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(54) Door lock.

(57) A door lock (1), comprising operating means (2) and a lock housing (8) provided with a forend plate (7) for fitting into a herefore intended recess (21) in a door leaf (20). The recess (21) exhibits an opening (25) for the lock housing (8) facing towards the side of the door frame, and at least two openings (26) in the sides (30, 31) of the door leaf (1) being positioned opposite each other, through which openings (26) said operating means (2) extend for engagement with the lock housing (8) in the final fitted state of the door lock. The invention relates specifically to that the lock housing, at at least one of its faces (12, 38, 39) facing the wall faces (35) of the recess (21), exhibits a resilient retaining member for retaining the lock housing (8) in the recess (21) during a stage prior to final fitting by way of engagement with said at least one wall face (35).

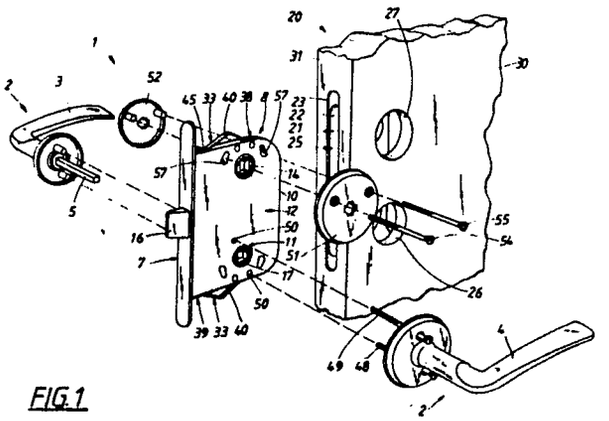

FIG.1

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Door lock

The present invention relates to a door lock of the type being provided with a lock case with a forend plate and operating means such as door handles. The invention relates specifically to door locks intended for fitting into interior doors, but is of course also applicable in every case where a lock housing is fitted into a recess in a door leaf. Examples of such doors are exterior doors, cupboard doors, storage doors etc.

Background of the invention:

The fitting of door locks, especially interior door locks is traditionally done by inserting the lock housing, provided with said forend plate, in a recess in the door leaf. The lock housing is thereafter secured in the recess by inserting two screws through screw holes in the forend plate, the screws being entirely secured in the door leaf. The screw holes are hereby positioned at the upper and lower end portions of the forend plate. The fitting of the lock housing in the door leaf is usually done at the manufacturing plant where the door leaf is made. The real function of the screws, in this stage, is to serve as a transport safety for retaining the lock housing in the recess until final fitting is done at the customer's site by the fitting of operating means, for example in the shape of door handles and keyhole plates through openings in the door sides leading into the recess. The two screws in the forend plate also eliminates the inherent play which exists between the lock housing and the recess walls. At the final fitting, the door handles are secured to the lock housing by two screws extending through the lock housing via the openings in the sides of the door leaf.

Furthermore, between these screws there is an operating rod, usually having a square cross section, extending through the openings in the door leaf for engagement with the mechanism of the lock housing. The keyhole plates are secured in much the same way as the door handles, whereby the finally fitted door lock is held steadily in place in the door leaf with the help of a total of four through-going screws as well as said through going operating rod. Thus, after the final fitting, there is no further need for the aforementioned screws in the forend plate in order to securely hold the lock in the door leaf.

However, in a large scale, time effective series production of doors, the traditional screw fitting of the lock housing causes problems, for instance in the shape of undesirable time losses. The traditional fitting is carried out today either manually by two men who then inserts and secures the lock housing, or in an automatic operation copying the manual method whereby two separate machine-screwdrivers are used, or alternatively a single machine-screwdriver moveable between two positions with the inherent control problems this inevitably brings about.

The object of the present invention is to alleviate the above problems by providing a door lock of the type initially described, whereby manual as well as automatic fitting of the lock housing during a stage prior to final fitting is substantially facilitated, and whereby the storage of lock details is limited.

The above object is achieved by providing a door lock according to the invention, comprising operating means and a lock housing provided with a forend plate for fitting into a herefore intended recess in a door leaf. The recess exhibits an opening for the lock housing facing towards the side of the door frame, and at least two openings in the sides of the door leaf being positioned opposite each other, through which said operating means extend for engagement with the lock housing in the final fitted state of the door lock. The invention relates specifically to that the lock housing, at at least one of its faces facing the wallfaces of the recess, exhibits a resilient retaining member. The retaining member is arranged to retain the lock housing in the recess during a stage prior to final fitting by way of engagement with said at least one wallface.

In a preferred embodiment the retaining members are at least two in number. One being hereby provided at the upper edge face of the lock housing and the other being provided at its lower edge face.

In another suitable embodiment the retaining members are also at least two in number, and are provided at the two side faces of the lock housing.

In a third, advantageous embodiment, said retaining members are at least four in number, and are provided at the upper and lower edge faces of the lock housing, as well as at its two side faces.

The retaining member consists in a preferred embodiment of a substantially V-shaped leaf spring attached to the lock housing. One end portion of the leaf spring is hereby securely fastened in the face of the lock housing, while the other end portion is arranged to freely slide through a herefore intended opening in said face.

In another embodiment of the leaf spring, both its end portions are designed to freely slide through herefore intended openings in the face of the lock housing.

The idea behind the invention is thus that the traditional screws in the forend plate are eliminated by having the corresponding function built into the lock housing. The fitting of the lock housing in the door leaf is hereby made extremely simple and effective in the door manufacturing plant, as the housing is inserted into the recess of the door leaf in one single operation. Furthermore, the storage of lock details can be largely reduced since the need for the two screws is eliminated by way of the invention.

Short description of the drawings:

The invention will in the following be understood in greater detail from the following description of preferred embodiments with reference to the accompanying drawings, in which similar numerals in the different figures denote corresponding parts.

Fig. 1 is an exploded view of a door lock according to a preferred embodiment of the invention. A broken up door leaf can also be seen in the figure.

Fig. 2 is a broken sectional view of a lock housing provided with a forend plate and fitted in a recess in a door leaf according to the invention.

Fig. 3 is a sectional view taken on line III-III in Fig. 2.

Fig. 4 is a sectional view like the one in Fig. 2, but showing another embodiment of the invention.

Fig. 5 is a sectional view taken on line V-V in Fig. 4.

Description of embodiments:

In Fig. 1 the reference numeral 1 denotes a door lock, which for the sake of clarity is shown in an exploded view. The door lock 1 hereby comprises operating members 2, which in the shown embodiments consists of door handles 3 and 4, as well as of an operating rod 5 of square cross section. The door lock further comprises a lock housing 8 provided with a forend plate 7. In this embodiment the lock housing 8 exhibits an upper 10 and a lower 11 through hole, which are positioned at the two side faces 12 of the housing 8. The upper through hole 10 exhibits a rotatable element 14 having a square cross section, for fitting of different key-adapted so called rowers, which are not shown in the figure. When the elements 14 is rotated by a key or other tool, the lock bolt 16 of the door lock 1 is moved for locking or unlocking the door via the internal mechanism of the lock housing 8 (not shown). The corresponding lower through-hole 11 similarly exhibits an element 17 of square cross section, which is rotated by the aforementioned square-shaped operating rod 5 of the door handle 3, for opening and closing of the door.

In Fig. there is further shown a broken door leaf 20 exhibiting a recess 21. The recess 21 more specifically consists of a rebate 22 for receiving the lock housing 8, as well as of a rebate 23 for countersinking the forend plate 7. The recess 21 further exhibits an opening 25 facing the door frame side, through which opening 25 the lock housing 8 is inserted, and at least two openings 26 positioned opposite each other, of which only one can be seen in the figure since the second one is covered up in this view. Two further openings 27, also positioned opposite each other, lead to the recess 21 in order to access the square element 14 in the lock housing 8. The openings 26 as well as the openings 27 are, as can be clearly seen in the figures, provided at the sides 30 and 31 of the door leaf 20.

When the lock housing 8, provided with the forend plate 7 is to be fitted into the recess 21, which as mentioned often takes place in the manufacturing plant, said lock housing 8 is inserted into the recess 21 to the position shown in the Fig. 2. The lock housing 8 is hereby held steadily in place in the recess 21 by way of two resilient retaining members 33. The retaining members 33 are positioned at faces 12, 38, 39 of the lock house 8, said faces facing the wall faces 35 of the recess 21. In the shown embodiment the retaining members 33 are more specifically positioned at the upper 38 and the lower edge face 39 of the housing 8. The retaining members 33 consist in the embodiment of a leaf spring 40 attached to the lock housing 8, which leaf spring 40 is substantially V-shaped as is clearly shown in the figures. In the embodiment shown in figures 1-3, one end portion 41 of the leaf spring 40 is securely fastened in the face 12, 38, 39 of the lock housing 8, for instance with a rivet 45 extending through the wall of the ,lock housing 8 as well as through the leaf spring 40, as is shown in Fig. 2. Hereby maximum spring effect is achieved. The second end portion 42 of the leaf spring 40 is however designed to freely slide through a herefore intended opening 42 in said face 12, 38, 39. Another embodiment of the leaf spring 40 is shown in Fig. 4 and 5, where both end portions 41 and 42 of the leaf spring 40 freely slides through rectangular openings 43 and 44 in the face of the lock housing 8, for instance the upper edge face 38 as is clearly shown in Fig. 4. In the embodiment shown in Fig. 3, the leaf spring 40 is bent upwards near the end portions 41 and 42 in order to hold the spring 40 in place when the lock housing 8 is not yet fitted in the recess 21 of the door leaf 20. The function of the retaining member

33 is as mentioned before to securely retain the lock housing 8 in the recess 21 from the time when the housing 8 is inserted in the recess 21 at the manufacturing plant, until when the door lock 1 is finally fitted at the customer's site. The rounded mid-sections 46 of the leaf springs 40 is hereby forcefully in contact with the wall faces 35 of the recess 21, whereby the lock housing 8 is secured in said recess 21 so that is will be safely held in place and so that the play between the housing 8 and the recess 21 is eliminated.

At the final fitting of the door lock 1 the operating member 2 is attached to the lock housing 8 when the square shaped operating rod 5 is brought into engagement with the square element 17 in the lock housing 8, as the door handles 3 and 4 shown in the figure is fitted in the openings 26 of the door leaf. The fitting of the door handles 3 and 4 is carried out with two screws 48 and 49, which in a conventional manner extend from the door handle 4 through the opening 26 and into holes 50 positioned in the housing 8, to be screwed into the door handles on the other side of the door leaf 20. At said final fitting, keyhole plates 51 and 52 are also fitted in a similar way with two through-going screws 54 and 55. The screws 54 and 55 are brought through the keyhole plate 51 via one of the openings 27 in the door leaf 20, through holes 57 in the lock housing 8, to finally be secured in the opposite keyhole plate 52.

In Fig. 4 and 5 is shown another embodiment of the invention, in which said retaining members 33 are additionally placed on the two side faces 12 of the lock housing 8. The retaining members 33 are here positioned approximately in line with the lock bolt 16, in order to make contact with the wall faces 35 of the recess 21 which lies between the opening 26 and 27 in the door leaf 20 as shown in Fig. 1.

It is understood that the present invention is not eliminated to the above described embodiments. The invention can naturally be freely modified within the scope of the accompanying patent claims. Thus, the leaf springs 40 does not necessarily have to be V-shaped, but may of course also exhibit a substantially semi-circular shape. Further, the lock housing 8 may be provided with only one retaining member 33. The spring effect of the retaining member 33 may of course also be achieved by resilient members other than leaf springs, for instance helical spring operated members, rubber elements or stampings in the sheet metal of the lock housing 8. The described leaf spring 40 may further more be replaced by a resilient rod of circular cross section and in a similar shape.

Claims

1. A door lock (1) comprising operating means (2) and a lock housing (8) provided with a forend plate (7) for fitting into a herefore intended recess (21) in a door leaf (20), said recess (21) exhibiting an opening (25) for the lock housing (8) facing towards the side of the door frame, and at least two openings (26) in the sides (30, 31) of the door leaf (20) being positioned opposite each other, through which openings (26) said operating means (2) extend for engagement with the lock housing (8) in the final fitted state of the door lock (1), **characterized in**, that the lock housing (8), at at least one of its faces (12, 28, 39) facing the wall faces (35) of the recess (21), exhibits a resilient retaining member (33) for retaining the lock housing (8) in the recess (21) during a stage prior to final fitting by way of engagement with said at least one wall face (35).

2. A door lock (1) according to claim 1, **characterized in**, that said retaining members (33) are at least two in number, whereby one is provided at the upper edge face (38) of the lock housing (8) and the other being provided at its lower edge face (39).

3. A door lock (1) according to claim 1, **characterized in**, that said retaining member (33) are at least two in number, and are provided at the two side faces (12) of the lock housing (8).

4. A door lock (1) according to claim 1, **characterized in**, that said retaining members (33) are at least four in number, and are provided at the upper and lower edge faces (38, 39) of the lock housing (8), as well as at its two side faces (12).

5. A door lock (1) according to any of the preceding claims, **characterized in**, that said retaining member (33) consists in a leaf spring (40) attached to the lock housing (8).

6. A door lock (1) according to claim 5, **characterized in**, that the leaf spring (40) is substantially V-shaped.

7. A door lock (1) according to claim 5, **characterized in**, that one of the end portions (41) of the leaf spring (40) is securely fastened in the face (12, 38, 39) of the lock housing (8), and its second end portion (42) is designed to freely slide through a herefore intended opening (43) in said face (12, 28, 39).

8. A door lock (1) according to claim 5, **characterized in**, that both end portions (41, 42) of the leaf spring (40) are designed to freely slide through herefore intended openings (43, 44) in the face (12, 38, 39) of the lock housing (8).

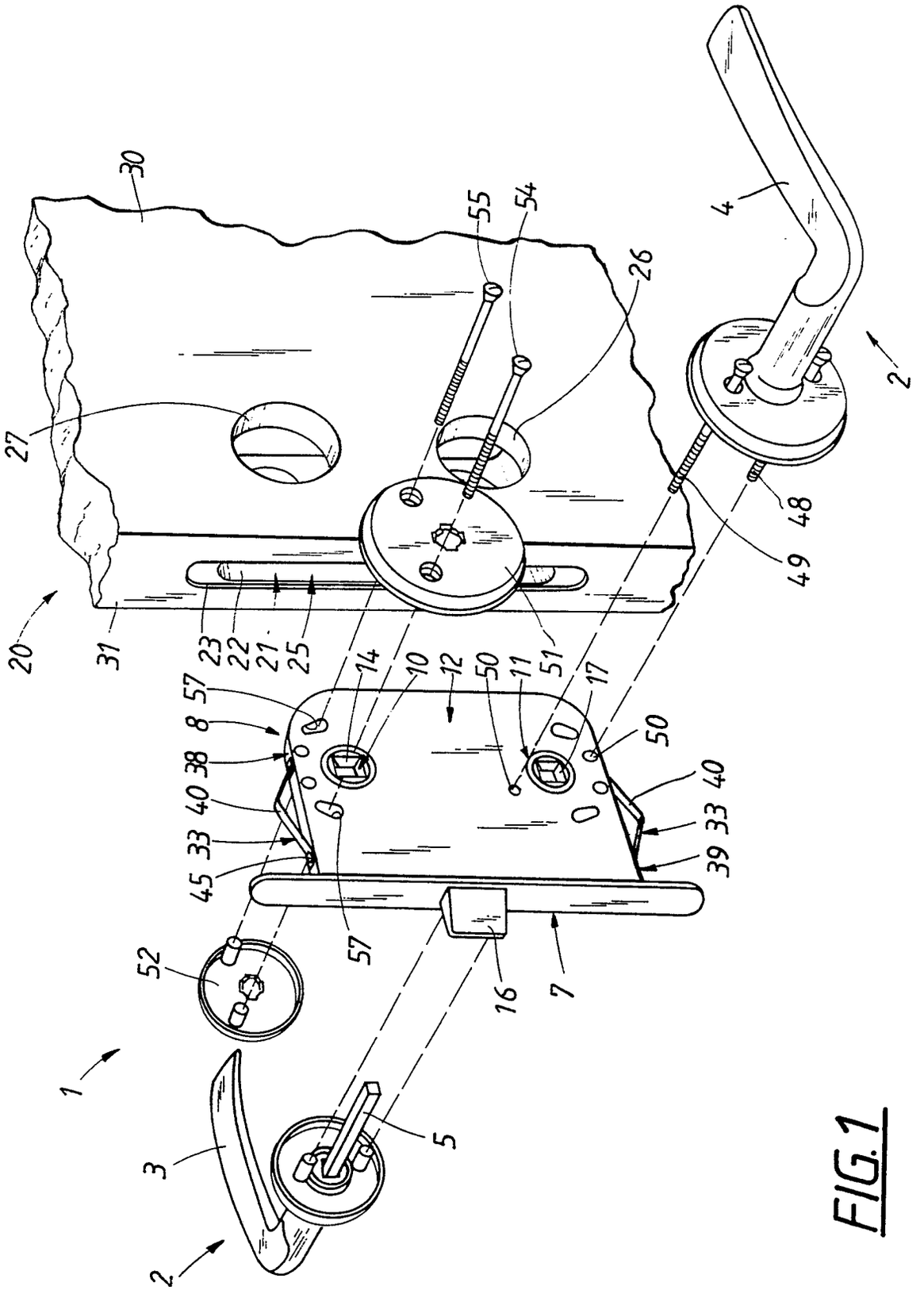
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FIG.1

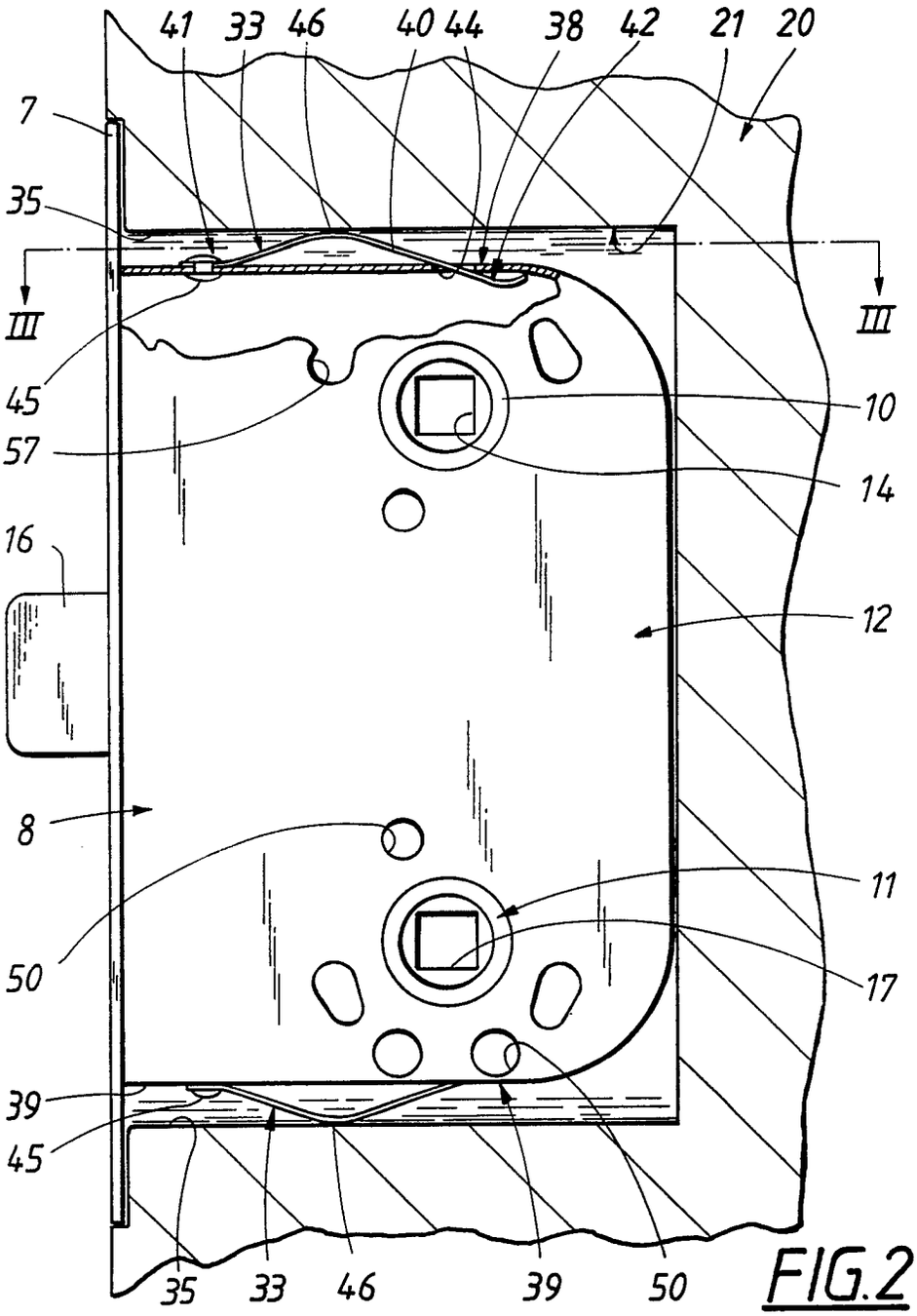
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FIG.2

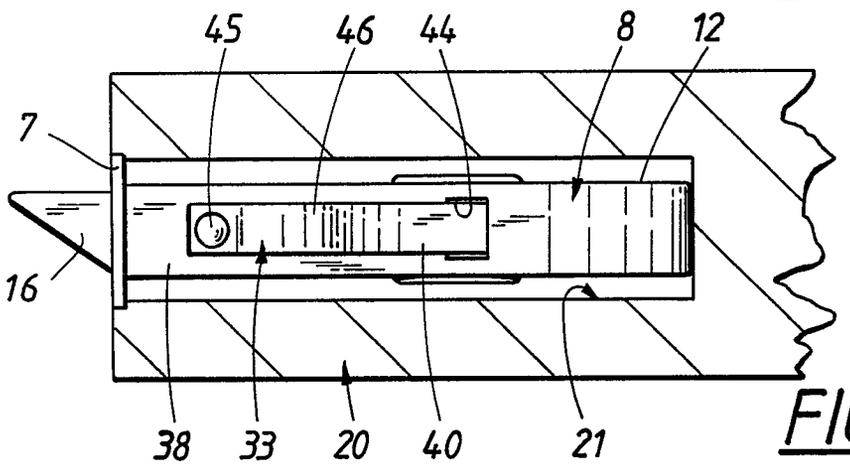
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FIG.3

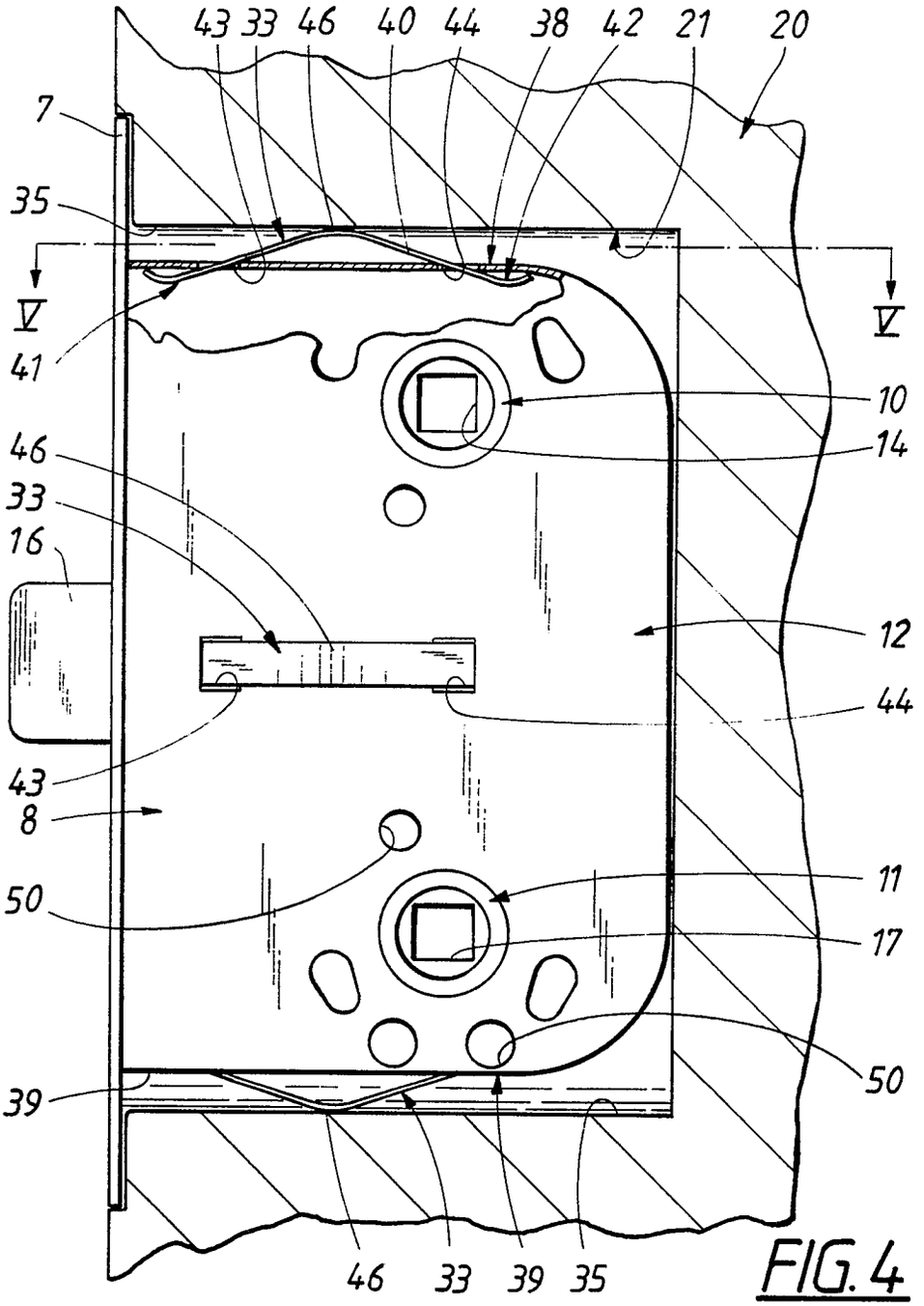
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FIG. 4

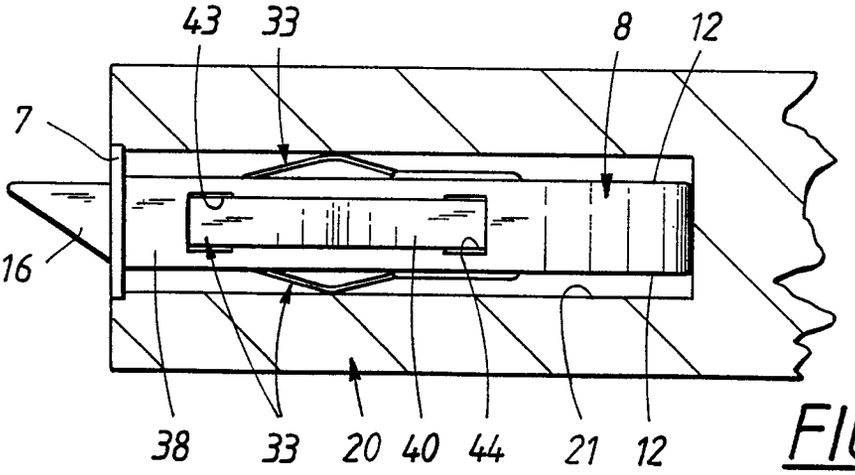
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FIG. 5

European Patent Office

EUROPEAN SEARCH REPORT

Application Number EP 90850207.3

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)
A	DE - A1 - 2 622 816 (SCHULTE-SCHLAGBAUM) * Claims 1-3; fig. 1-5 * --	1,2	E 05 B 63/08
A	DE - A - 2 162 425 (H. KOLB) * Claims 1-10; fig. 1-6 * --	1,2,3	
A	US - A - 4 614 374 (LANNERT) * Claims 1-5; fig. 1-8 * ----	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.5)

E 05 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
VIENNA	10-10-1990	CZASTKA

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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