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(71) Applicant: **KEYROBOT S.P.A.**
47040 Coriano (RN) (IT)

(72) Inventors:
- **Migliorini, Massimo**
  47037 Rimini RN (IT)
- **Caldari, Gianfranco**
  47036 Riccione RN (IT)

(74) Representative: **Lanzoni, Luciano**
c/o BUGNION S.p.A.
Via Cairoli, 107
47037 Rimini (Forli) (IT)

(54) Sliding-door handle with latch

(57) A sliding-door handle (1) with latch, in which the door (4) is provided with an upright having a plate (13) with a hole (14) for engagement of the latch (15), comprising a plate element (16) provided with a hook (17) at an end (18) designed so that rotation of its special operating body (23) about a fixed axis (24) imparts to the plate element (16) an oscillating movement as a result of which the hook (17), from an end rest position in which it is hidden inside the door (4), is projected towards the outside of the latter, until it engages with the plate (13) of the upright, hooking up with it after passing through the hole (14) thereof, and vice versa, the operating body (23) forming at least one projection defined by at least one recessed impression (2), both of which can be accessed by the user both frontally and laterally.

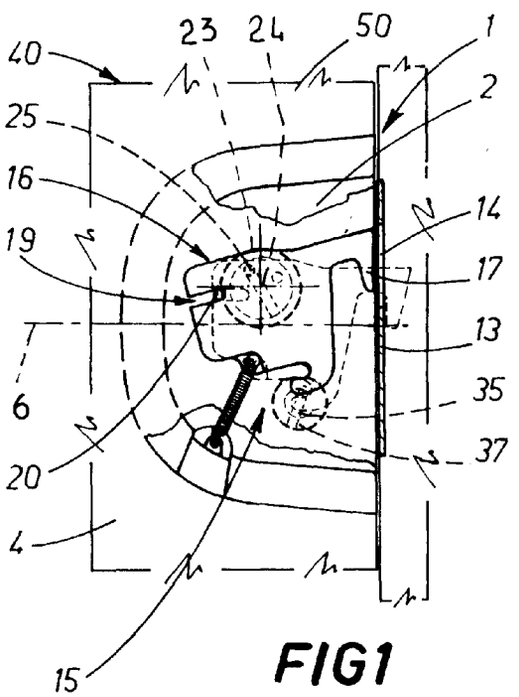

FIG1

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Description

The present invention relates to a sliding-door handle with latch, in which the door is provided with an upright having a plate provided with a hole for engagement of the latch.

In particular, the invention relates to sliding doors which are totally concealed inside a receiving compartment formed in a wall, without however losing its universality as a result. It can in fact be advantageously used also in sliding doors which are partially concealed, or also in some types of hinged doors.

As is known, any sliding door, whether it is of the totally concealed type or not, always has the problem that it is not easily accessible, for gripping of the handle, in the end position where the door is fully open.

In fact, if the sliding door is not of the totally concealed type, it is mounted so as to project from the wall, in the end open position, by the amount which is needed in order to be able to easily grip the handles thereof.

This, however, results in the drawback that incomplete use is made of the access opening of the door.

This drawback is overcome by sliding doors which are totally concealed inside the wall, such as those, for example, which are provided with housing boxes inserted in the wall. In these constructional designs the handles are in fact inset in the thickness of the door, with the obvious aim of not obstructing free sliding of the latter into the box. However, in the totally open condition of the door where the latter is inserted inside the receiving compartment, gripping of the handles would be extremely difficult, if not even impossible. The door, therefore, is equipped with an additional accessory designed to allow at least partial extraction of the door from the box containing it. This accessory normally consists of an insert located in the front side of the door and provided with a curved hole, into which one can introduce a finger so as to displace the door from its entirely open end position into a more or less extracted position, where it is then possible to operate the inset handle.

It is obvious, at this point, that these constructional designs also, while overcoming the drawback of incomplete use of the access opening, have the disadvantage that they are somewhat inconvenient, since it is necessary to operate several distinct and separate gripping members, using procedures requiring several stages which, necessarily, must be performed in succession. A no less important disadvantage is the cost of the labour required in order to assemble the set of components intended for opening of the door. This cost is by no means negligible since it is necessary to assemble as many as three gripping members: two inset handles, one on each side, and an accessory located in the front side of the door.

A further problem as yet unresolved is represented by the need to provide the aforementioned handles, which are particularly flat and have necessarily small dimensions, with a latch which also allows stable and reliable closing of the door, whenever necessary. The object of the present invention, as characterized in the accompanying claims, is that of eliminating all the drawbacks indicated above. This is achieved by means of a handle, comprising a special movable latch, which can be hidden inside the door and is provided with an end hook and an operating body with which the hook, from an end rest condition in which it is totally hidden inside the door, is projected towards the outside of the latter until it engages in an operative condition with a plate mounted on the fixed upright of the door, hooking up with it, and vice versa. Since the latch, in its non-operative rest position, is entirely contained inside the door, the fundamental advantage which is derived is that of total safety of the latch against accidental gripping, when the door is open, in addition to an appreciable aesthetic effect resulting from the absence of visible elements projecting from the door. The aforementioned latch can be integrated, finally, with means for locking in the closed position, which enable the door to be secured in a manner similar to a key-type closing system, without however involving any of the difficulties of sliding associated with the presence of a projecting key-hole and key such as those conventionally used in movable hinged doors. The latch is also provided with a constructional configuration which is simple to realize and low-cost.

Furthermore, it can be perfectly integrated with the body of the handle, so as to allow the realization of an overall assembly of closing elements which operates efficiently and offers a high degree of accessibility for the user of the sliding door. In fact, owing to its particular and ingenious design, the handle in question allows the door to be concealed totally inside the containment box, while allowing the user to pull out the door from the wall box by operating a single member consisting precisely of the handle and by means of a single operation. This results in considerable convenience of operation, entirely comparable with that of conventional movable hinged doors. The solution obtained, consisting in a single member, is particularly economical both in terms of production costs and in terms of assembly costs.

Moreover, the possibility of providing a perfectly symmetrical handle means that it is possible to use the latter indifferently as a right-hand handle or as a left-hand handle, acting in exactly the same manner on both sides of the door.

Further technical features of the invention in accordance with the aforementioned objects can be clearly derived from the contents of the claims indicated below, and the advantages of the said invention will emerge more clearly from the detailed description which follows, with reference to the accompanying drawings which illustrate a non-limiting example of embodiment thereof, in which:

- Figures 1, 2, 3 and 4 show respectively, in diagrammatic form, with parts removed for the sake of clarity, a front side view, rear side view, front end view

and top plan view of the invention;

- Figures 5, 6 and 7 show a side view, bottom view and front end view of a detail of the invention;
- Figure 8 shows a top view of a second component of the invention;
- Figure 9 is a cross-section through the component according to Figure 8 along the line IX-IX;
- Figures 10 and 11 are side view and plan view illustrations of a third component of the invention;
- Figure 12 shows a front side view and front end view of a detail of the invention on a larger scale. With reference to Figures 1 and 2, 15 denotes a latch for the handle 1 of a sliding door 4 which can be hidden, until totally concealed, inside a building wall.

The latch 15 is mounted on the leaf side 50 of the door 4 intended to be associated, during closing of the door 4, with a facing upright 12 of the counter-frame provided with a plate 13 having a hole 14 for engagement of the latch 15.

The latch 15 essentially comprises: a plate element 16, contained in the door 4 and formed so as to have an end hook and a slot 19 opposite the hook 17; a fixed pin 20 onto which the slot 19 of the plate element 16 engages; and a body 23 for operating the latch 15, mounted rotatably about a fixed axis 24 and having an eccentric pin 25 on which the plate element 16 is hinged.

If we consider also Figure 5, it can be seen moreover that the hook 17 comprises a head 30 with a front face 31 and a rear face 32 which are flat, shaped and mutually converging at an acute angle towards a vertex 51 located towards the bottom end of the door 4.

The shape of the plate element 16 and the locations of the rotating pin 25 and the fixed pin 20 are such that, following rotation of the operating body 23, an oscillating movement is imparted to the plate element 16 in the plane 40 in which the door 4 lies, as a result of which the hook 17, from an end rest condition in which it is hidden inside the door 4, is projected towards the outside the latter, until it engages, in an operative condition, with the plate 13, hooking up with it after passing through the hole 14 thereof, and vice versa.

The front and rear faces 31 and 32 of the head 30 are oriented, in particular, so as to be equidistant with respect to the plate 13 of the upright 12 in the end positions reached by the plate element 16 during the oscillation movement.

The latch 15 comprises moreover recall means interacting with the plate element 16 so as to recall always the latter into a stable immobile condition corresponding, alternately, to the rest condition or to the operative condition.

In particular, the recall means are actuated by a resilient reaction element 26, consisting of an extension spring, with opposite ends 27, 28 respectively anchored on one side to the plate element 16 and on the other side to a fixed point 29 of the door 4. The extension spring acts in a direction which is displaced with respect to the axis 24 of rotation of the operating body 23. The presence of the spring therefore causes a rotational moment of the plate element 16 about the fixed pin 25 which, in the absence of external forces applied to the operating body 23, always brings the plate element 16 itself into one of its end positions: i.e. the rest position or operative position, depending on the position assumed by the spring with respect to an ideal line Y, which joins the fixed pin 25 to the fixed point 29.

The latch 15 is equipped with means for stable locking of the plate element 16 in order to block rotation of the plate element 16 in the aforementioned end positions, in the same way as a conventional key-type locking system.

In particular, the locking means (Fig. 9) are actuated by a pawl 35 supported by a pommel 37 rotoidally mounted on the door 4 and by a cam 36 formed on the plate element 16.

The pawl 35 and the cam 36 are shaped in a complementary manner and are mounted on the latch 15 so as to be movable with respect to one another between two end positions.

In one of these positions the cam 36 and the pawl 35 mechanically interfere with one another, so as to prevent the oscillating movement of the plate element 16. As a result, the operating body 23 is prevented from rotating and the door 4, if closed, remains locked.

In the other position, on the other hand, the cam 36 and the pawl 35 are disengaged from one another; consequently the plate element 16 and the operating body 23 are freely movable.

From Figures 3 and 4 it can be also observed that, owing to its characteristic and extremely compact shape with small dimensions, the latch 15 may be advantageously mounted inside the sliding door 4, even in a zone 38 of fairly limited thickness, such as for example that in which the inset handles 1 of the door 4 are formed.

As a result of this feature the latch 15 can also be incorporated in the handle 1 itself. This allows the realization of the closing assemblies which are highly efficient from a functional point of view, having a great degree of constructional simplicity and posssessing a pleasing aesthetic appearance. If we observe Figures 1 and 2, it can be noted in fact that, by forming the handles 1 as recessed impressions 2 in the door 4, which can be accessed by the user both tangentially and transversely with respect to the plane 40 in which the door 4 lies, the body 23 operating the plate element 16 of the latch 15 may be mounted, inside the recessed impression 2, projecting transversely with respect to the plane 40 in which the door 4 lies.

As a result of this arrangement, the operating body 23 and the recessed impression 2 define, in combination with one another, an access space (22) with a dual entry direction for the user of the door 4.

The access space, in a first entry direction, is accessible such that the user is able to introduce a finger

tangentially with respect to the plane 40 in which the door 4 lies and curl it around the operating body 23: as a result, it is possible both to operate the latch 1 and extract the door 4 from the containment compartment in the wall.

In the other entry direction, the access space on the other hand allows the user to grasp the operating body 23 following a direct approach movement transversely with respect to the plane 40 in which the door 4 lies.

Moreover, the handle 1 may be formed so as to be utilizable on both sides of the door 4, as in the example shown in the drawings. In this case, the handle is symmetrical with respect to a vertical median plane 7, parallel to the main plane of the door 4, precisely so as to be accessible equally well on both sides of the door 4 itself. However, it could be constructed solely for monolateral use on one side only, as in the cases where the sliding door is completely external and able to be accessed on one side, where a normal handle may thus be provided. In any case, it is advantageous, whatever the type of handle in question, for it to be symmetrical with respect to a horizontal median axis 6, so as to be used indifferently as a left-hand or right-hand handle. A peripheral frame 9 provides a trimming for the handle/door combination, as well as giving the handle itself greater stability.

From what has been stated above it is obvious how the handle 1 described fully achieves the preset objects, having moreover the further advantage that it allows pre-assembly of the handle 1 together with the latch 15. This results in a drastic reduction in the total costs for preparing the door 4 to receive the handle 1, as well as a reduction in the installation costs for fitting the handle 1, the latter having a body designed to be positioned inside said opening 44. It can be deduced, in fact, that, as regards the preparatory work to be carried out on the door 4 prior to installation of the handle 1 and the latch 15, this is reduced to only preparation of an opening 44 for receiving the handle 1.

As regards instead fitting of the handle 1 on the door 4, no preparatory work of any kind is required and fitting of the latch 15 does not produce any additional costs compared to fitting of the handle 1 alone.

The abovementioned advantageous features are further confirmed by Figure 12 in which it can be noted, moreover, that the latch 15 is associated with a handle 1 which can be fixed to the door 4 by means of simple screws 60 which are inaccessible when the door 4 is closed. The screws 60 may moreover be advantageously hidden from sight, even when the door 4 is open, by means of a cover 61 fitted onto a complementary cavity 62 formed on the handle 1 and designed to receive the heads 63 of the screws 60. The invention thus conceived may be subject to numerous modifications and variants, all of which fall within the scope of the innovative idea. Moreover, all the details may be replaced by technically equivalent elements.

The materials and dimensions which form the individual components of the invention may obviously be the most relevant in relation to the specific requirements of these components.

In practice, modifications and/or improvements are obviously possible, provided that they fall within the scope of the following claims.

Claims

1. Sliding-door handle with latch, in which the door (4) is provided with an upright (12) having a plate (13) provided with a hole (14) for engagement of the latch (15), characterized in that the latch (15) comprises: a plate element (16) contained in the door (4) and provided with a hook (17) at the end (18) and a slot (19) opposite the hook (17); a fixed pin (20) onto which the slot (19) of the plate element (16) engages and a body (23) for operating the latch (15), mounted rotatably about a fixed axis (24) and having an eccentric pin (25) on which the plate element (16) is hinged, rotation of the operating body (23) imparting to the plate element (16) an oscillating movement in the plane (40) in which the door (4) lies, as a result of which the hook (17), from an end rest position in which it is hidden inside the door (4), is projected towards the outside of the latter, until it engages in an operative condition with the plate (13), hooking up with it after passing through the hole (14) thereof, and vice versa.

2. Handle according to Claim 1, characterized in that the latch (15) comprises recall means (26) interacting with the plate element (16) so as to recall it into the rest position or into the operative position.

3. Handle according to Claim 2, characterized in that the recall means (26) comprise a resilient reaction element (26) with opposite ends (27, 28) respectively anchored to the plate element (16) and to a fixed point (29) of the door (4), said reaction element (26) imparting to the plate element (16) an action designed to recall it into the rest position or into the operative position.

4. Handle according to Claim 3, characterized in that said reaction element (26) is actuated by an extension spring acting in a direction which is displaced with respect to the hinging pin (25) of the plate element (16).

5. Handle according to Claim 1, characterized in that the hook (17) of the latch (15) comprises a head (30) with a front face (31) and a rear face (32) shaped so as to be equidistant with respect to the plate (13) of the upright (12) in the end positions of the plate element (16).

6. Handle according to Claim 5, characterized in that the front face (31) and the rear face (32) of the latch (15) are flat.

7. Handle according to Claim 1, characterized in that it comprises means for stably locking the plate element (16) in the said end positions.

8. Handle according to Claim 7, characterized in that said stable-locking means are actuated by a pawl (35) and by a cam (36) shaped in a complementary manner and mounted on the latch (15) so as to be movable with respect to one another between two end positions, in one of which, where the cam (36) and the pawl (35) mechanically interfere with one another, oscillation of the plate element (16) is prevented, whereas in the other position, corresponding to disengagement of the pawl (35) from the cam (36), said oscillation is permitted.

9. Handle according to Claim 7, characterized in that cam (36) is formed on the plate element (16) and the pawl (35) is supported by a pommel (37) rotoidally mounted on the door (4).

10. Handle according to any one of the preceding claims, characterized in that said latch is associated with a handle (1) which can be fixed to the door (4) by means of screws (60) which are inaccessible when the door (4) is in the closed condition.

11. Handle according to any one of the preceding claims, characterized in that it is mounted inside a sliding door (4) and in a zone (38) of limited thickness where the handle itself is provided with at least one recessed impression (2) which can be accessed by the user tangentially and transversely with respect to the plane (40) in which the door (4) lies.

12. Handle according to Claim 11, characterized in that the operating body (23) of the plate element (16) is mounted on the door (4) so as to project transversely with respect to the plane (40) in which the latter lies and is located inside the recessed impression (2), the operating body (23) and the recessed impression (2) defining, in combination with one another, an access space (22) having a dual entry direction for the user of the door (4), said access space (22), in a first entry direction, being accessible such that the user is able to introduce a finger tangentially with respect to the plane (40) in which the door (4) lies and curl it around the operating body (23) so as to operate the latch (1), whereas in the other entry direction the user is able to grasp the operating body (23) following a direct approach movement transversely with respect to the plane (40) in which the door (4) lies.

13. Handle according to any one of the preceding claims, characterized in that it is symmetrical with respect to a horizontal median axis (6), so that it can be used indifferently as a left-hand or right-hand handle.

14. Handle according to any one of the preceding claims, characterized in that it is symmetrical with respect to a vertical median plane (7), parallel to the main plane of the door (4), so as to be accessible equally well on both sides of the door (4) itself.

15. Handle according to any one of the preceding claims, characterized in that it has a body designed to be inset in the door (4), the latter having a corresponding opening (44) formed in it.

16. Handle according to any one of the preceding claims, characterized in that it has a peripheral frame (9) providing a trimming for the combination consisting of handle (1) and door (4).

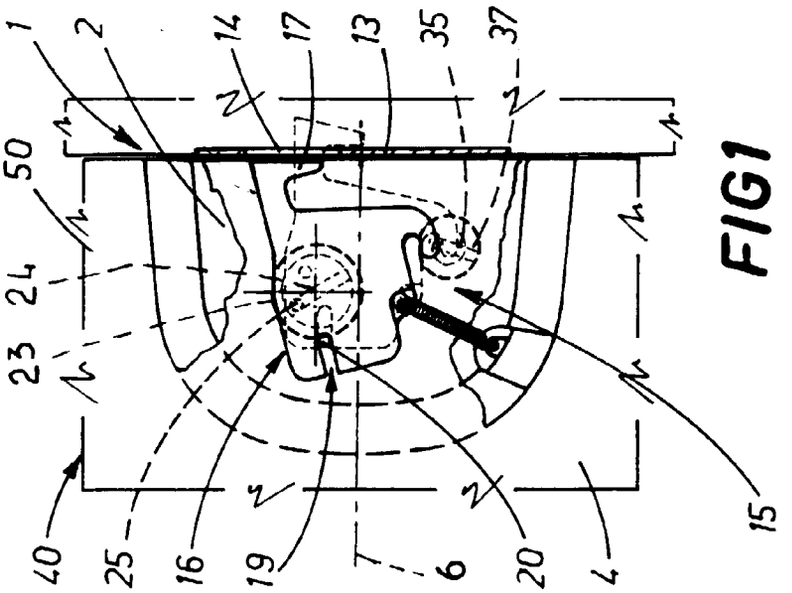


FIG1

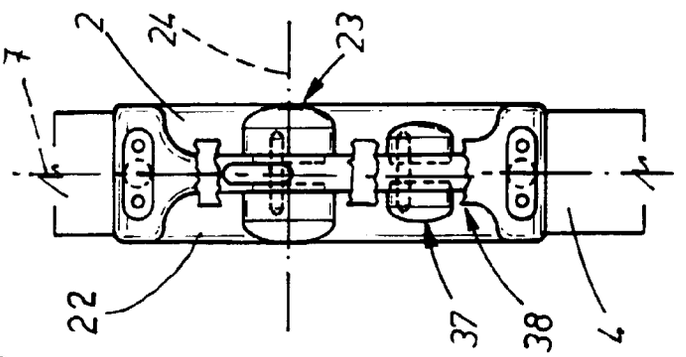


FIG3

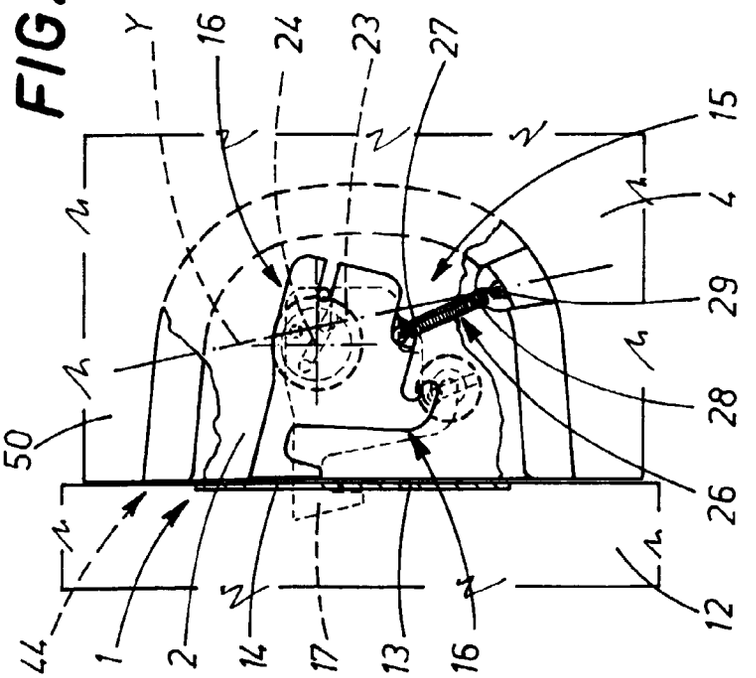


FIG2

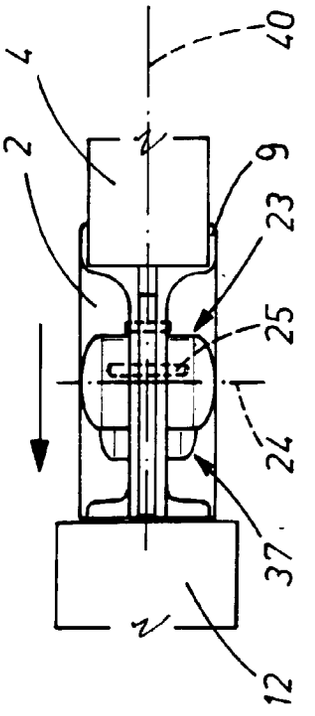


FIG4

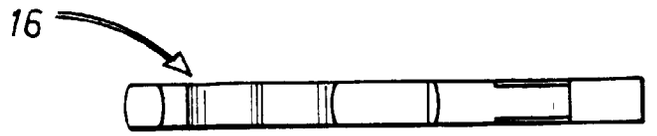
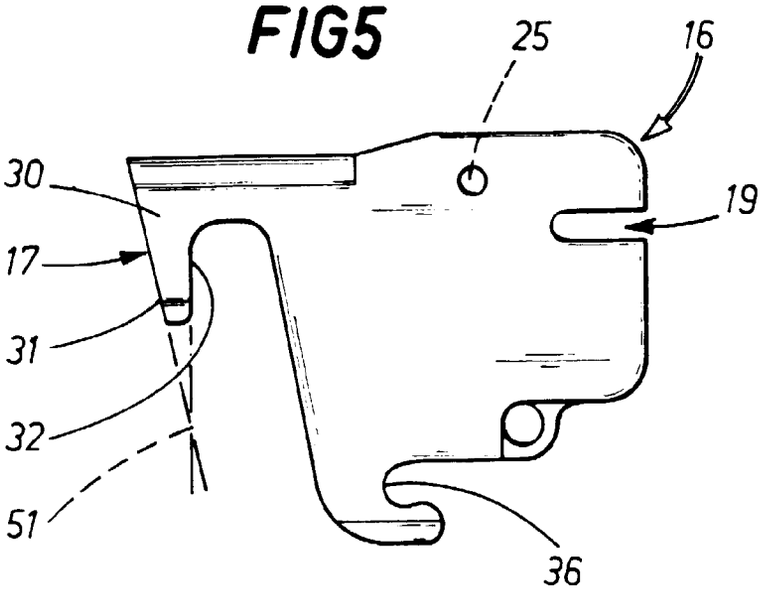


FIG6

FIG5



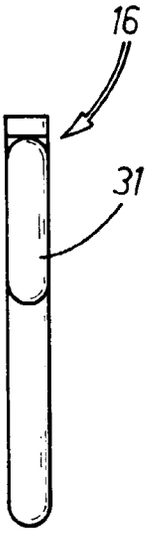


FIG7

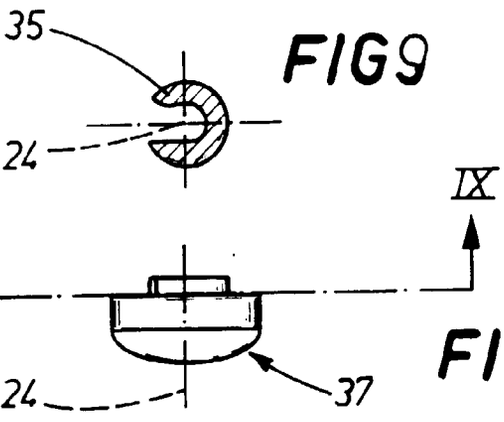


FIG9

FIG8

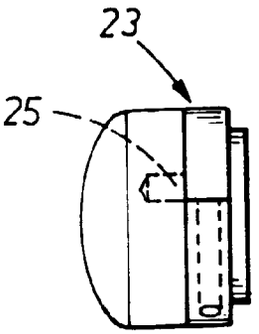


FIG10

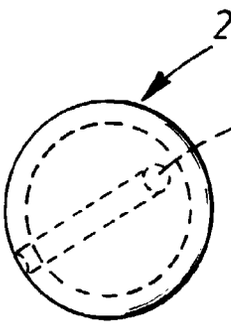


FIG11

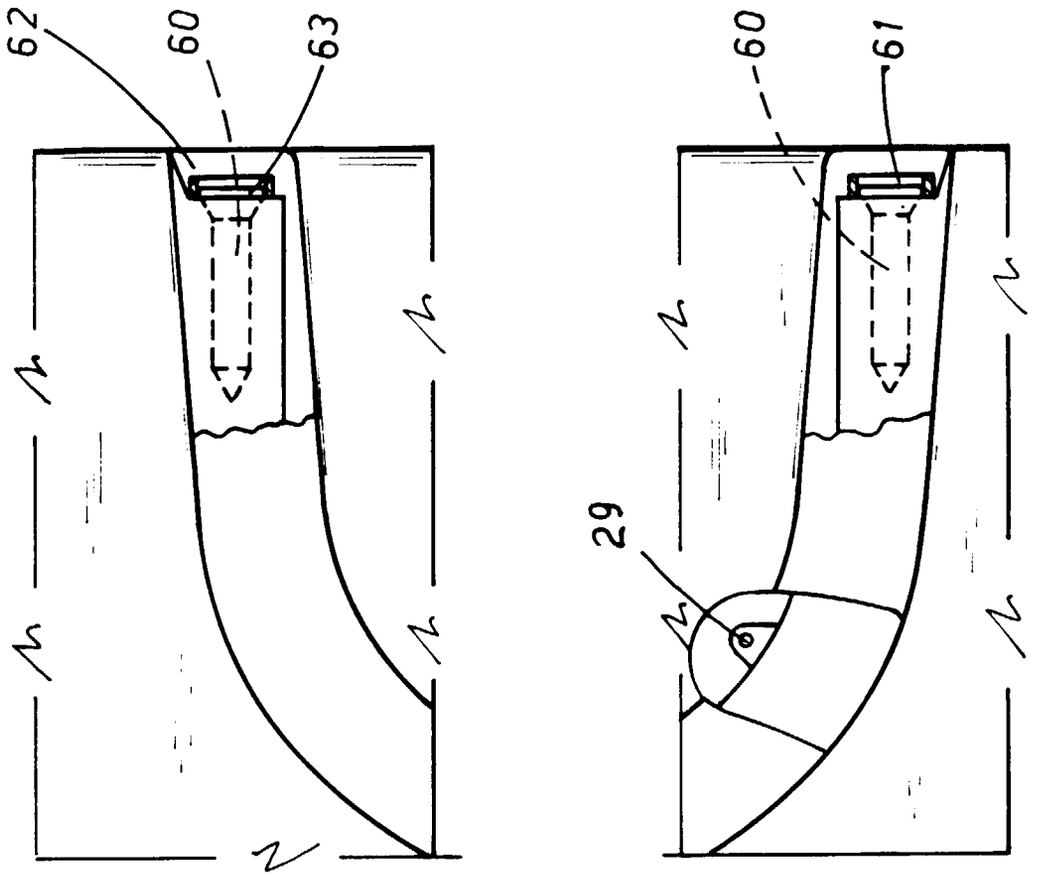
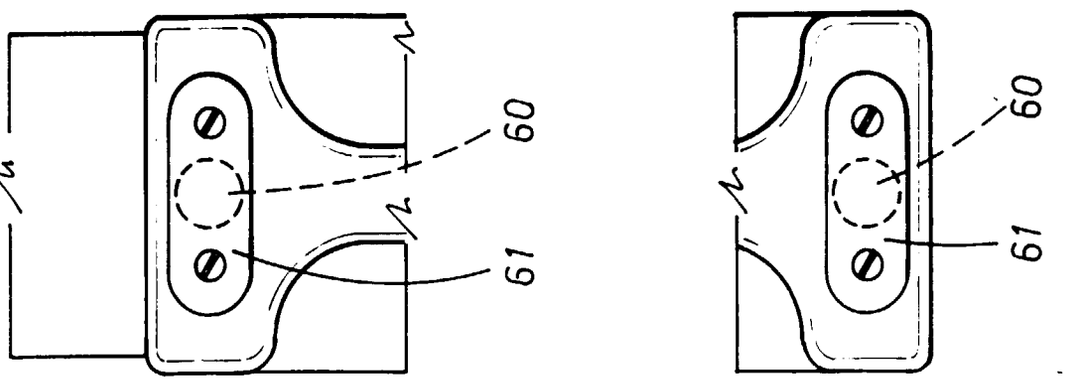


FIG 12



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EUROPEAN SEARCH REPORT

Application Number
EP 96 83 0368

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)
X	US 2 701 156 A (PALMER CHARLES S)	1-4,7, 10,11, 13,15,16	E05B65/08
A	* the whole document *	6,14	
X	US 3 019 043 A (WOODWORTH JOHN A.)	1,7,11, 13,16	
A	* the whole document *	2-4,6,14	
X	US 2 855 234 A (EADS CHARLES L)	1,7,8, 10,13-16	
A	* the whole document *	2	
X	US 4 417 430 A (LOIKITZ FRANK F) * the whole document *	1	
A	US 3 851 922 A (MCCOY R) * the whole document *	7-9	
A	DE 29 04 761 A (FAGRO PRESS UND STANZWERK GMBH) * the whole document *	7-9	TECHNICAL FIELDS SEARCHED (Int.Cl.6)
A	US 2 723 148 A (JOHNSON LEONARD E) * the whole document *	10-16	E05B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	5 February 1997	PEREZ MENDEZ, J

CATEGORY OF CITED DOCUMENTS

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