are constituted, for example, by a second helical spring 34 that is interposed between the bottom of the fourth seat 33 and the locking pin 32.

[0049] On the lateral surface of the pivot 4 a slot 35 is provided in which, when it is positioned at the fourth seat 33, the locking pin 32 enters, by the action of the second helical spring 34, thus preventing the further sliding movement of the pivot 4 away from the first seat 3.

[0050] On the lateral surface of the slot 35, a third inclined plane 36 is formed that is adapted to push the locking pin 32 towards the bottom of the fourth seat 33 during the sliding movement of the pivot 4 towards the first seat 3.

[0051] In the embodiment shown in Figures 7 and 8, such retaining means are constituted by an abutment element 37, for example a pin, that radially protrudes from the lateral surface of the first seat 3 and is adapted to abut, with its two ends, against a second groove 38 that is provided annularly on the pivot 4, so as to limit the sliding movement of such pivot with respect to the first seat 3.

[0052] The use of the invention is the following.

[0053] With reference to the accompanying Figures, when the pivot 4 is inserted in the first seat 3, and the magnetic key 27 is not associated with the slot 22, the cams 20, due to the mutual interaction of the first magnets 26 of such cams, are arranged in such a way that the through holes 25 of such cams do not face the first seat 3.

[0054] The appendages 19 abut with the lateral surface of the cams 20, preventing the pin 13 from translating away from the pivot 4; thus the front end 13a of the pin 13 remains inserted in the first groove 14, and prevents the pivot 4 from sliding with respect to the first seat 3, maintaining the padlock 4 in the closed condition.

[0055] By arranging the magnetic key 27 in the slot 22, with the plate 28 resting on the second cap 24, the second magnets 30 of the magnetic key 27 magnetically mate with the first magnets 26 of the cams 20 and thus induce the rotation of such cams until all the through holes 25 of the cams 20 face towards the first seat 3 and are mutually aligned approximately according to the longitudinal median axis of the pin 13.

[0056] By exercising traction on the pivot 4 in the direction of extraction of its front end 4a from the first seat 3, the first inclined plane 17, which is formed by the first groove 14, abuts against the front end of the pin 13, pushing the pin away from the pivot 4; as shown for example in Figures 6 and 8, the pin 13 can translate away from the pivot 4 because the appendages 19 that protrude from such pin can be inserted within the through holes 25 of the cams 20.

[0057] By continuing to exercise traction on the pivot 4 in the direction of its coming out of the first seat 3, it is thus possible to obtain the opening of the padlock 1.

[0058] The separation of the pivot 4 from the body 2 is prevented by the retaining means of such pivot 4 previously described.

[0059] To close the padlock 1, with the magnetic key 27 associated with it, it is sufficient to push the pivot 4 in the direction of its insertion within the first seat 3; the second inclined plane 18 provided at the front end 4a of the pivot 4 abuts against the front end 13a of the pin 13, pushing such pin towards the inside of the cavity 12 and thus allowing for the passage of the pivot 4, and the subsequent positioning of the front end 13a of such pin 13, by the action of the first helical spring 15, in the first groove 14.

[0060] It has thus been found that the invention described achieves the intended aim and objects, providing a padlock that, in the closed condition, has no parts that are accessible from the outside, including for example a keyhole, and thus reduces the risk of unauthorized opening or tampering of such padlock.

[0061] Further, the fact that no parts are accessible from the outside when in the closed condition, allows the padlock according to the invention to be exposed to atmospheric agents, including from example rain or snow, reducing the risk of damage or deterioration of such padlock.

[0062] Moreover, as the appendages that protrude from the pin may only all simultaneously be inserted in the respective through holes of the contiguous cams, it is not possible to open the padlock through manipulation by orienting one cam at a time, for example with the help of a magnet, and insert one appendage at a time in the through hole of such cam, which thus makes the padlock according to the invention more resistant against unauthorized opening.

[0063] Further, the manufacturing costs of the padlock according to the invention are low, as it is provided solely with components that are easily manufactured and/or assembled.

[0064] Naturally the invention is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0065] Naturally the materials used, as well as the dimensions constituting single components of the invention, could be more pertinent according to the specific needs.

[0066] The different means for providing certain different operations certainly do not need to coexist solely in the embodiment shown, but can be present in many embodiments, that are also not shown.

[0067] The characteristics designated as advantageous, suitable or the like, can be missing or substituted with other equivalent elements.

[0068] Where technical features mentioned in any claim are followed by reference numbers and/or signs, those reference numbers and/or signs have been included for the sole purpose of increasing intelligibility of the claims and accordingly, such reference numbers and/or signs do not have any effect on the interpretation of each element identified by way of example by such reference numbers and/or signs.

Claims

1. A padlock comprising a body in which a first seat is provided, to which a pivot is slidingly associated, said body and pivot being shaped in such a way so that together they form a ring that can be selectively opened and closed by way of the sliding of said pivot with respect to said body, **characterized in that** in said body a cavity is formed, that is arranged transversally to said first seat and communicates with it, to which a pin is slidingly associated which is adapted to abut against a first groove, that is formed within said pivot, to temporarily block the sliding of said pivot with respect to said first seat in the condition in which the padlock is closed, one or more appendages protruding approximately radially from the lateral surface of said pin and interacting with one or more cams that are rotatably associated within said body and that selectively interact with magnetic means adapted to selectively modify the position of said cams in order to either block or allow said pin to slide within said cavity, and respectively block or unblock the sliding of said pivot with respect to said first seat.
2. The padlock according to claim 1, **characterized in that** said cavity and said pin have a substantially cylindrical conformation, the front end of said pin, facing towards said first seat, being rounded.
3. The padlock according to one or more of the preceding claims, **characterized in that** said pin is forced towards said first seat by way of first elastic means.

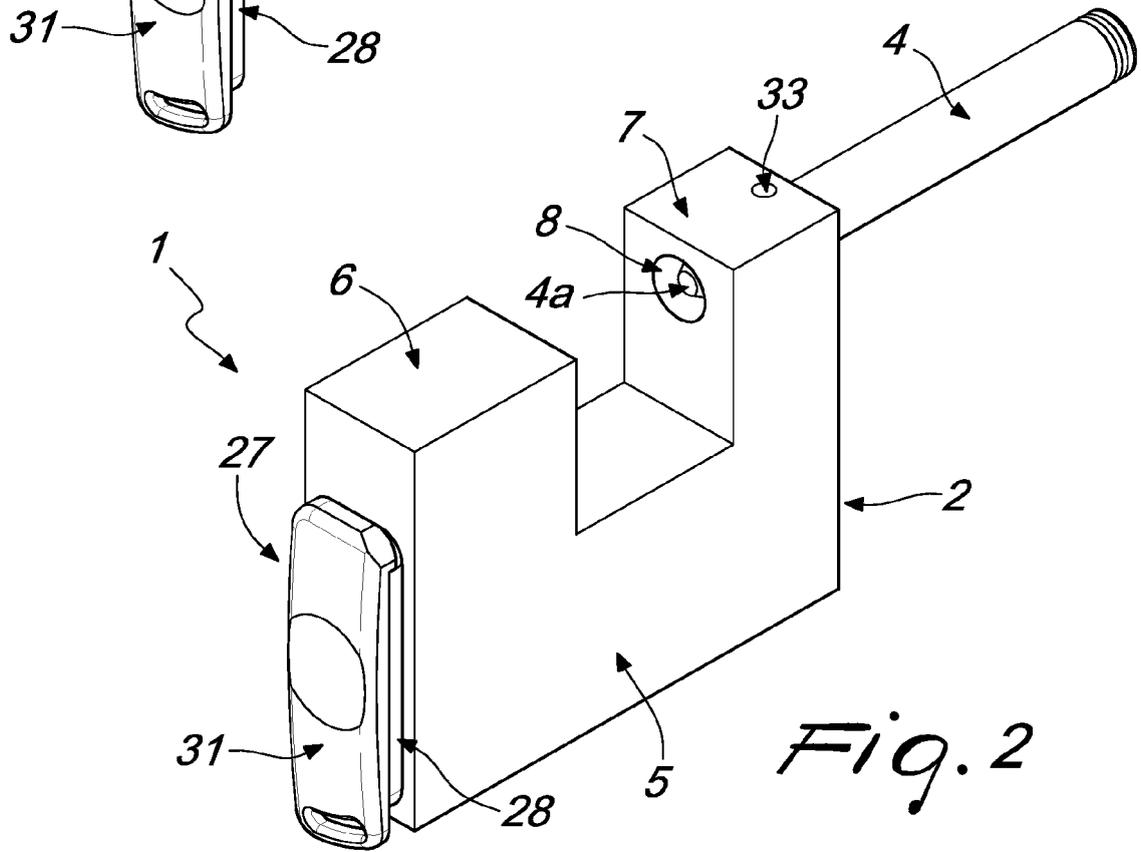
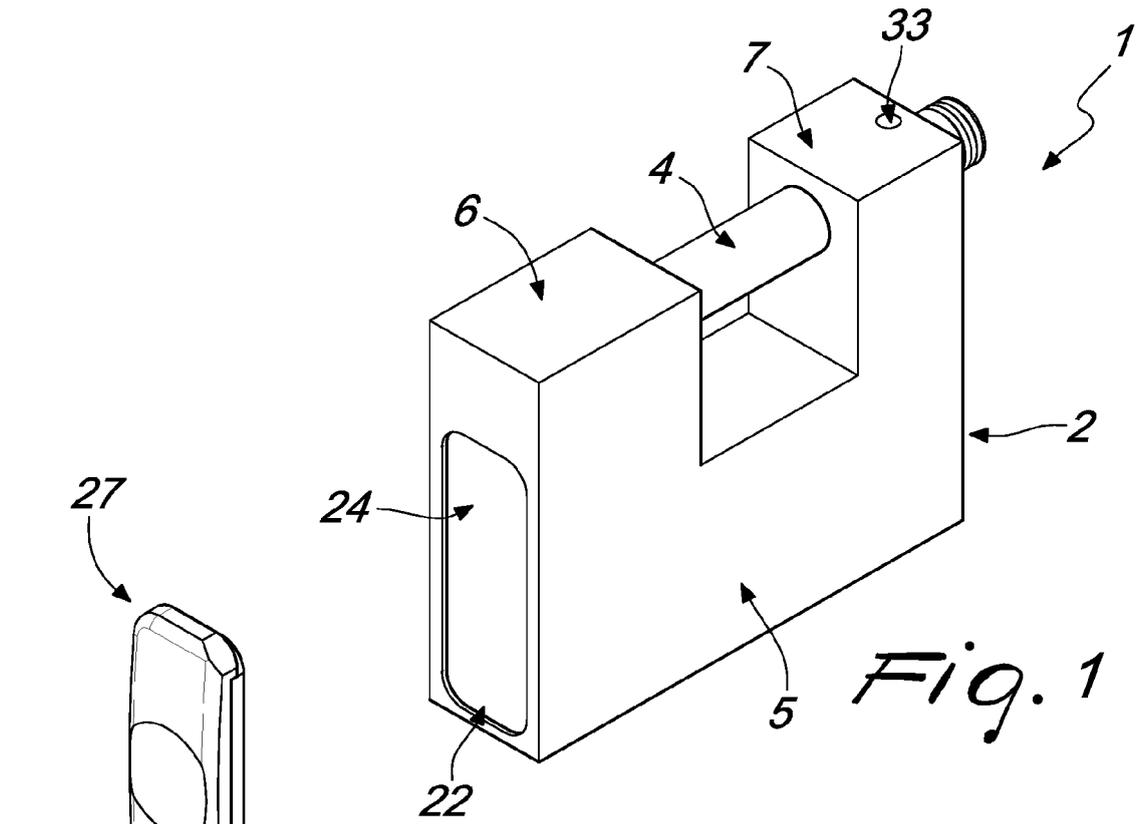
4. The padlock according to claims 1 and 3, **characterized in that** said first elastic means are constituted by a first helical spring that is interposed between said pin and the bottom of said cavity, or by a first cap to close said cavity.
5. The padlock according to one or more of the preceding claims, **characterized in that** said first groove is annularly provided within the lateral surface of said pivot and has, in a cross-section taken along a longitudinal median plane of said pivot, a flared conformation, that is preferably about an isosceles trapezium or an isosceles triangle in shape, so as to form a first inclined plane adapted to push said pin away from said pivot during the sliding of said pivot in the direction of its coming out of said first seat.
6. The padlock according to one or more of the preceding claims, **characterized in that** the front end of said pivot, beginning from said first groove, is substantially troncoconical in shape, so as to form a second inclined plane that is adapted to push said pin away from said pivot during the sliding of said pivot in the direction of its insertion in said first seat.
7. The padlock according to one or more of the preceding claims, **characterized in that** said one or more appendages are substantially mutually parallel and are mutually aligned approximately according to a generatrix of said pin.
8. The padlock according to one or more of the preceding claims, **characterized in that** said one or more appendages are substantially cylindrical or prismatic in shape.
9. The padlock according to one or more of the preceding claims, **characterized in that** said one or more cams are rotatably accommodated within one or more third seats, which are substantially cylindrical in shape, and are provided on the bottom of a slot that has a preferably approximately rectangular plan shape and is formed within said body, said third seats being arranged so that their longitudinal axes are about mutually parallel and mutually aligned according to the longitudinal median axis of said pin.
10. The padlock according to claims 1 and 9, **characterized in that** said one or more cams are kept within said respective third seats by way of one or more first caps that at least partially have a plan shape that complements said third seats, in order to be fixed by pressure therein, said first caps being covered by a second cap that has a plan shape that complements said slot, and is fixed therein and positioned at the desired distance from the perimetric edge of said slot.
11. The padlock according to claims 1 and 10, **characterized in that** on the lateral surface of said one or more cams a through hole is provided, along a generatrix and beginning from the surface of said cams which faces said pin, within which one of said one or more appendages may be accommodated.
12. The padlock according to one or more of the preceding claims, **characterized in that** said magnetic means comprise one or more first magnets, which are associated, in a suitable position, with said cams.
13. The padlock according to claims 1 and 12, **characterized in that** said magnetic means comprise a magnetic key that comprises a plate, that at least partially has a plan shape that complements said slot, so as to be able to be positioned at least partially within said slot, and rests on said second cap, on said plate being arranged one or more small disks to which one or more second magnets are associated that are adapted to magnetically interact with said first magnets of said cams in the condition in which said plate is positioned on said second cap, so as to cause the desired rotation of said cams.
14. The padlock according to claims 1 and 13, **characterized in that** the mutual position of said first and second magnets is such that, in the condition that said plate is positioned on said second cap, said through holes of said cams all face said first seat and are mutually aligned approximately according to the longitudinal median axis of said pin, so that said one or more appendages can be inserted in said through holes, and said pin is free to slide within said cavity, freeing the sliding movement of said pivot and allowing said padlock 2 to open.
15. The padlock according to claims 1 and 14, **characterized in that** said magnetic key comprises a third cap that is hinged to said plate and is adapted to close said disks.
16. The padlock according to one or more of the preceding claims, **characterized in that** it comprises retaining means that are adapted to prevent the separation of said pivot from said body.
17. The padlock according to claims 1 and 16, **characterized in that** said body is, in a front view, almost U-shaped to form a first base from which a first branch and a second branch respectively protrude that are about mutually parallel, said first seat, which is blind, being formed within said first branch, beginning from the surface of said first branch which faces said second branch, in said second branch being provided, according to the same axis as said first seat, a second seat, said pivot being substantially rectilinear and having a length that exceeds the dis-

tance between said first and second branches so as to be slidingly positioned within said second seat and simultaneously, with its front end, in said first seat, **characterized in that** said retaining means comprise a locking pin that is slidingly associated with a fourth seat, provided within said body, that is located transversally to said second seat and communicates therewith, said locking pin being forced against said lateral surface of said pivot by way of second elastic means that are interposed between the bottom of said fourth seat and said locking pin, on said lateral surface of said pivot being provided a slot in which, when it is positioned at said fourth seat, said locking pin enters, by the action of said second elastic means, thus preventing the further sliding movement of said pivot away from said first seat.

18. The padlock according to claims 1 and 17, **characterized in that** on the lateral surface of said slot, a third inclined plane is formed which is adapted to push said locking pin towards the bottom of said fourth seat during the sliding movement of said pivot towards said first seat.
19. The padlock according to claims 1 and 16, **characterized in that** said body has a substantially parallelepiped conformation, said first seat being provided on the top surface of said body, together with a second seat that is substantially cylindrical in shape and about parallel thereto, said pivot having a transversal section that is substantially circular and with a diameter that is slightly inferior to those of said first and second seats, and having about an upside-down U-shape in plan view, so as to form a bow that is provided with a second base, with an arched profile, from which a first and second arm protrude, which are substantially mutually parallel and are slidingly and rotatably associatable respectively within said first and second seats, said first arm having a length that is higher than said second arm, **characterized in that** said retaining means are constituted by an abutment element that radially protrudes from the lateral surface of said first seat and is adapted to abut with two terminal ends of a second groove that is annularly provided on said lateral surface of said pivot, in such a way as to limit the sliding movement of said pivot with respect to said first seat.

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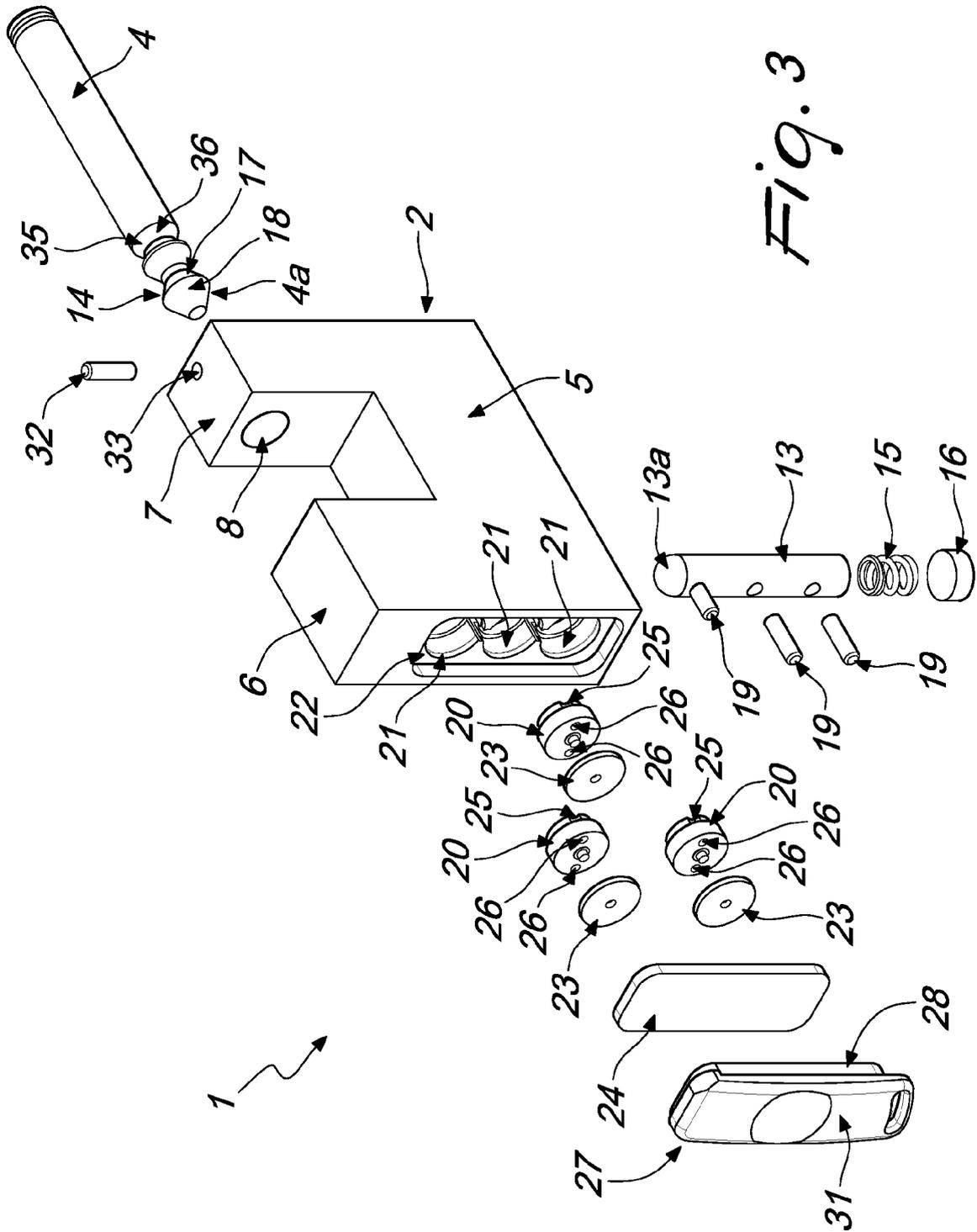


Fig. 3

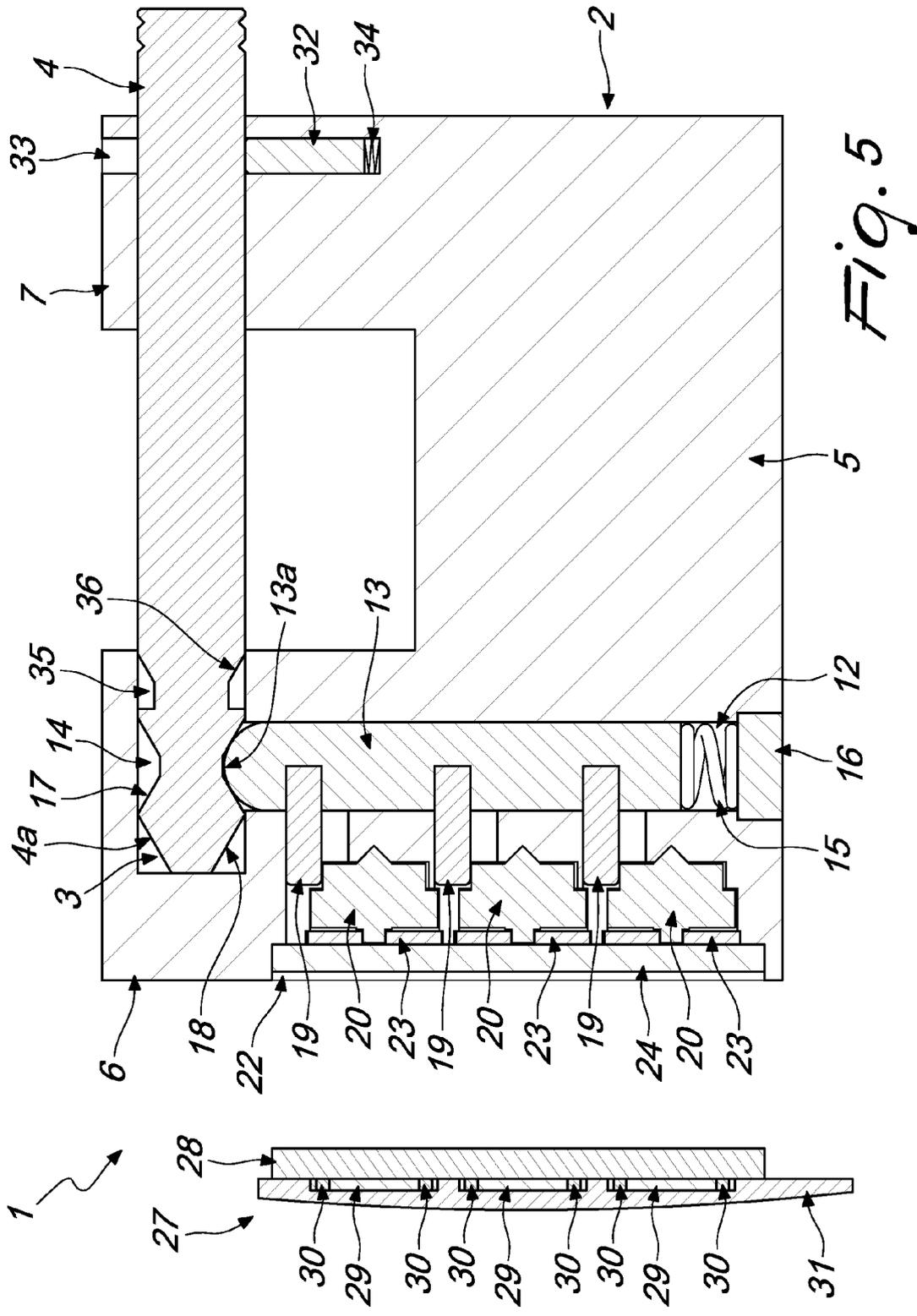


Fig. 5

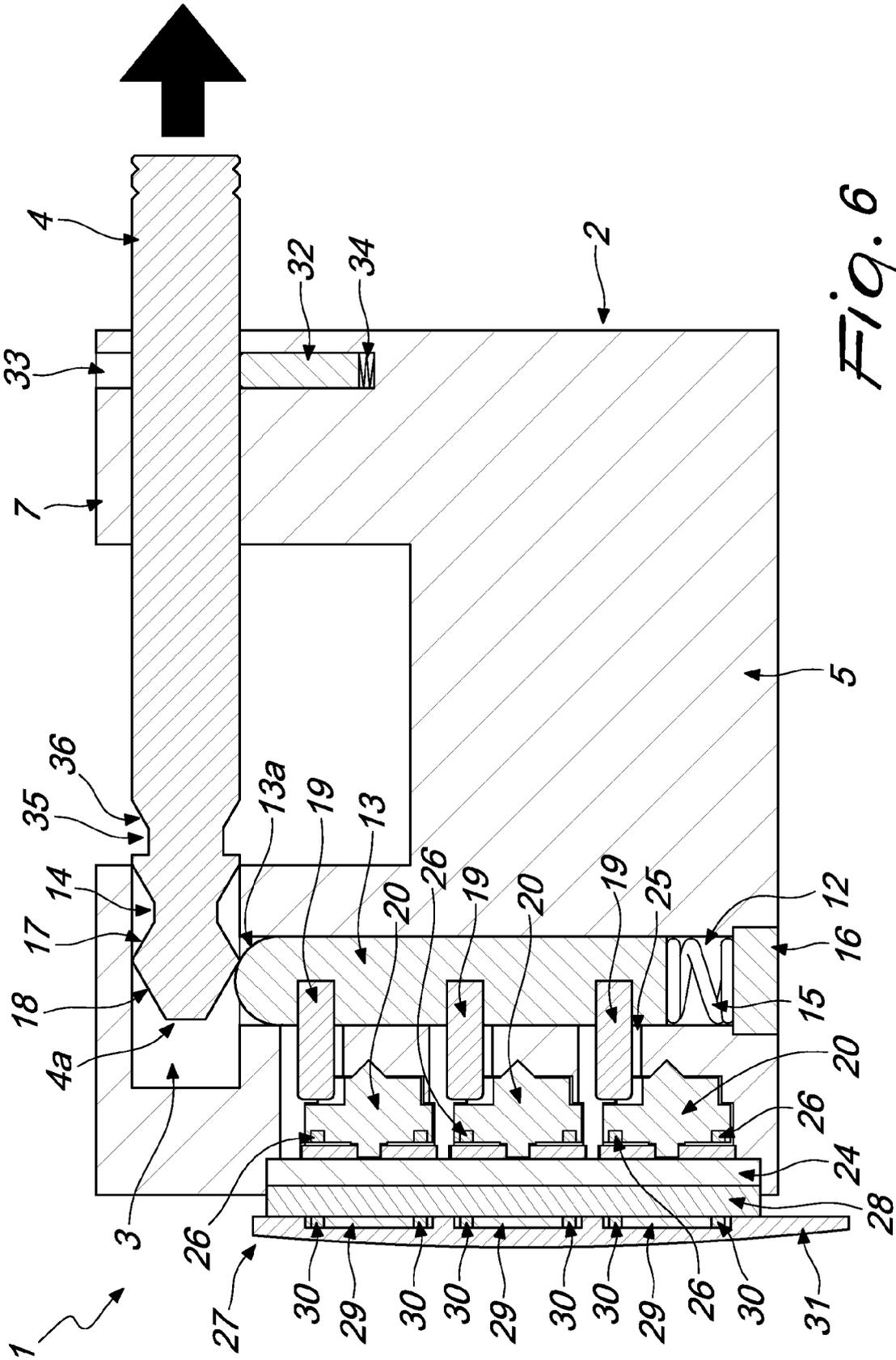


Fig. 6

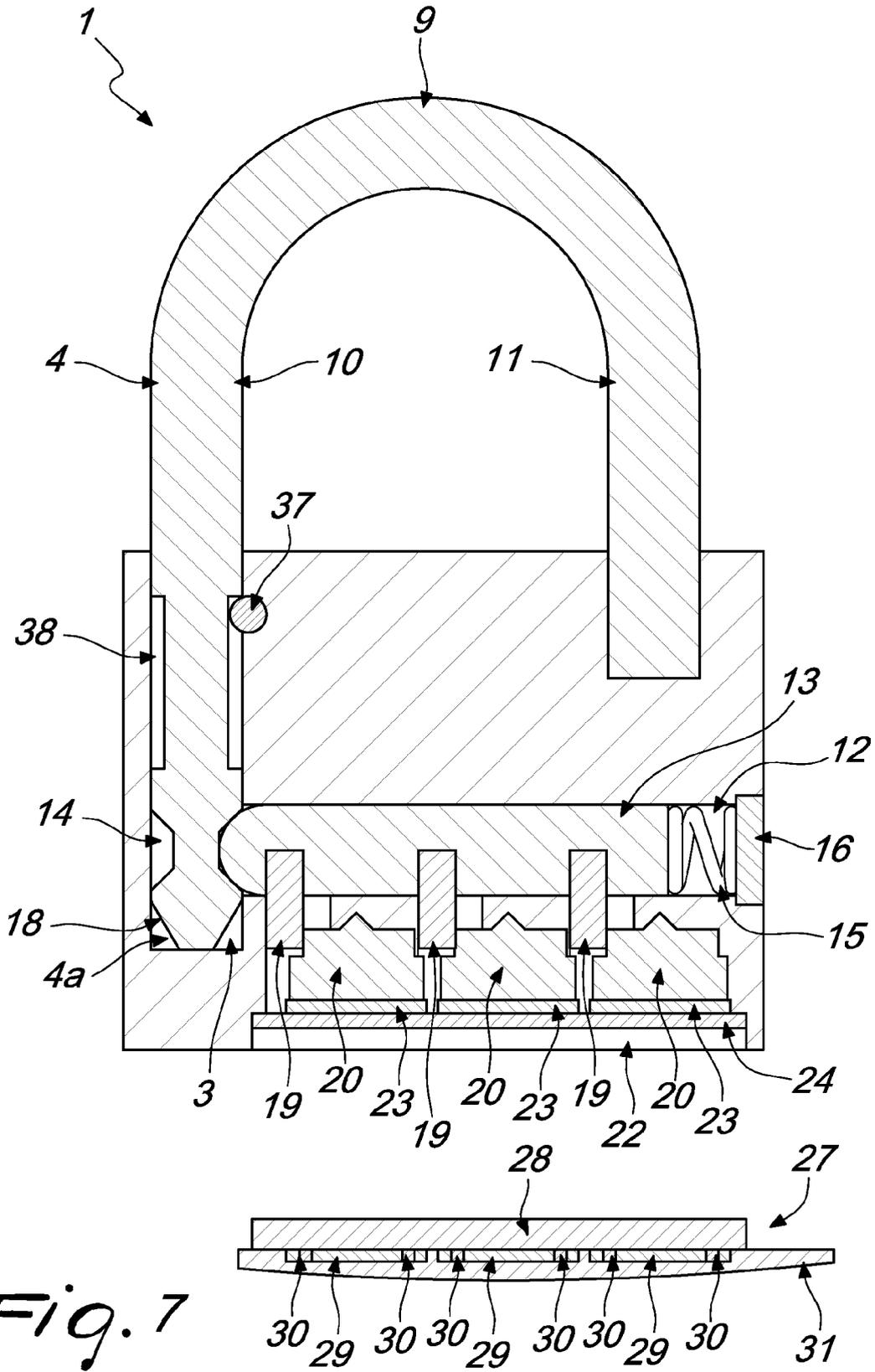


Fig. 7

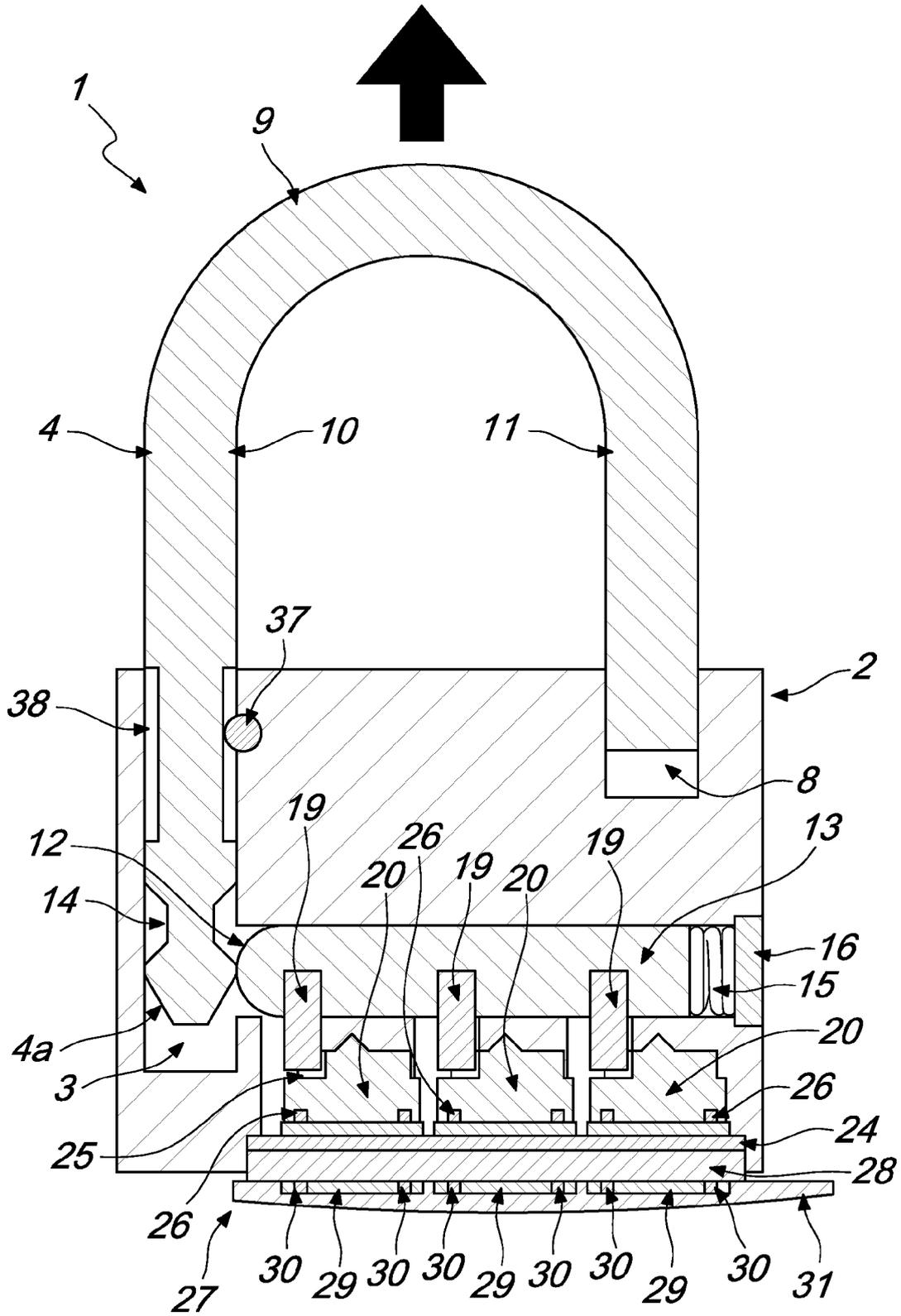


Fig. 8



EUROPEAN SEARCH REPORT

Application Number
EP 09 17 8740

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	US 7 076 976 B1 (GOLDMAN ILAN [IL]) 18 July 2006 (2006-07-18) * column 3, line 24 - column 7, line 50; figures 1-4 *	1-19	INV. E05B47/06 E05B67/22 E05B67/36
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A	US 6 047 575 A (LARSON WAYNE F [US] ET AL) 11 April 2000 (2000-04-11) * abstract; claim 1; figures 1-5 *	1-19	
A	DE 20 2005 007711 U1 (SANCHEZ ALEXANDER W [DE]) 4 August 2005 (2005-08-04) * the whole document *	1	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC) E05B
Place of search Munich		Date of completion of the search 8 June 2010	Examiner Friedrich, Albert
CATEGORY OF CITED DOCUMENTS 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		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 & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.02 (P04CO1)

ANNEX TO THE EUROPEAN SEARCH REPORT
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EP 09 17 8740

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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