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(54) Electric lock for safety doors

(57) A lock (1) for bar-type handles for safety doors with electrically-operated means for opening from the outside, comprising a box-like body (2) which can be accommodated in a door (3) and is provided with a closure latch which can be actuated from the inside by means of a bar-type or lever-type handle (20) and from the outside by means of a lever-type handle controlled by key-operated means, means for actuating the latch being further provided and being connected to first actuation means (21) associated with the bar-type handle and to second actuation means (30) associated with the lever-type handle, the lock further comprising means (40) for activating the second actuation means (30), which can be driven electrically, and manual actuation means (70) for opening the latch by way of key-operated means.

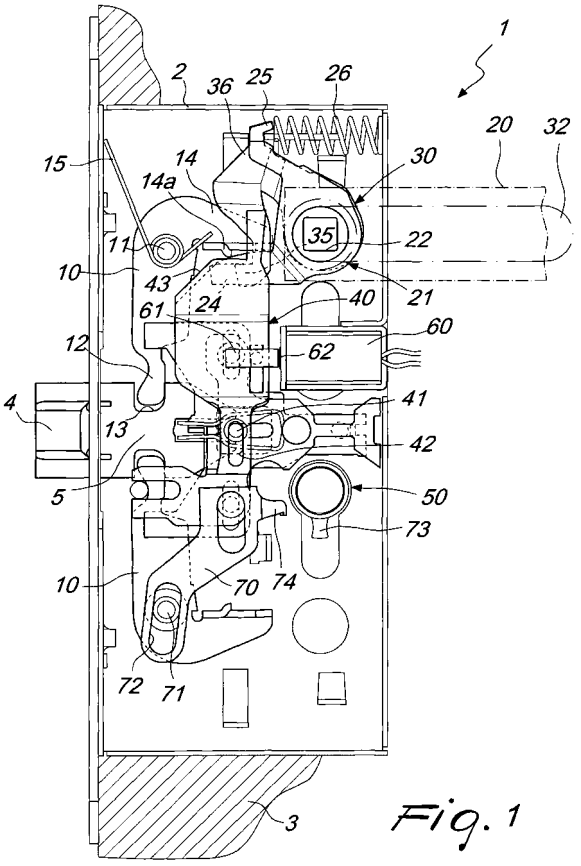

Fig. 1

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Description

[0001] The present invention relates to a lock for bar-type handles for safety doors with electrically-operated means for opening from the outside.

[0002] As is known, safety doors are already commercially available which are provided, toward the inside, with an anti-panic bar, which can be of any type, and further allow to open the door from the outside by means of a conventional lever-type handle.

[0003] Key-operated means are provided on these locks and allow to close the door as regards actuation from the outside, whereas it must be always possible to perform safety opening of the door, i.e., opening from the inside.

[0004] Locks have already been devised, for these types of locks, which can be operated electrically in order to allow their opening, but such locks have a very complex structure and there is further an overall limitation of the possibility to operate the lock manually.

[0005] These limitations are not welcomed by users, since they do not allow, with an electric lock, to have all the manual actuations deemed appropriate, and therefore it is necessary to resort in each instance to specific solutions.

[0006] The aim of the invention is to eliminate the drawbacks noted above, by providing a lock for bar-type handles for safety doors with electrically-operated means for opening from the outside which allows to have independently both electrical actuation and manual actuation, always with very simple use.

[0007] Within this aim, an object of the invention is to provide a lock in which, though having various types of actuation, it is possible to have a small number of components with idle actuation of the outside lever-type handle, without the possibility of forcing, when the key-operated means are in the closure position and the electrical means are not activated.

[0008] Another object of the present invention is to provide a lock for bar-type handles for safety doors which, thanks to its particular constructive characteristics, is capable of giving the greatest assurances of reliability and safety in use.

[0009] Another object of the present invention is to provide a lock for bar-type handles for safety doors which can be obtained easily starting from commonly commercially available elements and materials and is further competitive from a merely economical standpoint.

[0010] This aim and these and other objects which will become better apparent hereinafter are achieved by a lock for bar-type handles of safety doors with electrically-operated means for opening from the outside, according to the invention, comprising a box-like body which can be accommodated in a door and is provided with a closure latch which can be actuated from the inside by means of a bar-type or lever-type handle and from the outside by means of a lever-type handle controlled by key-operated means, means for actuating said latch being further provided which are connected to first actuation means associated with said bar-type handle and to second actuation means associated with said lever-type handle, characterized in that it comprises means for activating said second actuation means, which can be driven electrically, and manual actuation means for opening said latch by way of said key-operated means.

[0011] Further characteristics and advantages of the present invention will become better apparent from the description of a preferred but not exclusive embodiment of a lock for bar-type handles for safety doors with electrically-operated means for opening from the outside, illustrated by way of nonlimiting example in the accompanying drawings, wherein:

Figure 1 is a view of the lock in the open position, with the possibility to actuate it by means of the external lever-type handle;
Figure 2 is a view of the step for actuation by means of the external lever-type handle, with the lock in the open position;
Figure 3 is a view of the lock in the closed position;
Figure 4 is a view of the lock, with the key-operated means in the closure position and with activation of the lock by way of the electrical means which allow opening from the outside;
Figure 5 is a schematic view of the step for opening by means of the bar-type handle from the inside, which can also be performed with the key-operated means in the closure position;
Figure 6 is a view of the lock during actuation by way of the manual actuation means for opening the latch by way of the key-operated means;
Figure 7 is a view of the first and second actuation means;
Figure 8 is a view of the lock arranged inside a door.

[0012] With reference to the figures, the lock for bar-type handles for safety doors with electrically-operated means for opening from the outside, according to the invention, generally designated by the reference numeral 1, comprises a box-like body 2, which can be accommodated on the edge of a safety door, designated by the reference numeral 3.

[0013] The box-like body 2 accommodates a latch 4, which protrudes at said edge and is connected to a sliding plate 5, on which the latch actuation means act.

[0014] The latch actuation means are constituted by two L-shaped levers 10, which are arranged symmetrically with respect to each other and are pivoted at the vertex about a pivot 11 connected to the box-like body; the levers have a first arm 12, which engages, at one of its ends, a recess 13 provided in the plate 5 of the latch 4.

[0015] The second arm 14 of the L-shaped lever 10 is arranged at first actuation means, described in greater detail hereinafter, which are connected to a bar-type handle 20, which can be of any type, is arranged at the internal face of the door and can be constituted optionally

by a conventional lever-type handle, which allows to always open the door from the inside in any case.

[0016] A first coiled spring 15 acts on the L-shaped lever 10 and keeps the latch elastically in the extracted position.

[0017] The first actuation means, as shown in Figure 7, are constituted by a ratchet system 21 of the bar-type handle 20, or first ratchet system, which is provided with a square hole 22 in which the square pin 23 of the bar-type handle engages.

[0018] The first ratchet system is provided with a first tab 24, which is arranged at the second arm 14 of the lever 10.

[0019] The ratchet system 21 is provided with a first pusher arm 25, on which a pusher spring 26 acts; said spring abuts, at its other end, against the internal wall of the box-like body.

[0020] A second ratchet system 30 is arranged laterally adjacent to the first ratchet system 21, with optional spacers interposed, constitutes the second actuation means and is provided with a hole 4 for engagement with the square pin 31 of the lever-type handle 32.

[0021] The second ratchet system 30 is provided with a second actuation tab 35, which is superimposed on the first tab 24 and is unable to interfere directly with the arm 14.

[0022] The second ratchet system 30 is provided with a second pusher arm 36, which is arranged laterally adjacent to the first element 25 and is pushed elastically by the spring 26.

[0023] Means for activating the second actuation means are provided above the plate 5 of the latch and are constituted by an oscillating plate 40, which is pivoted about a central pivot 41, which engages an elongated slot 42 of the oscillating plate.

[0024] The oscillating plate has, at the end directed toward the arm 14 of the L-shaped lever 10, a folded abutment 43, which can be interposed between a pusher abutment 14a of the arm 14 of the lever 10 and the second actuation tab 35.

[0025] As shown in Figure 1, in the open condition the folded abutment 43 can be engaged by the second tab 35, so that by turning the lever-type handle from the outside the L-shaped lever 10 is turned, consequently opening the latch.

[0026] By arranging, by way of the key-operated means 50, the lock in the closure position, as shown in Figure 3, the oscillating plate 40 oscillates so that the folded abutment 43 disengages from the arm 35, and the consequent actuation of the lever-type handle from the outside is idle, so that the corresponding actuation of the L-shaped lever 10 does not occur.

[0027] To perform actuation, there are electrical means constituted by the coil 60, the armature whereof is associated with an element 61 for engagement with the oscillating plate 40 and pushes, by means of the spring 62, the oscillating plate into the disengagement position.

[0028] By activating the coil 60, i.e., by activating the electrical means, said coil attracts the armature, which is connected to the element 61, and consequently turns the oscillating plate 40, which arranges its fold 43 in such a position that it is activated by the second tab 35, allowing opening from the outside by means of the lever-type handle.

[0029] The activation of the coil 60 can be achieved with any means, such as for example an authorized card, an electronic key or any other element which allows authorized individuals to supply power to the coil 60, consequently allowing to open the door from the outside.

[0030] A particular feature of the invention consists in that there are also means for manual actuation in order to open the latch by way of the key-operated means, which are provided by means of a manual plate 70 fitted so that it can oscillate about a manual actuation pin 71, which engages an elongated slot 72, the manual plate 70 being provided with a lateral tab 74, which can be engaged by the eccentric element 73 of the key.

[0031] By turning the key, due to the engagement of the eccentric element 73 with the lateral tab 74, the manual plate 70 performs a translational motion and in turn engages by contact against the oscillating plate 40, which constitutes the means for activating the second actuation means, and consequently produces its translational motion, causing the oscillation of the L-shaped lever 10 and the consequent opening of the latch 4.

[0032] From what has been described above, it is therefore evident that the proposed lock offers various possibilities of actuation and in fact, with the lock in the open position, from the outside it is possible to perform opening simply by means of the lever-type handle or, optionally, it is also possible to actuate the latch manually without resorting to the use of the lever-type handle, using instead the rotation of the key.

[0033] Moreover, it is possible to perform opening from the outside without having the key acting on the key-operated means, but by having a card or, in any case, any other authorized element which activates the electrical means and, by attracting the armature of the coil 60, positions the oscillating plate 40 so that it is engaged by the second tab 35, with the consequent possibility to turn the L-shaped lever 10, consequently opening the latch 4.

[0034] It should be added to the above that the lock according to the invention is structurally very simple and is constituted by an extremely limited number of components, which interact with each other so as to increase the functionality of the lock.

[0035] The invention thus conceived is susceptible of numerous modifications and variations, all of which are within the scope of the appended claims.

[0036] All the details may further be replaced with other technically equivalent elements.

[0037] In practice, the materials used, as well as the contingent shapes and dimensions, may be any according to requirements.

[0038] The disclosures in Italian Patent Application No. MI2005A001279 from which this application claims priority are incorporated herein by reference.

[0039] 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 lock for bar-type handles of safety doors with electrically-operated means for opening from the outside, comprising a box-like body which can be accommodated in a door and is provided with a closure latch which can be actuated from the inside by means of a bar-type or lever-type handle and from the outside by means of a lever-type handle controlled by key-operated means, means for actuating said latch being further provided which are connected to first actuation means associated with said bar-type handle and to second actuation means associated with said lever-type handle, **characterized in that** it comprises means for activating said second actuation means, which can be driven electrically, and manual actuation means for opening said latch by way of said key-operated means.

2. The lock according to claim 1, **characterized in that** said first actuation means comprise a ratchet system of the bar-type handle which is provided with a square hole in which the square pin of said bar-type handle or lever-type handle engages, said ratchet system of the bar-type handle being provided with a first tab arranged at the second arm of the L-shaped lever which forms said latch actuation means.

3. The lock according to the preceding claims, **characterized in that** said ratchet system of the bar-type handle is provided with a pusher arm on which a pusher spring acts, said spring abutting, at its other end, against the internal wall of said box-like body.

4. The lock according to one or more of the preceding claims, **characterized in that** said second actuation means comprise a second ratchet system provided with a second actuation tab which is superimposed on said first tab and does not interfere directly with said second arm of said L-shaped lever, said second ratchet system being provided with a second pusher arm, against which said pusher spring acts.

5. The lock according to one or more of the preceding claims, **characterized in that** said means for activating said second actuation means comprise an oscillating plate, which is pivoted about a central pin which engages an elongated slot of said oscillating plate, said oscillating plate forming, at the end thereof directed toward said L-shaped lever, a folded abutment which is adapted to interact with said second actuation tab in order to open said latch by means of said lever-type handle.

6. The lock according to one or more of the preceding claims, **characterized in that** the arrangement of said oscillating plate is determined by said key-operated means.

7. The lock according to one or more of the preceding claims, **characterized in that** it comprises electrical means which control said activation means and are constituted by a coil which is provided with an armature connected to an engagement element which can engage said oscillating lever, elastic means being further provided which are adapted to push said oscillating lever into a position of disengagement with said key-operated means in the closure position.

8. The lock according to one or more of the preceding claims, **characterized in that** when the coil is supplied with power, said engagement element generates the rotation of said oscillating plate, with consequent engagement upon its abutment against said second tab.

9. The lock according to one or more of the preceding claims, **characterized in that** said manual actuation means comprise a manual plate, which is mounted so that it can oscillate about a manual actuation pin which engages in an elongated slot of said manual plate, said manual plate being provided with a tab which can be engaged by the eccentric portion of the key-operated means for the translational motion of said manual plate, and of said oscillating plate which can be activated by said manual plate for opening said latch.

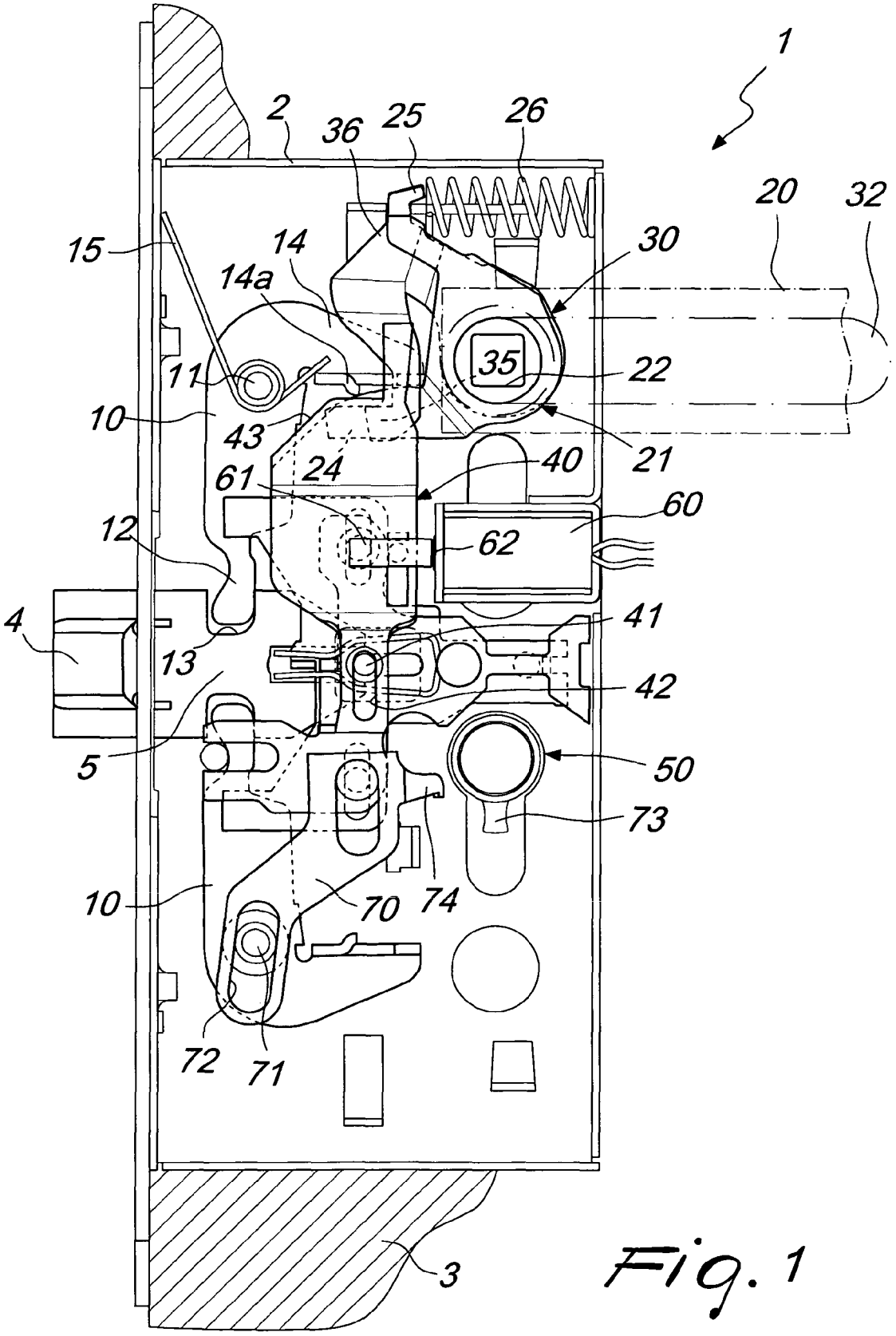
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Fig. 1

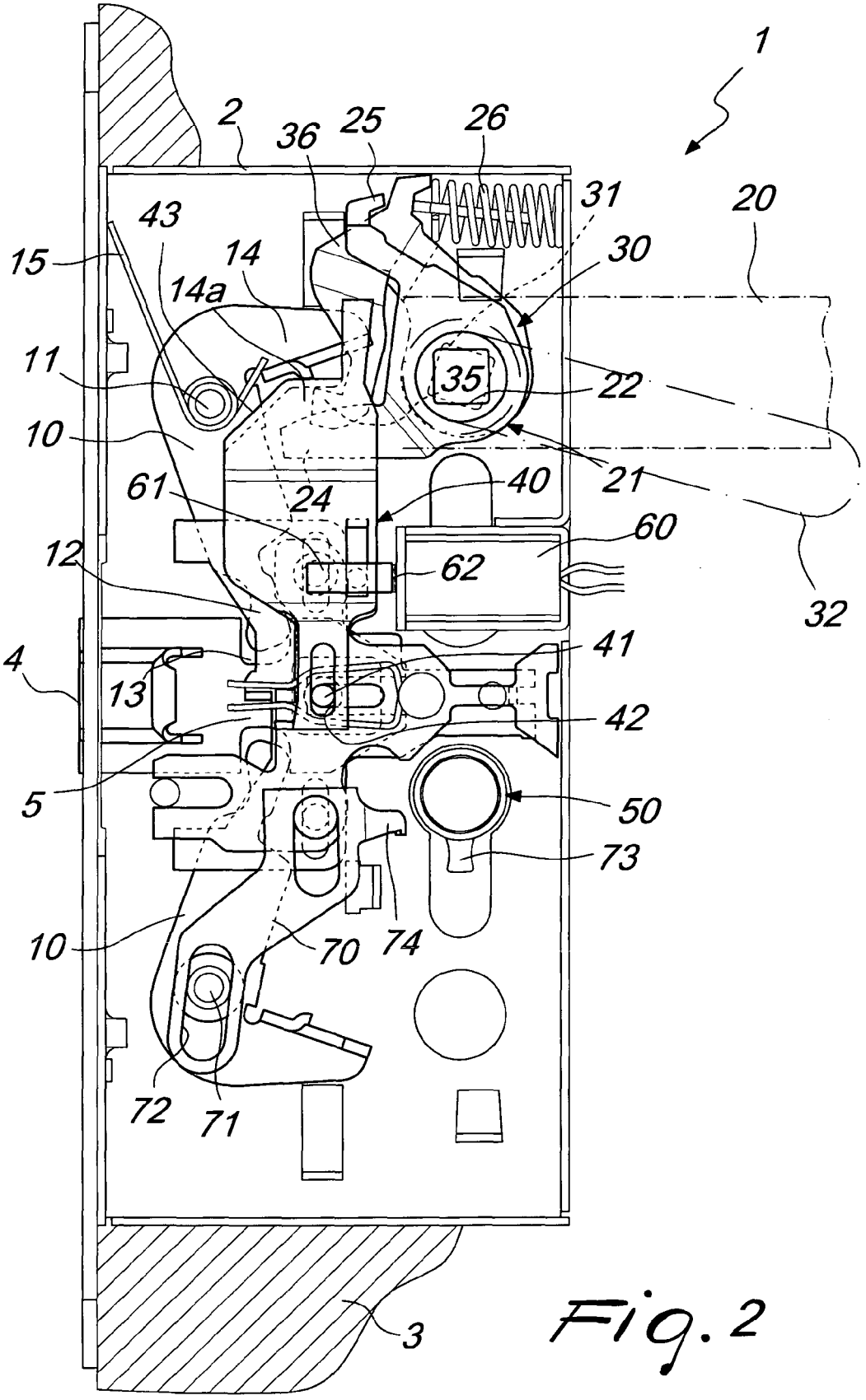
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Fig. 2

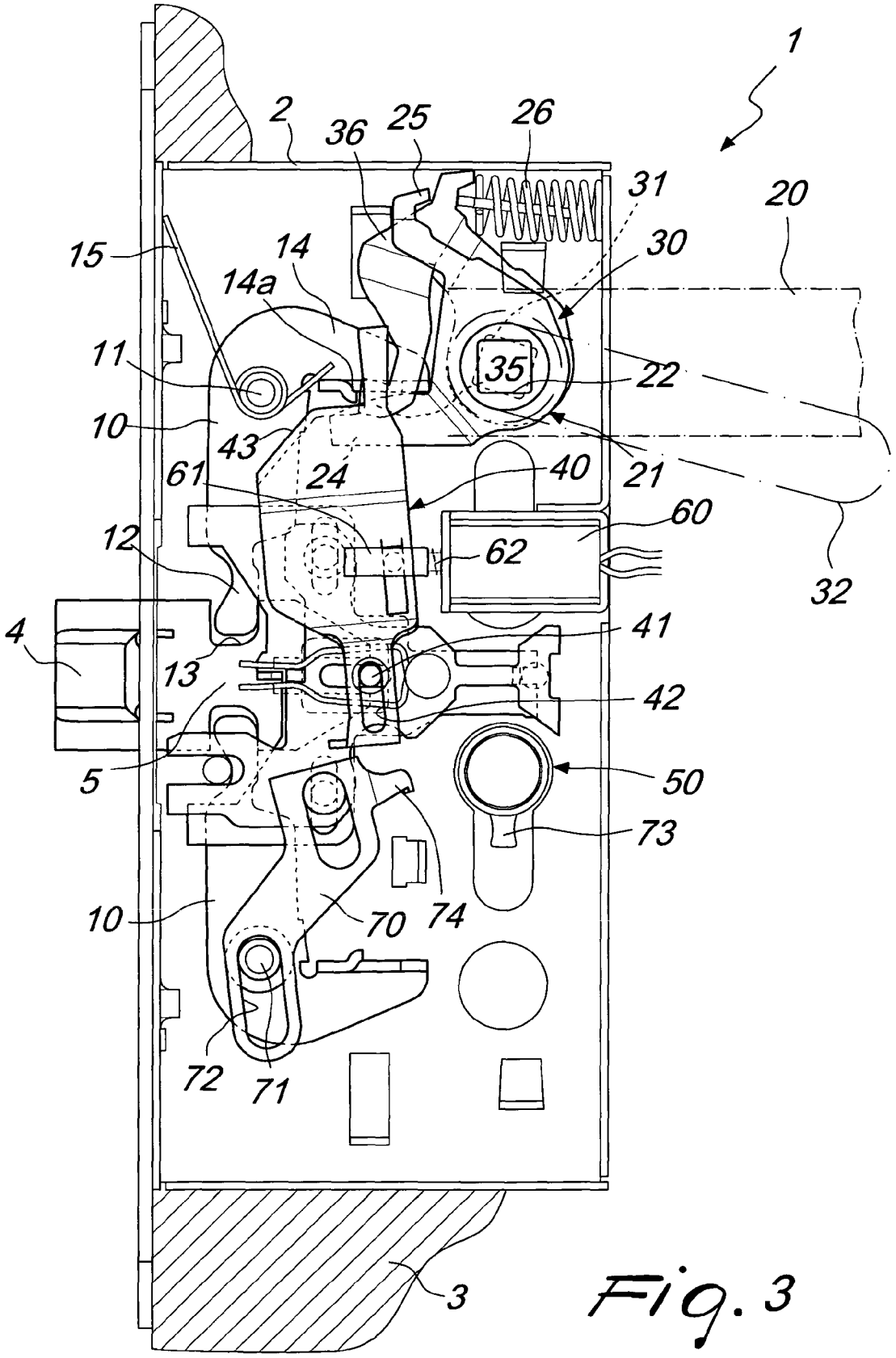
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Fig. 3

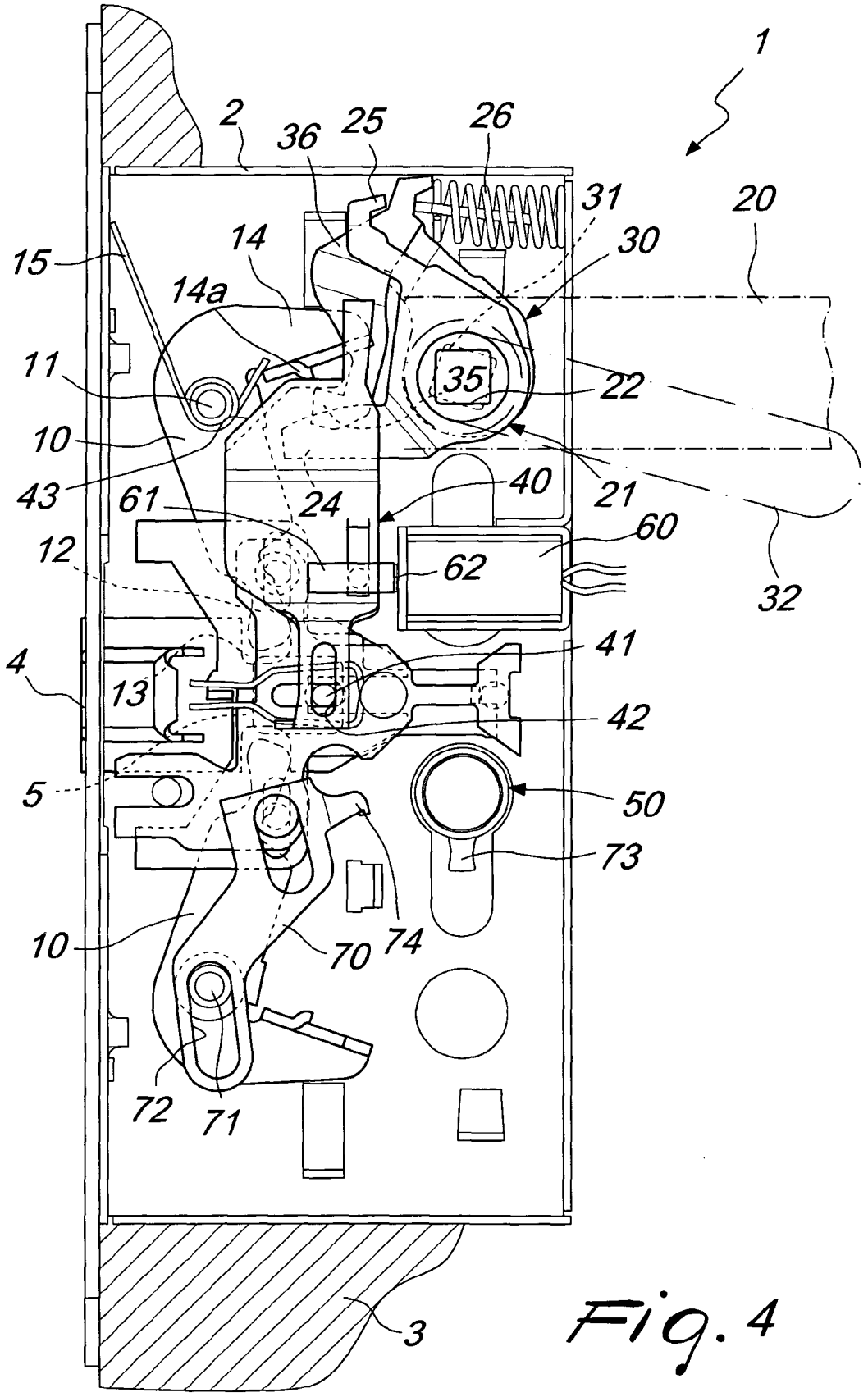
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Fig. 4

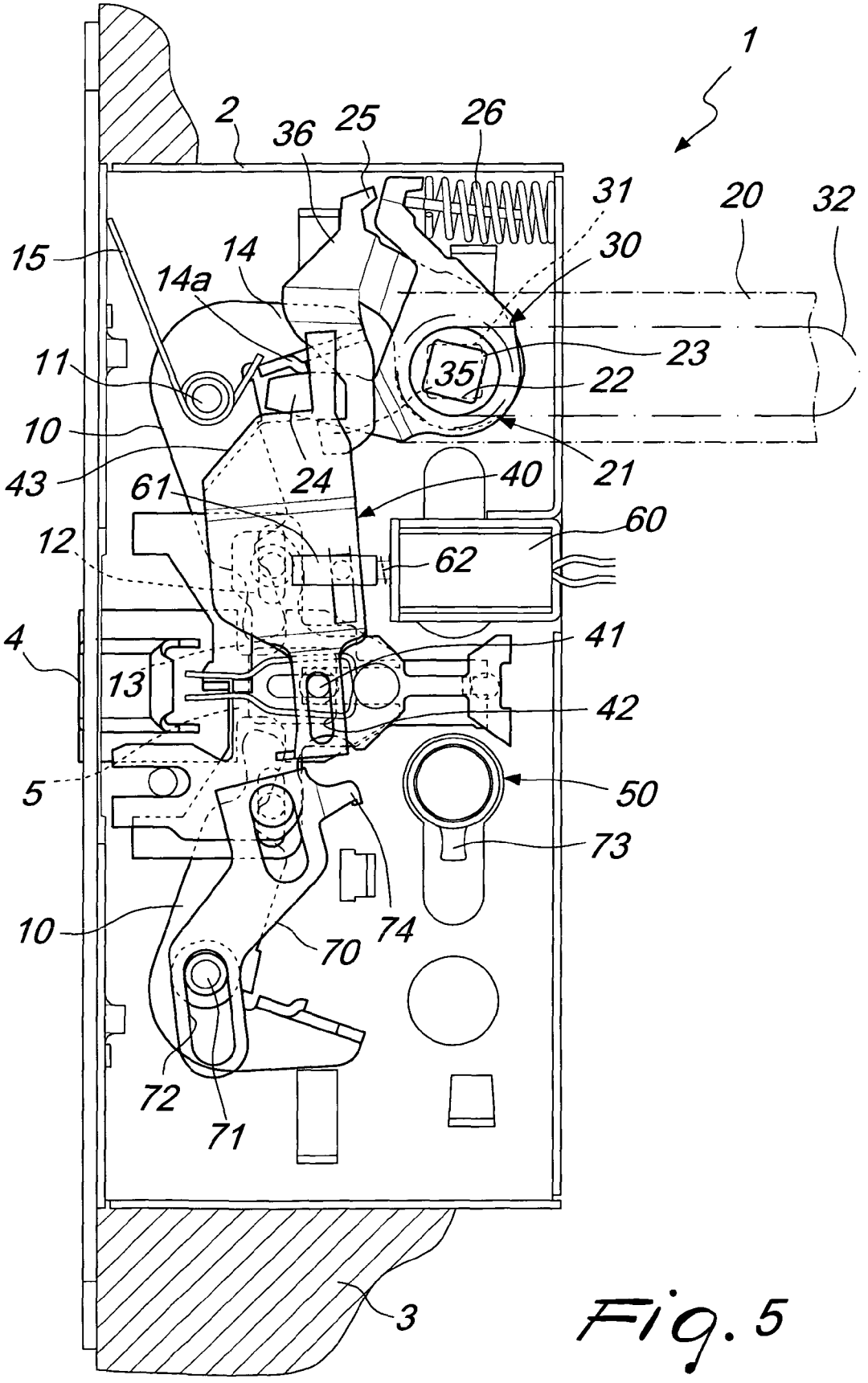
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Fig. 5

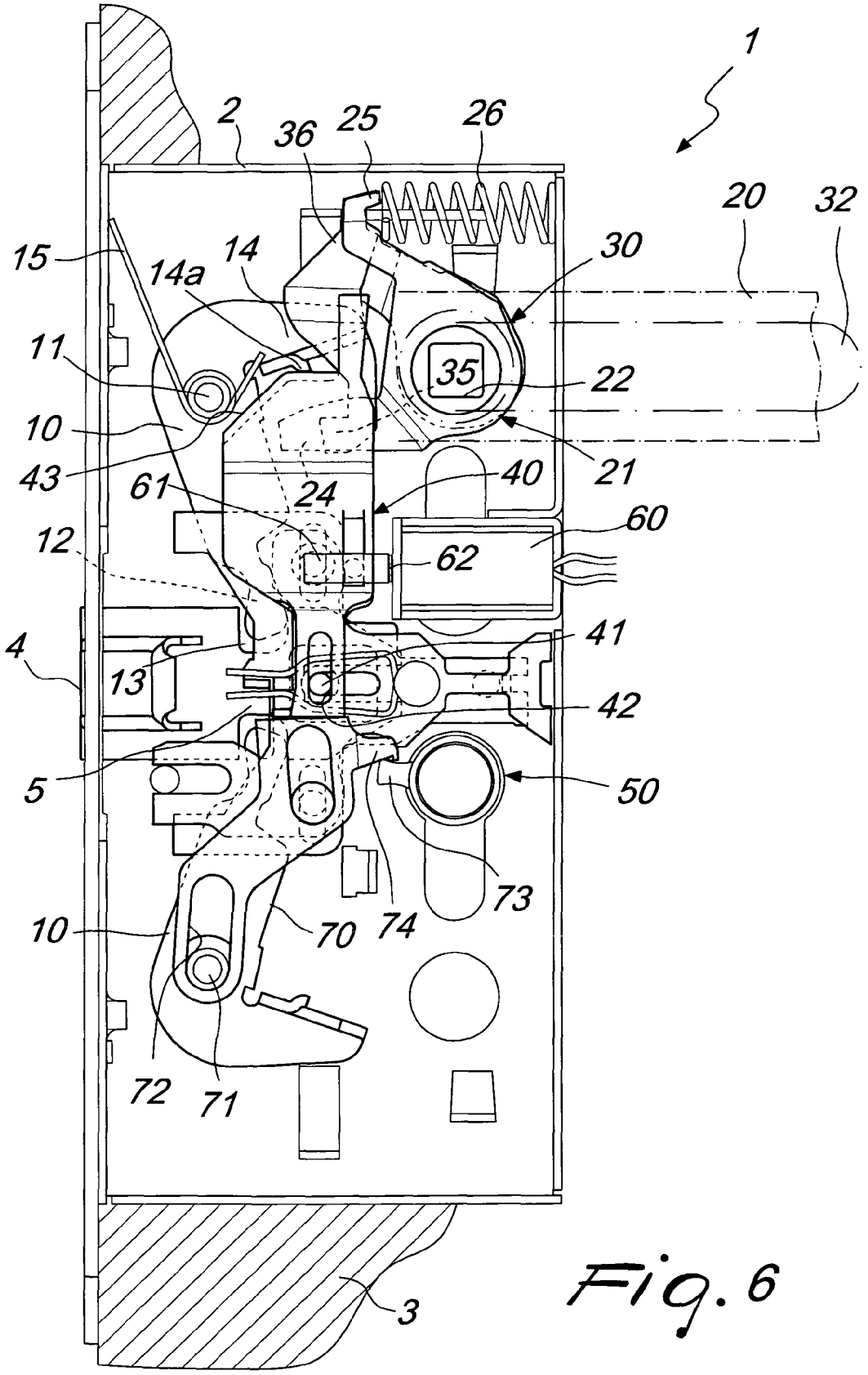
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Fig. 6

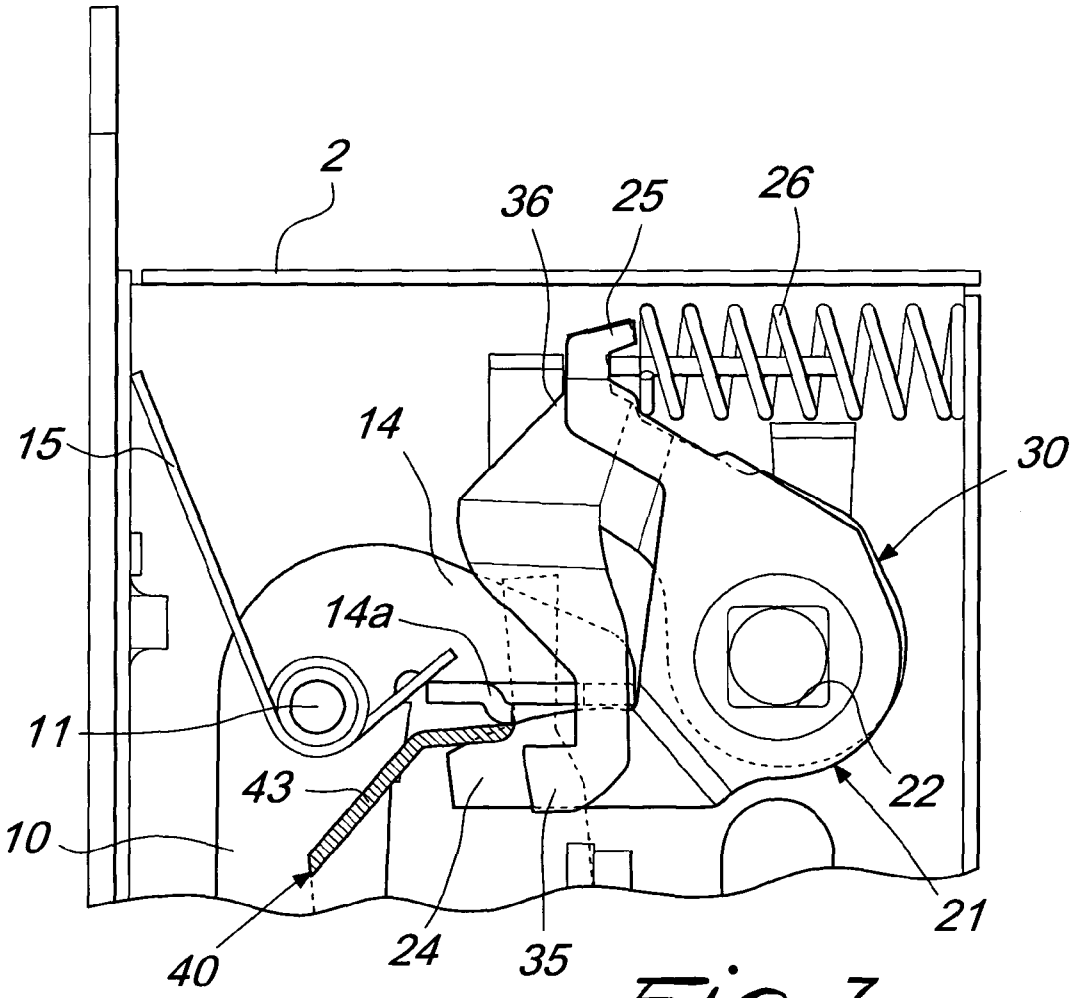

Fig. 7

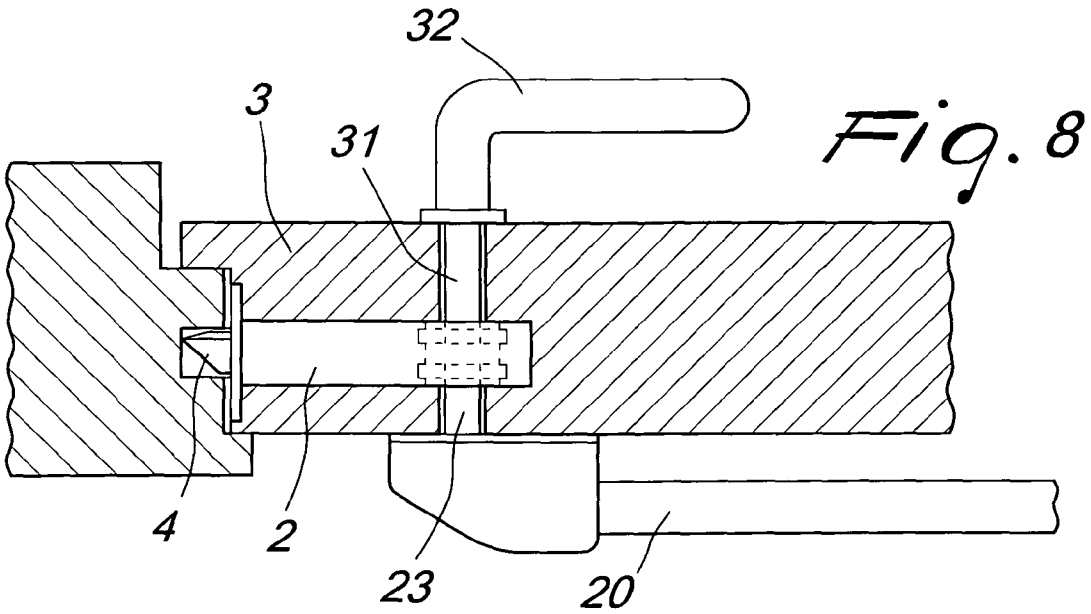

Fig. 8

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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