



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) **EP 0 922 825 A1**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
16.06.1999 Bulletin 1999/24

(51) Int. Cl.⁶: **E05B 63/04**, E05B 13/00

(21) Application number: **98122528.7**

(22) Date of filing: **30.11.1998**

(84) Designated Contracting States:
**AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE**
Designated Extension States:
AL LT LV MK RO SI

(30) Priority: **10.12.1997 IT BO970710**

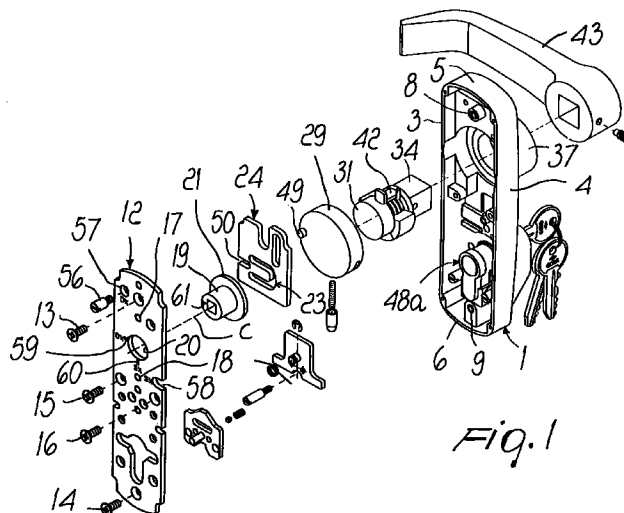
(71) Applicant:
**INDUSTRIE METALMECCANICHE PERUGIA
I.M.P. S.p.A.
06068 Tavernelle di Panicale (Perugia) (IT)**

(72) Inventor: **Errani, Deo
48018 Faenza (Ravenna) (IT)**

(74) Representative:
**Modiano, Guido, Dr.-Ing. et al
Modiano & Associati SpA
Via Meravigli, 16
20123 Milano (IT)**

(54) **Device for selecting the actuation direction of a lock according to the door side on which it is installed**

(57) A device for selecting the actuation direction of a lock according to the door side whereon it is installed, the lock comprising an input shank (34), whereunto a handle (43) is rotationally rigidly coupled, and an output shank (19), which is coaxial to the input shank, the shanks (19,34) having adjacent ends between which a plate (24) is arranged, the plate being guided at right angles to the rotation axis of the shanks. The plate (24) is provided with a first slot (50) which is engaged, on one side of the plate, by an eccentric pin (49) of the input shank and, on the opposite side of the plate, by an eccentric pin (22) of the output shank, so that by actuating the handle (55) and the corresponding input shank (34) in one direction the output shank (19) rotates in the same direction, the second slot (23) having a U-shaped configuration with two parallel portions (51,52) which are perpendicular to the sliding direction of the plate and are connected by a circular arc-like portion (53), the portions being individually engageable by the eccentric pin (22) of the shank according to the direction of rotation of the shank.



EP 0 922 825 A1

Description

[0001] The present invention relates to a device for selecting the actuation direction of a lock according to the door side whereon it is installed.

[0002] In locks provided with an actuation handle a problem is encountered which is that of matching the direction of rotation of the handle with the side whereon the door opens. Accordingly, for example, in a door with right-side hinges the lock, being fitted on the left, requires a handle which turns clockwise. Viceversa, if the hinge is to the left, the lock, being installed on the right, requires a handle turning counterclockwise.

[0003] In order to cope with this problem, locks are known having adjustments which allow to reverse their motion but require to open the lock in order to act on the internal elements every time it is necessary to prepare the lock so as to match the door installation side.

[0004] The aim of the present invention is to provide a device which allows to select the actuation direction of a lock by acting without having to open the lock.

[0005] This aim is achieved with a device for selecting the actuation direction of a lock according to the door side whereon it is installed, said lock comprising an input shank, whereto a handle is rotationally rigidly coupled, and an output shank, which is coaxial to said input shank, said shanks having adjacent ends between which a plate is arranged, said plate being guided at right angles to the rotation axis of said shanks, characterized in that said plate is provided with a first slot which is engaged, on one side of said plate, by an eccentric pin of said input shank, and with a second slot which is engaged, on the opposite side of said plate, by an eccentric pin of said output shank, so that by actuating the handle and the corresponding input shank in one direction the output shank rotates in the same direction, said second slot having a U-shaped configuration with two parallel portions which are perpendicular to the sliding direction of said plate and are connected by a circular arc-like portion, said portions being individually engageable by the eccentric pin of said shank according to the direction of rotation of said shank.

[0006] Further characteristics and advantages of the present invention will become apparent from the following detailed description of a preferred embodiment, illustrated by way of non-limitative example in the accompanying drawings, wherein:

Figure 1 is an exploded view of the device;

Figure 2 is a rear view of the device after removing the cover that closes, to the rear, the case that contains the elements of the device;

Figure 3 is a sectional view, taken along the plane III-III of Figure 2;

Figure 4 is a view, similar to Figure 2, after removal of the output shank.

[0007] With reference to the above Figures, 1 designates the case of the lock. Said case 1 is vertically elongated and is composed of a substantially rectangular front wall 2 and of two parallel walls 3 and 4 which are mutually connected by rounded walls 5, 6 which delimit the compartment 7 for containing the elements of the device (see Figure 2).

[0008] Four threaded bushes 8, 9, 10, 11 protrude from the front wall 2 into the compartment 7; the first two bushes 8 and 9 lie on the vertical centerline plane A of the case and the second two bushes 10, 11 lie on the horizontal centerline plane B.

[0009] For the sake of convenience in description, the letters A and B also designate the vertical and horizontal directions.

[0010] The cover 12 rests on the bushes 8-11, closes the compartment 7 to the rear, and is fixed by screws 13, 14, 15, 16 screwed into the bushes 8-11.

[0011] Threaded holes 17, 18 are formed in the cover 12 and the threaded ends of screws for fitting the lock to a door are screwed into said holes.

[0012] The operating connection between the lock and a door locking element, for example a latch or a bolt, is provided by means of a rod, not shown, which has a square cross-section and which activates the locking element when it is turned by the lock.

[0013] The rod is coupled with a side fit in a complementarily shaped seat of a cylindrical shank 19 which protrudes from the cover 12 through a hole 20 in which it is supported so that it can rotate about the axis C. The shank 19 is termed output shank of the lock hereinafter.

[0014] The shank 19 has a flange 21 which rests on the internal face of the cover 12 and has a pin 22 (Figure 3) which is eccentric with respect to the rotation axis C.

[0015] The pin 22 engages a U-shaped slot 23 formed in a plate 24 which is adjacent to the flange 21.

[0016] The plate 24 (see Figure 2 in particular) is substantially rectangular and is guided in the direction A between the side walls 3, 4 of the case 1 and above raised portions 25, 26, 27 which protrude inside the compartment 7.

[0017] In the raised portions 25, 26, 27 there is a seat 28 (Figure 2) in which a disk 29 can rotate; in turn, said disk has a cylindrical internal cavity 30 which is open toward the front wall 2.

[0018] A flange 31 is rotatably accommodated in the cavity 30 inside the disk 29, and a central stem 32 and a sector 33 protrude from said flange along the axis C. The central stem 32 has an end which is inserted in, and rotationally coupled to, a recess of a square shank 34 which is fixed axially by means of a screw 35 which engages the stem 32.

[0019] The square shank 34, hereinafter termed input shank, is provided with a collar 36 which is rotatably supported in a sleeve 37 which protrudes outside the front wall 2.

[0020] The collar 36 has an external sector 38 in which a recess 39 is formed; said recess is shaped

complementarily with respect to the sector 33 in order to receive it so as to provide a rotary coupling between the flange 31 and the shank 34.

[0021] A chamber is formed between the central stem 32 and the collar 36 in which a spring 40 accommodates, which is wound around the central stem 32 and whose opposite ends are folded outward and rest on opposite sides of a tooth 41 (Figure 3) which protrudes inward from the sleeve 37 and of a tab 42, respectively (see also Figure 1), which projects axially from the collar 36. The tooth 41 and the tab 42 have the same angular breadth, so that the ends of the spring 40, by acting on both sides of the tooth 41 of the tab 42, keep the input shank 34 elastically in a given inactive position. In this manner, by applying to the shank 34 a handle 43 (Figure 1) which is orientated for right or left actuation, the spring 40 in any case returns the shank 34 into the inactive position both when the handle 43 is turned clockwise and when it is turned counterclockwise.

[0022] A dead hole 44 is formed in the flange 31 (see Figure 3) and a pin 45 is slidingly guided therein; said pin is actuated by a spring 46 so that it engages in a hole 47 of the disk 29 and provides a rotary coupling between the input shank 34 and the output shank 19. In order to disengage the shanks 34 and 19 and make the actuation of the handle 43 ineffective, a mechanism, which is generally designated by the reference numeral 48 and actuated by the bit of a pin-tumbler cylinder 48a, is provided. Said mechanism is not illustrated in detail because it is beyond the scope of the present invention and is in any case disclosed in a Patent Application in the name of the same Applicant, filed on even date and entitled "Device for operating a panic-proof lock from the outside", which is referenced herein as an integral part of the present invention. The disk 29 has a pin 49 which is eccentric with respect to the rotation axis C and which, in the inactive condition, is arranged on the plane D, which is perpendicular to the plane A and passes through the axis C.

[0023] The pin 49 is engaged in a slot 50 (Figure 4) formed on a lateral edge of the plate 24, so that the rotation of the disk 29 in either direction causes the movement of the plate 24 in the direction A by an equal extent with respect to the plane D.

[0024] The slot 23 is composed of two portions 51, 52 which are perpendicular to the plane A and are connected by a circular portion 53 so as to produce a U-shaped slot which is open toward the wall 3 and has portions 51, 52 which are equidistant with respect to the plane of the slot 50.

[0025] The pin 22 of the flange 21 of the output shank 19 engages the portion 51 or 52, depending on whether the lock is to be installed on a door which opens on its right or left side, as described hereinafter.

[0026] The operation of the above-described lock is the same both when the lock is to be installed in a door opening on its left side, i.e., in a door in which the hinges are arranged to the right, and when the door opens is to

the right, i.e., has hinges arranged to the left.

[0027] However, according to a substantial prerogative of the present invention, the device can be preset so that it operates only for one type of opening. For this purpose, in the front plate 2, above and below the plate 24, there are two threaded holes 54, 55, in one of which an abutment pin is screwed in each instance; starting from a position in which the slot 50 lies on the axis D, said pin prevents the stroke of the plate 24 in the direction in which the pin is arranged. In Figures 1 and 4, the pin is designated by the reference numeral 56 and is screwed into the hole 54 and therefore allows the plate 24 to move only downward. Accordingly, the disk 29 and the input shank 34 can rotate in the counterclockwise direction E (viewing the case 1 from the rear).

[0028] Likewise, the pin 22 of the output shank 19 is arranged so as to engage the portion of the slot that allows the shank 19 to rotate in the same direction E as the input shank 34, i.e., the portion 51 as shown in Figure 4.

[0029] Advantageously, in order to indicate outside the case the manner in which the pin 56 must be arranged according to the door opening side, in the cover 12 there are two openings 57, 58 (see Figure 1) which allow to place the pin 56 without having to remove the cover 12 and there are two notches 59, 60 which allow to orientate a reference marking 61 of the output shank 19 so that the pin 22 engages the portion 51 or 52 of the slot 23.

[0030] In the illustrated example, it is assumed that the pin 22 is engaged in the portion 51 (see Figure 4).

[0031] The opening 57 of the cover allows to place the pin 56 in the threaded hole 54, so as to preset the device for doors opening on the right side. Conveniently, the opening and the notch 59 are identified by a symbol Dx (right) in order to indicate right-side opening.

[0032] In a similar manner, the opening 58 allows to position the pin 56 for doors which open on the left side. In this case, the opening 58 and the notch 60 are identified by the symbol Sx (left) to indicate left-side opening.

[0033] The operating method of the device is as follows.

[0034] Assuming that a door which opens on the right side (as shown in the figures) has to be opened, the pin 56 is placed in the hole 54 of the front wall 2 that is marked with Dx and the output shank 19 is orientated so as to place the reference marking 61 on the symbol Dx of the cover. In this position, the pin 22 is engaged in the portion 51 of the slot 23.

[0035] By actuating the handle 43 in the counterclockwise direction E, by virtue of the coupling provided by the pin 45 between the disk 29 and the flange 21, the pin 49 of the disk 29 moves downward, drawing the plate 24 and the pin 22 with it and accordingly turning the output shank 19 in the same direction E. The output shank 19 turns the square rod that is coupled with a side fit therewith and actuates the latch or bolt of the

door, releasing it and thus allowing to open the door from outside.

[0036] The rotation of the input shank 34 loads the spring 40, which returns the handle 43 to the inactive position as soon as the action on said handle ceases.

[0037] It is evident that the invention perfectly achieves the intended aim and objects. In particular, it is noted that in order to preset the device for left-side opening, the pin 22 of the output shank 19 moves into the lower portion 52 of the slot 23 after removing the pin 56 from the hole 54 and before screwing it into the hole 55. The plate 24 can thus slide freely and the pin 22 can move along the arc-like portion 53 of the slot 23 in order to engage the lower portion 52.

[0038] It should be observed that in the inactive position of the device, the pin 22 engages the end of the portion 51 or 52 which is opposite to the ends connected by the arc-like portion 23, and that the radius of the pin 22 with respect to the rotation axis C of the output shank 19 is greater than the stroke that the plate 24 performs until it abuts against the pin 56. In this way, the pin 22 cannot oscillate to return into the arc-like portion 53 and remains rigidly coupled to the selected portion 51 or 52 of the plate 24.

[0039] The fact is particularly important that the plate 24 acts as an increasing or reducing element for the rotation of the output pivot 19. By varying the distance between the portions 51 and 52 it is in fact possible, for an equal angular movement of the eccentric pin 49, to vary the stroke of the pin 22 in the direction A and therefore vary the rotation angle of the output shank 19. For example, with an angular rotation of 45° of the input shank 34 and therefore of the disk 29 it is possible to achieve a 90° rotation of the output shank 19.

[0040] The disclosures in Italian Patent Application No. BO97A000710 from which this application claims priority are incorporated herein by reference.

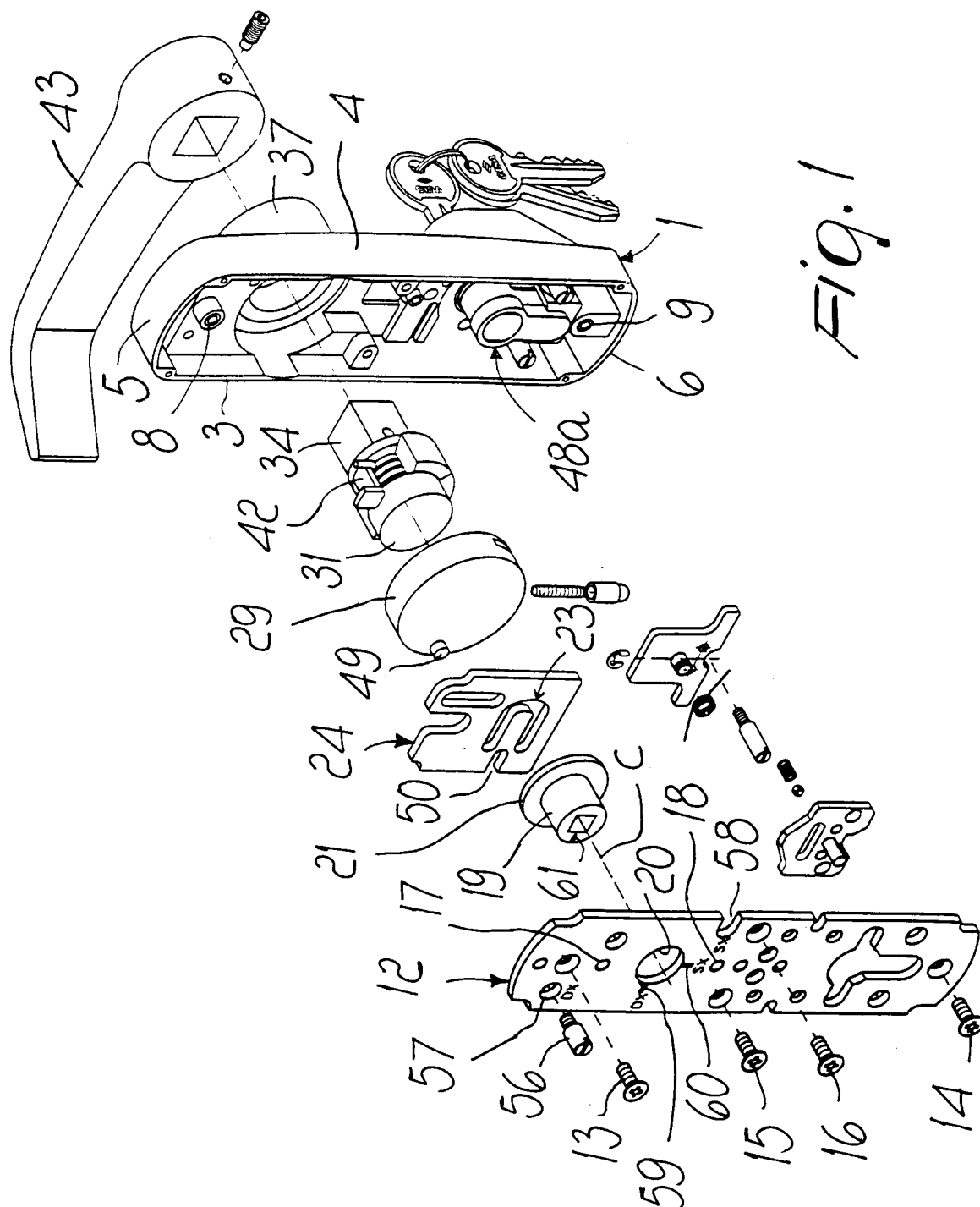
[0041] Where technical features mentioned in any claim are followed by reference signs, those reference signs have been included for the sole purpose of increasing the intelligibility of the claims and accordingly such reference signs do not have any limiting effect on the interpretation of each element identified by way of example by such reference signs.

Claims

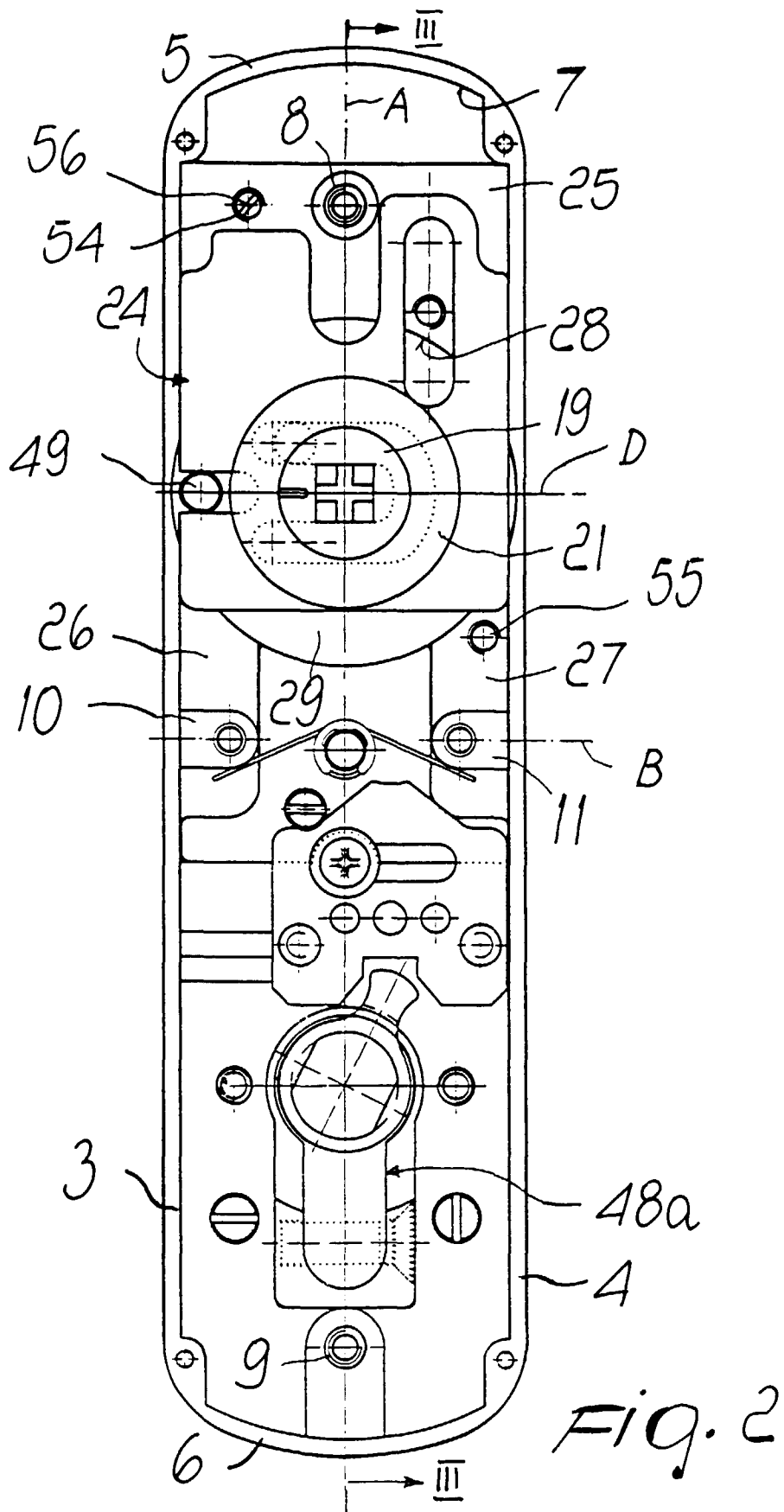
1. A device for selecting the actuation direction of a lock according to the door side whereon it is installed, said lock comprising an input shank (34), whereinto a handle (43) is rotationally rigidly coupled, and an output shank (19), which is coaxial to said input shank, said shanks having adjacent ends between which a plate (24) is arranged, said plate being guided at right angles to the rotation axis of said shanks, characterized in that said plate (24) is provided with a first slot (50) which is engaged, on one side of said plate, by an eccentric pin (49) of

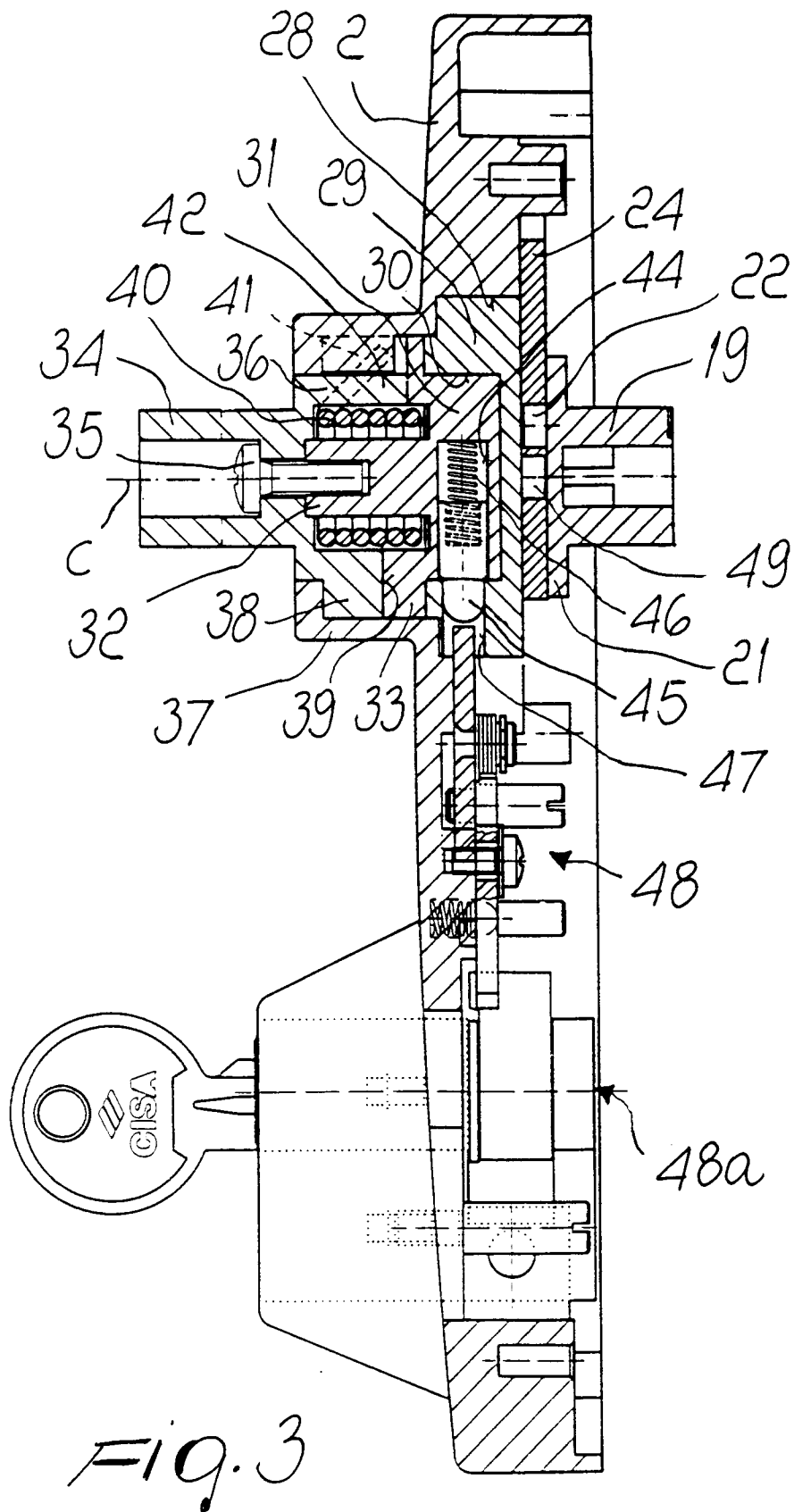
said input shank (34), and with a second slot (23) which is engaged, on the opposite side of said plate, by an eccentric pin (22) of said output shank (19), so that by actuating the handle (55) and the corresponding input shank (34) in one direction the output shank (19) rotates in the same direction, said second slot (23) having a U-shaped configuration with two parallel portions (51, 52) which are perpendicular to the sliding direction of said plate and are connected by a circular arc-like portion (53), said portions being individually engageable by the eccentric pin (22) of said output shank according to the direction of rotation of said shank.

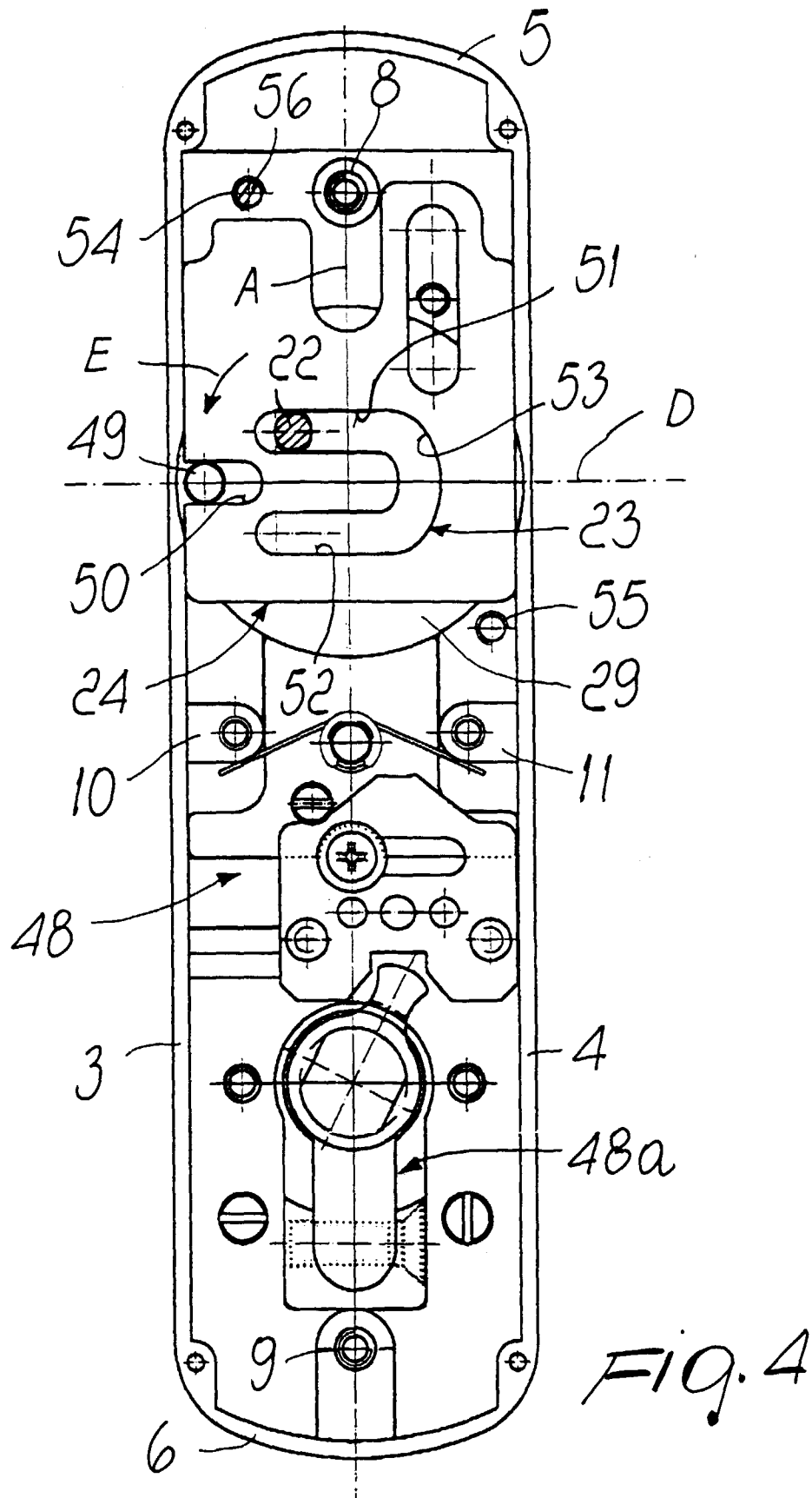
2. The device according to claim 1, characterized in that it comprises an abutment (56) which is positionable from the outside of said case (1) and allows the movement of said plate (24) and therefore the rotation of the handle and of the output shank only in the direction that corresponds to the side whereon the door opens.
3. The device according to claim 2, characterized in that said case comprises a closure cover (12) which is provided with openings (57, 58) for selecting the position of the abutment (56) of said plate (24) according to the side whereon said door opens.
4. The device according to claim 3, characterized in that the abutment of said plate (24) is constituted by a pin (56) which can be screwed through respective openings (57, 58) in one of two threaded holes (54, 55) which are formed in said case so as to block the movement of said plate (24) in the opposite direction with respect to the one that corresponds to the side whereon said door opens.
5. The device according to claim 4, characterized in that said input shank (34) comprises a flange (31) whereon a disk (29) is rotatably supported, said disk being provided with said eccentric pin (49), a dead hole (44) being formed radially in said flange to accommodate a pin (45) which is actuated by a spring (46) so as to engage a hole (47) of said disk (29), so as to provide a rotary coupling between said flange (31) and said disk (29), a mechanism (48) being provided which is actuated by the bit of a cylinder (48a) which is accommodated in said case and is adapted to act on said pin (45) to disengage said flange (31) from said disk (29) and cause the actuation of the handle to be ineffective.



1613









European Patent
Office

EUROPEAN SEARCH REPORT

Application Number
EP 98 12 2528

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.6)
A	FR 2 644 826 A (CHAUVAT SOFRANQ, S.A.) 28 September 1990 * page 4, line 15 - page 16, line 4; figures *	1-4	E05B63/04 E05B13/00
A	EP 0 430 420 A (ADAMS RITE MANUFACTURING COMPANY) 5 June 1991 * page 3, line 22 - page 6, line 20; figures *	1-3	
A	FR 2 682 985 A (SOCIETE JPM CHAUVAT (S.A.) ET CHAUVAT-SOFRANQ SOCIETE ANONYME) 30 April 1993 * page 7, line 27 - page 14, line 5; figures *	1,5	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			E05B
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 15 March 1999	Examiner Vacca, R
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	

EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 98 12 2528

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
The European Patent Office is in no way liable for these particulars which are merely given for the purpose of information.

15-03-1999

Patent document cited in search report		Publication date	Patent family member(s)		Publication date
FR 2644826	A	28-09-1990	NONE		
EP 430420	A	05-06-1991	US 4982986 A		08-01-1991
			CA 2028871 A		02-06-1991
FR 2682985	A	30-04-1993	NONE		