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(54) Strike lock with two-leaf safety doors.

(57) Strike lock for two-leaf safety doors, comprising two transmission elements (4,4a), which are respectively connected to an upper rod-like bolt (5) and to a lower one (5a), both of which are arranged vertically. The transmission elements are actuatable in opposite directions by means of an internal reloadable mechanism of the strike lock (2) which is suitable to make said bolts snap into the position for engagement in respective recesses (31,49) of the upper and lower selvages (32, 48) of the door. The strike lock further comprises an element (6) for the release of said transmission elements (4,4a), whereas a pivot (33,47) is provided in the recess (31,49) of the upper selvage (32) of the door, the pivot protruding outside the recess and being adapted to act by virtue of rod-like elements (26,36) on said release element (6) so as to produce the snap actuation of said transmission elements (4,4a) and the engagement of the bolts (5,36) in the respective recesses.

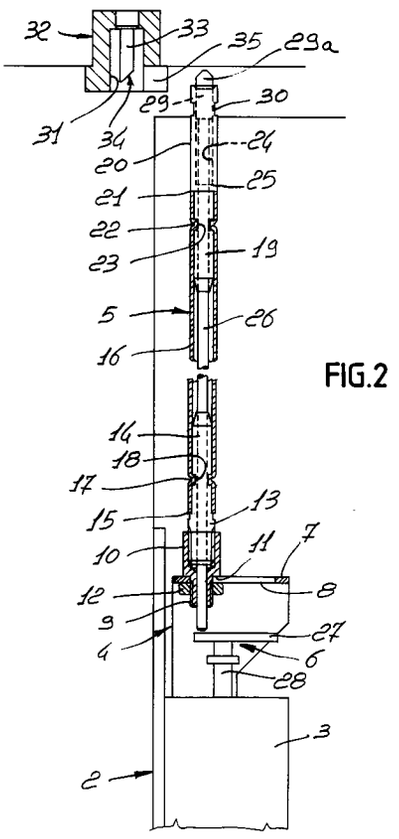

FIG.2

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The present invention relates to a strike lock for two-leaf safety doors.

In safety doors of the indicated type, both leaves open outward, and the one which is normally used to enter and exit (hereinafter termed leaf A), is provided with a panic-proof lock which is designed so that the spring latch and the bolt can be moved simultaneously into release position by actuating the handle. The other leaf (hereinafter termed leaf B) acts as rabbet for leaf A and is provided with an upper bolt and with a lower bolt which are connected, by means of rods, to a so-called panic-proof actuation strike lock which can be actuated by means of its own handle. The particularity of safety doors of the indicated type is that the spring latch and the bolt of the lock installed on leaf A engage in seats of the strike lock of leaf B, the mechanism of which is preset so that if only the lock of leaf A is actuated in order to open, thus retracting the spring latch and the bolt, only leaf A can be opened, since the strike lock keeps its bolts in the position in which they engage the upper and lower selvages. On the other hand, in the strike lock of leaf B there is an element which is expelled from the strike lock and acts in the mechanism of the lock of leaf A, actuating the retraction of the spring latch and of the bolt. Thus, even if one actuates the strike lock alone, not only leaf B but also leaf A opens. In known safety doors, the bolts are preset so that when leaf B is open, the lower bolt might descend and make contact with the floor. To prevent this, an appropriate device blocks the rods. This device is installed at the exit point of the upper rod and is activated by the abutment of a mechanical sensor against the upper rail of the door. It has been observed that this device is often the source of drawbacks, first of all because it is troublesome to install, especially when the door has a frame made of metallic profiled elements, and secondly because it does not allow to adjust the position of the rods inside the front stile in which they must slide. Rod locking devices are known for example from German patents no. 2746049, no. 2912881, and no. 3822286.

The technical aim of the present invention is therefore to provide a strike lock for safety doors with two leaves which obviates the shortcomings which can be observed in the prior art. This aim is achieved with a strike lock for safety doors with two leaves, as defined in the appended claims.

Further features and advantages of the invention will become apparent from the following description of a preferred embodiment, illustrated only by way of non-limitative example in the accompanying drawings, wherein:

figure 1 is a view of a strike lock in assembly position;

figure 2 is an enlarged-scale detail view of the strike lock of figure 1;

figure 3 is a view of a further aspect and of a detail in enlarged scale;

figure 4 is an enlarged-scale sectional view of the upper selvage of the strike lock of figure 3; and

figure 5 is a plan view of the selvage of figure 4.

With reference to the above figures, the numeral 1 designates the leaf B of a two-leaf safety door of the type described initially. The strike lock 2 is mounted on the leaf 1. Said strike lock comprises a device which can be actuated by means of a handle and cooperates with a lock installed in the leaf A of the door in the manner already described. The device is contained a casing 3 provided with a faceplate 3a; two elements 4 and 4a for the transmission of two rod-like bolts 5,5a extend from the upper and lower ends of said casing 3; said bolts can engage in the upper rail of the door and in the floor, and can be moved mutually closer when the handle is actuated. When the two elements 4 and 4a have been moved mutually closer, an engagement device arranged inside the device keeps them in this mutually close position. The transmission elements are released by means of an internal mechanism of the strike lock which is actuated by an element 6 arranged on the side of the upper transmission element 4. The engagement device can be constituted by a known ratchet system, which is not described hereinafter since it is not pertinent to the present invention and which once activated releases the internal mechanism which causes the transmission elements to snap in opposite directions. As shown by figure 2, the transmission element 4 is constituted by a plate the end portion of which is folded at 90° so as to form a wing 7. A slot 8 is formed in the wing 7 and is elongated at right angles to the faceplate 3a of the casing, in which the tubular tang 9 of a bush 10 which is part of the bolt 5 is inserted. The bush 10 forms, together with the tang, a shoulder 11 for resting on the wing 7. A nut 12 screwed on the tang 9 allows to block the bush 10 along the slot 8. The bush 10 is internally threaded, and a sleeve 13 is screwed in it; said sleeve 13 is provided with a tang 14 which defines a shoulder together with said sleeve. The tang 14 is inserted up to the shoulder 15 in the lower end of a tubular rod 16 which is blocked axially and rotationally on the tang by means of two opposite crimps 17 which engage in respective millings 18 of the tang 14. The tang 19 of a further sleeve 20 is inserted in the upper end of the tubular rod 16 until abutment against a shoulder 21 occurs. The tang 19 is also blocked inside the rod 16 by means of crimps 22 which engage in opposite millings 23 of the tang 19. The sleeve 20 forms a hole 24 whose diameter is

greater than that of the tang 19, so that an internal annular step 25 is formed. A stem 26 is guided through the sleeves 13 and 20, and its lower end passes through the bush 10 and rests on the release element 6. Conveniently, the release element 6 is constituted by a plate 27 which is mounted on the top of a pivot 28 and extends below the wing 7 at the slot 8. The pivot 28 is guided vertically so as to enter the casing 3 and activate the mechanism which, by acting on the engagement device of the elements 4,4a, pushes the transmission elements 4,4a outward when the stem acts on the plate 27. The top of the stem 26 comprises a larger-diameter portion 29 which can slide in the hole 24 and ends with a conical tip 29a. Two diametrically opposite flattened portions 30 are formed outside the sleeve 20 for the engagement of an appropriate tool which allows to screw the sleeve 13 in the bush 10. When the leaf 1 is in closed position, the bolt 5 can align with a recess 31 of a tubular body 32 which is fixed in the upper rail of the door and constitutes the selvage for engaging the rod 5. The diameter of the recess 31 is equal to that of the sleeve 20, and a pivot 33 extends from its bottom coaxially to the stem; said pivot 33 has a smaller diameter than the portion 29 of the stem 26 and is provided with a 45° chamfer 34 which is directed toward an indent 35 of the tubular body 32. It should be noted that in the drawing the chamfer 34 and the indent 35 are shown in the plane of the leaf for the sake of clarity. Actually, they are orientated at right angles to the leaf to allow the engagement of the upper end of the bolt 5 during door closure. The lower bolt 5a, which is fixed to the transmission element 4a, also has the same structure as the bolt 5, except for the absence of the internal stem. The operation of the described strike lock is as follows. Assume the transmission elements are reloaded, i.e. retained in the snap position of the release element 6. When the leaf 1 is placed adjacent to the rabbet, the upper end of the sleeve 20 enters the indent 35 and, by passing below the pivot 33, is arranged in the recess 31. Simultaneously, the conical point 29a of the stem 26 makes contact with the chamfer 34 of the pivot 33 and is pushed downward so as to allow the stem 26, which rests on the plate 27 of the release element 6, to act on said release element and release the transmission elements 4 and 4a. Said elements protrude upward and downward from the casing 3 and push the sleeves 20 of the respective bolts 5,5a so that they engage in the respective recesses, thus blocking the leaf in closed position. In particular, the upper sleeve 20 engages the recess 31 of the body 32, whereas the lower sleeve engages a seat of the floor. The strike lock is opened by means of the handle, the actuation of which returns the transmission elements 4,4a into the casing and reloads the element 6 in the position in which it is ready to act on the stem 26.

As can be seen, the device according to the present invention is particularly suitable for leaves which have a frame made of metallic profiled elements with a tubular abutment stile. Since the bush 10 can be adjusted on the wing 7, it allows to set the position of the bolts 5,5a with respect to the front edge of the stile, depending on the characteristics of the profiled element which constitutes the stile.

This adjustment furthermore allows to correct any mistakes in alignment between the body 32 and the bolts to ensure the engagement of the sleeves 20 in the respective recesses. Advantageously, the sleeves 20 are made of very hard steel to prevent their cutting during effraction attempts.

In the embodiment of figures 3 and 4, the upper bolt is designated by the reference numeral 36 and comprises a lower tang 37 which extends downward with a stem 38 which is guided in a bush 39 fixed to the upper transmission element 4 of the strike lock 2 in a manner fully similar to that of the bush 10 described above. When the transmission element 4 is in snap position, i.e. adjacent to the casing 3, the lower end of the stem 38 is in contact with the release element 6.

The stem 38 has, above the bush 39, a collar 40 which is guided in a sleeve 41 rigidly coupled to the bush 39. The collar 40 is crossed by a pin 42 the opposite ends of which slide in respective axial slots 43 of the sleeve 41. A spring 44 is arranged on the portion of the stem comprised between the collar 40 and the tang 37, and rests in an upward region against a shoulder formed by the tang and in a downward region against the top of the sleeve 41 with a washer 45 interposed.

The top 46 of the bolt 36 cooperates with a pivot 47 which is part of the upper selvage 48 wherein the bolt 36 must engage. The pivot 47 is constituted by a cylindrical blind stub, guided in a recess 49 formed in a block 50 and closed by a bottom 51 which is coupled to the block by a pair of diametrically opposite bridges 52 so as to define two semicircular slots 53.

Two axial notches 54 extend along the pivot 47, and the bridges 52 slide in them, so that the pivot 47 is prevented from rotating in the recess 49.

The open end of the pivot 47 protrudes upward from the recess 49 through the slots 53, and an elastic ring 55 is applied on it. A spring 56 is accommodated inside the pivot and acts between the bottom 51 and the closed end of the pivot, so as to keep the ring 55 rested on the block 50, in a position in which the pivot 47 protrudes from the

recess 49. A threaded hole 57 and a smooth hole 58 are formed in the block 50 parallel to the recess 49. A screw 59 is screwed in the hole 49, and a locking ring 60 is engaged on said screw and is inserted in a slot 61 which intersects the hole 48.

A pin 62 is guided in the hole 49; one end of said pin is provided with a stroke limiting flange 63, and the opposite end is fixed to a plate 64.

The screw 59 is also axially coupled to the plate 64, and is freely rotatable with respect thereto. Coupling is provided by means of a washer 65 inserted in an annular groove formed adjacent to the head of the screw 59.

An opening 66 is formed at the center of the plate 64 and is aligned with the recess 49. The opening 66 has the same diameter as the recess, and its edge is flared so as to facilitate the insertion of the bolt 36, as will become apparent hereinafter.

The plate 64 is preset to be fixed to the upper rail of the door frame by means of screws inserted through holes 67, whereas the block 50 is accommodated in a compartment of said rail. By acting on the screw 59 it is possible to move the block 50 away or toward the plate 64 and thus adjust the length of the portion of pivot which protrudes from the plate.

With the strike lock of figures 3, 4 and 5, when the leaf 1 is closed the top 46 of the bolt 36 moves into contact with the pivot 47, which is provided with a chamfer 68.

Since the spring 56 is more rigid than the spring 44, action on the leaf lowers the bolt 36. The downward stroke of the bolt 36 is adjusted so that when the bolt is substantially aligned with the pivot 47 the stem 38 has moved the release element 6 into a position which allows the transmission element 4 to snap upward. Since during the descending stroke the pin 42 has descended along the slots 43 until it rests on the sleeve 41, the snapping of the transmission element 4 produces a thrust on the pivot 47 which, by virtue of the elastic means included in the strike lock, is stronger than the contrast force applied by the spring 56. In this manner, the bolt 36 can enter the recess 49 and block the leaf.

A substantial advantage of the embodiment of figures 3-5 is constituted by the possibility of adjusting the level of the pivot 47 by acting on the screw 59 so as to correct changes in the position of the leaf with respect to the jamb and ensure the impact of the top of the bolt 36 on the chamfer 68, which is necessary to make the bolt snap into engagement in the selvage 48.

The invention thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept.

All the details may furthermore be replaced with other technically equivalent elements.

In practice, the materials employed, as well as the contingent shapes and dimensions may be any according to the requirements.

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 scope of each element identified by way of example by such reference signs.

Claims

1. Strike lock for two-leaf safety doors, comprising: two transmission elements (4,4a), which are respectively connected to an upper rod-like bolt (5) and to a lower one (5a), both of which are arranged vertically, said transmission elements being actuatable in opposite directions by means of an internal reloadable mechanism of the strike lock (2) which is suitable to make said bolts snap into the position for engagement in respective recesses (31,49) of the upper and lower selvages (32, 48) of the door; characterized in that it comprises an element (6) for the release of said transmission elements (4,4a) and in that a pivot (33,47) is provided in the recess (31,49) of the upper selvage (32); said pivot protrudes outside the recess and is adapted to act by virtue of rod-like means (26,36) on said release element (6) so as to produce the snap actuation of said transmission elements (4,4a) and the engagement of the bolts (5,36) in the respective recesses.

2. Strike lock according to claim 1, characterized in that said pivot (47) is guided in a recess (49) of a block (50) which is accommodated in the upper rail of the door frame, and is moved by a spring (56) into a stroke limit position in which the end of said pivot protrudes from said recess, and in that said upper bolt (36) is guided in a bush (39) which is rigidly coupled to the respective transmission element (4) and comprises a lower stem (38) operatively associated with the release element (6); said stem has, above said bush, a collar (40) guided in a sleeve (41) coaxially rigidly coupled to the bush (39) and diametrically traversed by a pin (42) having opposite ends which slide in respective axial slots (42) of the sleeve (41); a spring (44) is arranged on the stem (38) between said sleeve (41) and a shoulder of the bolt and is less rigid than the spring (56) acting

on the pivot (47) of the selvage (48).

3. Strike lock according to claim 2, characterized in that said block (50) has two holes (57,58) parallel to said recess (49); a pin (62) guided in one (58) of said holes, a screw (59) screwed into the other hole (57); a plate (64) associated with said pin (62) and with said screw (59), and adapted to be fixed to the upper rail of a door, said plate being provided with an opening (66) aligned with said recess (49) and through which said pivot (47) protrudes.

4. Strike lock according to claim 3, characterized in that said pivot (47) is constituted by a blind stub inside which said spring (56) is accommodated; said spring (56) acts against a bottom (51) of said block (50), and said blind stub has an open end which protrudes from said recess (49) through slots (53) of said bottom (51) and to which a ring (55) is fixed; said ring (55) acting as abutment for said blind stub, said slots (53) being divided by bridges (52) engaging axial notches (54) of said blind stub so as to prevent its rotation but allow its axial sliding in contrast with the action of said spring (56).

5. Strike lock according to claim 1, characterized in that at least said upper bolt (5) is tubular, so as to act as guide for an internal stem (26) having a lower end engaging said release element (6); in a door closure position, the upper end (29a) of said stem (26) cooperates with a central pivot (33) of the upper recess (31) so that said stem (26) activates said release element (6) in the snap position, in which said transmission elements (4,4a) push said bolts (5,5a) into engagement in said recesses (31); said transmission elements (4,4a) disengaging the bolts (5,5a) from the respective recesses (31) when the strike lock (2) is actuated to open it.

6. Strike lock according to one or more of claims 1-5, characterized in that each transmission element (4,4a) comprises a wing (7) in which a slot (8) is formed; said slot (8) being elongated in the plane of the leaf (1) in which the related bolt (5, 5a) can be fixed in an adjustable manner.

7. Strike lock according to claim 6, characterized in that the upper bolt (5) comprises a tubular rod (16) and two sleeves (14,14a) fixed to the opposite ends of said rod; one of said sleeves has a thread for screwing in a bush (10) which can be fixed along the slot (8) of said upper transmission element (4).

8. Strike lock according to claim 5, characterized in that said recess (31) for the engagement of the upper bolt (5) is formed in a tubular body (32) fixable to the upper rail of a door; said central pivot (33) is provided with a chamfer (34) directed toward a lateral indent (35) of said tubular body and being engageable by a conical end (29a) of said stem (26) which protrudes from the top of said rod-like bolt (5), whereby to actuate said stem so that it activates said release element.

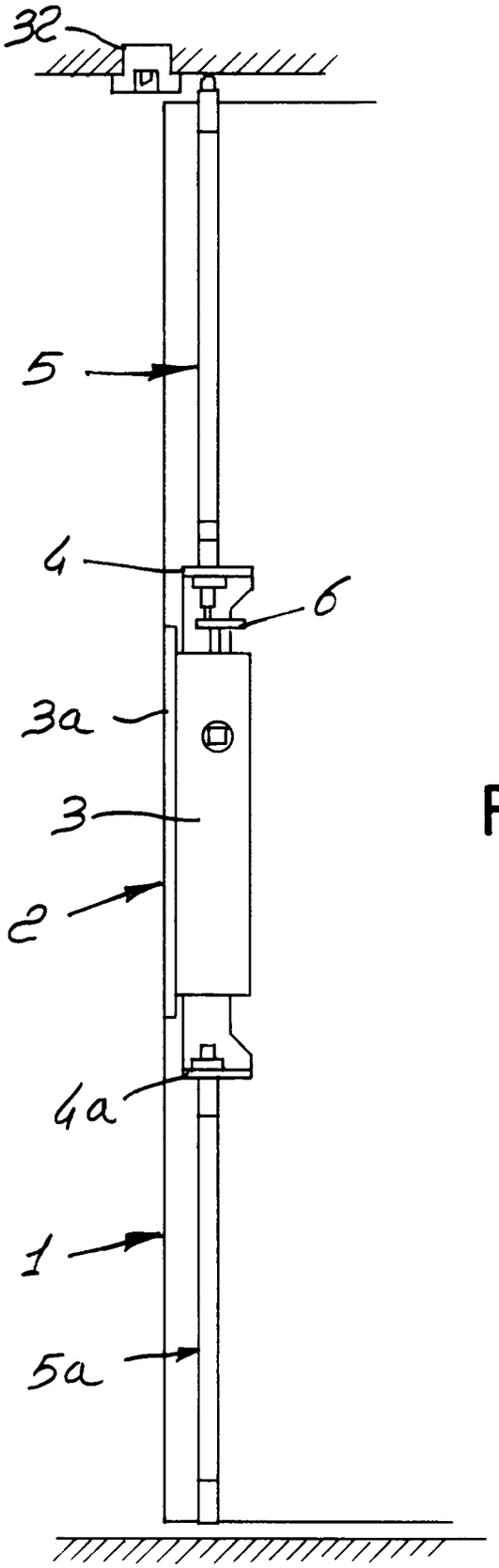

FIG.1

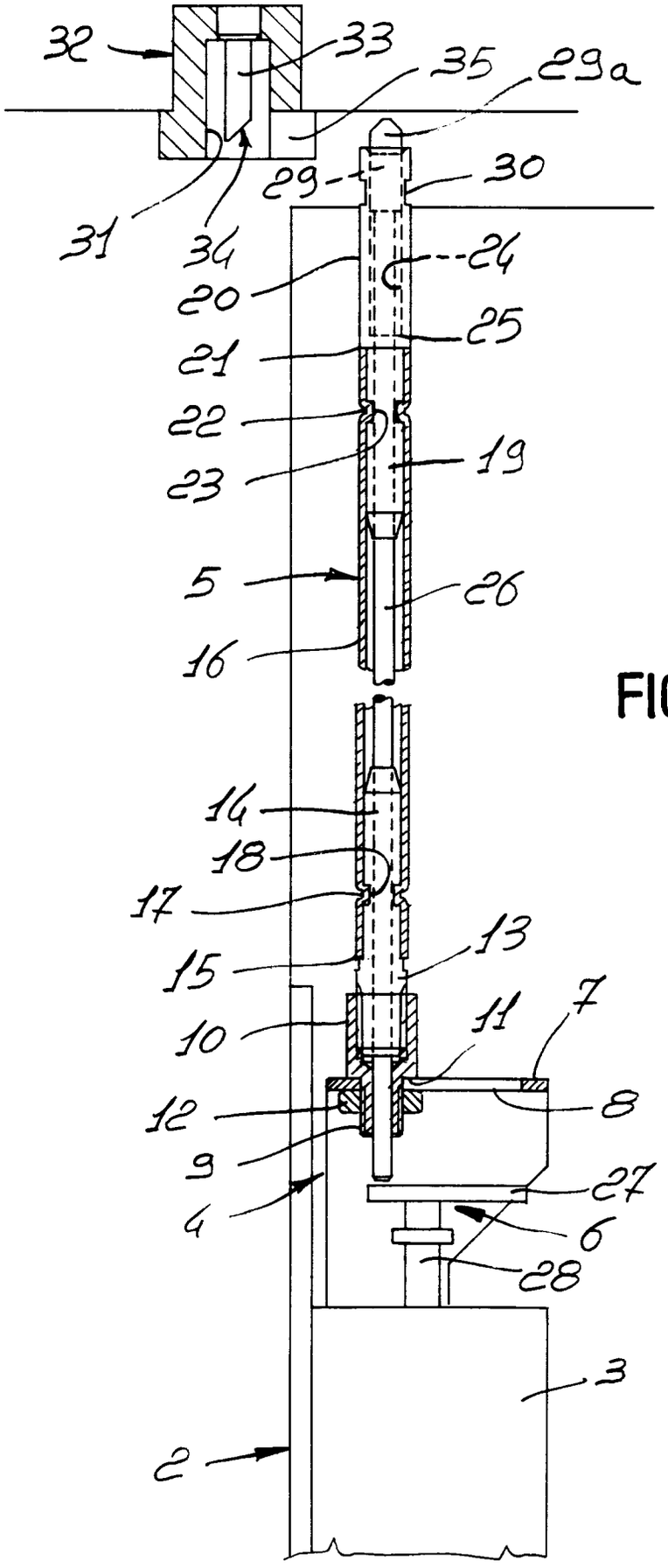
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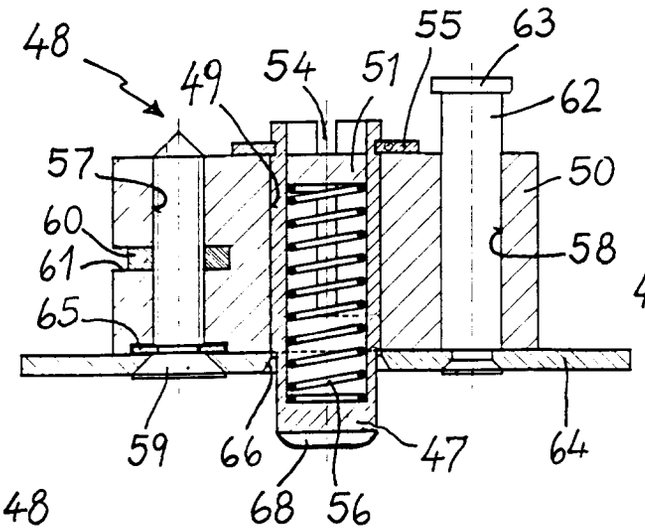
FIG.2

FIG. 4



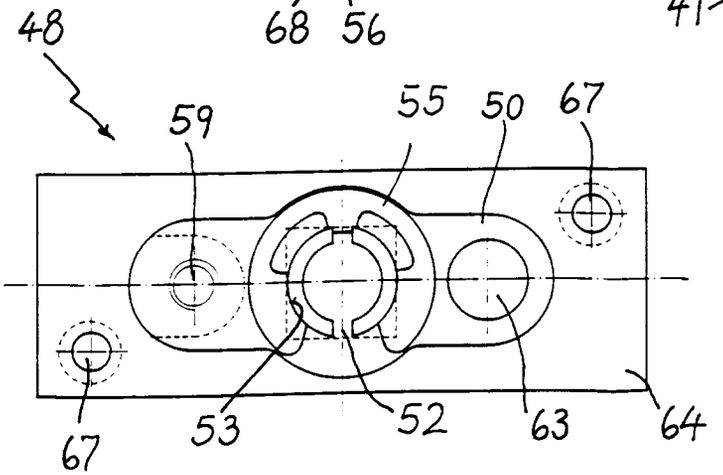


FIG. 5

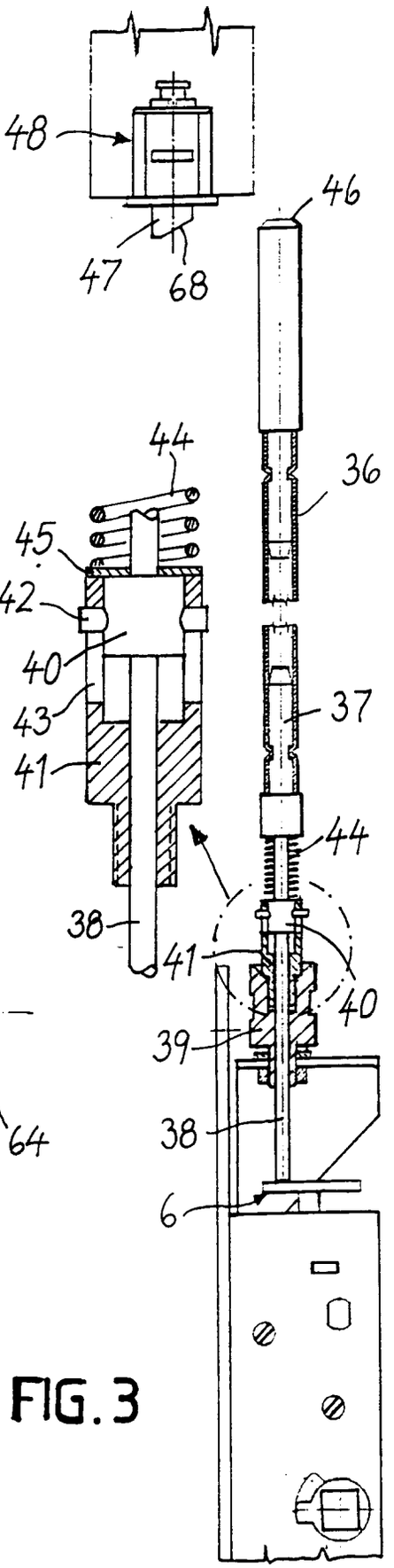


FIG. 3

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EUROPEAN SEARCH REPORT

Application Number EP 93104729.4

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.5)
D,A	DE - C - 2 746 049 (SCOVILL SICHERHEITSEIN-RICHTUNGEN GMBH) * Fig. 1-4; claims 1-7 * --	1,2,5, 8	E 05 B 65/10
D,A	DE - C - 2 912 881 (BKY SICHERHEITSTECHNIK GMBH) * Fig. 1-5; claims 1-5 * --	1	
A	WO - A - 83/01 644 (PARLEBAS) * Fig. 1-5; claims 1-9 * --	1,2,5, 6,7,8	
X	WO - A - 87/04 750 (TEMET USA) * Fig. 1-5; claims 1-9 * --	1,2,3, 4,6-8	
A	GB - A - 519 937 (J. ADAMS & SON LTD.) * Fig. 1-5; claims 1-8 * --	1,3	
A	US - A - 3 801 144 (DIEHL) * Fig. 1-5; claims 1-10 * --	1,3	TECHNICAL FIELDS SEARCHED (Int. Cl.5) E 05 B
X	GB - A - 2 206 641 (ADAMS RITE MANUFACTURING CO) ----	1-8	

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	15-09-1993	CZASTKA

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
Y : particularly relevant if combined with another document of the same category
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E : earlier patent document, but published on, or after the filing date
D : document cited in the application
L : document cited for other reasons

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