



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) Publication number:

0 545 679 B1

(12)

EUROPEAN PATENT SPECIFICATION

(49) Date of publication of patent specification: **22.11.95** (51) Int. Cl.⁶: **E05F 3/22**

(21) Application number: **92310988.8**

(22) Date of filing: **02.12.92**

(54) **Position adjusting device of floor hinge in case.**

(30) Priority: **06.12.91 JP 108962/91**

(43) Date of publication of application:
09.06.93 Bulletin 93/23

(45) Publication of the grant of the patent:
22.11.95 Bulletin 95/47

(84) Designated Contracting States:
DE FR GB

(56) References cited:
DE-A- 2 253 700
DE-B- 1 163 704
GB-A- 1 239 915

(73) Proprietor: **RYOBI LTD.**
No. 762, Mesaki-cho
Fuchu-shi,
Hiroshima-ken (JP)

(72) Inventor: **Yamane, Motoharu**
c/o Ryobi Limited,
762, Mesaki-cho
Fuchu-shi,
Hiroshima-ken (JP)

(74) Representative: **Heath, Peter William Murray et al**
FRY HEATH & SPENCE
The Old College
53 High Street
Horley
Surrey RH6 7BN (GB)

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid (Art. 99(1) European patent convention).

EP 0 545 679 B1

Description

BACKGROUND OF THE INVENTION

This invention relates to a floor hinge accommodated in a cement case or outer case embedded in a floor, and more particularly to a position adjusting device of the floor hinge for adjustably locating the floor hinge in the cement case.

In general, a floor hinge has a main shaft connected to a door to be rotated in response to rotating motion of the door. The main shaft is connected to a piston which is controlled by an oil pressure control circuit. When the door is opened, the piston is moved in a direction where a return spring is compressed. When the door is closed, the compressed return spring pushes back the piston toward a door closing position.

Such a floor hinge is accommodated in a cement case embedded along the bottom end face of the door in a concrete floor. In order to connect the main axis with a connecting portion of the door, it is necessary to adjustably move in a widthwise direction of the door (longitudinal direction of the case) at the time when the door is fully closed. In addition, in order to adjust an angular position of the main shaft so that the door is fully closed at a predetermined position, it is necessary to adjustably slightly rotate the floor hinge in the door opening and closing direction (lateral direction of the case) in the cement case embedded in the floor.

A conventional position adjusting device of a floor hinge is disclosed in Japanese Utility Model Publication SHO 58-38137. The conventional position adjusting device comprises five bolt and nut assemblies which are provided at predetermined positions on the body case of the floor hinge accommodated in a cement case so as to be projected toward the inner walls of the cement case. When two positional adjustments of the floor hinge in the widthwise and rotational directions of the door are performed, two lock nuts on both sides in the longitudinal direction of the cement case and two lock nuts on both sides in the lateral direction of the cement case are respectively loosened by using two spanners at the same time. Then, for the adjustment in the widthwise direction of the door, the projected length of one bolt opposed to one end wall of the cement case is shortened while the projected length of the other bolt opposed to the other end wall of the cement case is lengthened and the both lock nuts are simultaneously fastened in a state wherein the distal ends of the bolts abut against the inner walls opposed to each other.

Thereafter, when the floor hinge is so adjusted that the main shaft is angularly located at a predetermined position where the door is fully closed, two bolts projected laterally from the body case of

the floor hinge are adjusted in the same manner in a state wherein bolts for adjustment in the widthwise direction of the door are loosened.

Such adjustments take a long time and are troublesome. Especially, when the adjustments in widthwise and rotational directions of the door are performed at the same time, one adjustment in one direction of the door must be performed while the bolts for the other adjustment in the other direction of the door are loosened, the adjustments are very troublesome and difficult.

Specification DE-B-1163704 discloses a floor hinge with longitudinal position adjusting means but no angular adjustment means.

Specification GB-B-1239915 discloses a floor hinge according to the preamble of claim 1 with a check against over opening of the door. There is no guide means acting between the bottom of the body case and the outer case of the floor hinge to guide adjustments of their relative positions.

It is an object to provide a position adjusting device for a floor hinge accommodated in a cement case embedded on a floor, in which two adjustments in the widthwise and rotational directions of a door can be performed independently of each other without the influence of another adjustment to facilitate the adjustments in a short time.

According to the present invention, there is provided a floor hinge accommodated in an outer case adapted to be embedded in a floor and including a body case, a main shaft for connection to a door, a position adjusting device for adjusting a longitudinal position of the main shaft in the longitudinal direction of the outer case and an angular position thereof and fastening means for fastening the body case to the outer case after position adjustment, characterised in that said position adjusting device includes a guide means provided between a bottom surface of the body case and a bottom plate of the outer case, for guiding movement of the body case of the floor hinge in the longitudinal direction of the outer case and acting as a pivot point when the body case is rotated in the lateral direction of the outer case; and in that said position adjusting means comprises a slide holding member slidable in the longitudinal direction of the outer case while holding the body case of the floor hinge, a first adjusting means connected between the slide holding member and the outer case for adjustably moving the slide holding member in the longitudinal direction of the outer case, and a second adjusting means connected between the body case and the slide member for adjustably rotating the body case about the pivot point in a lateral direction of the outer case relative to the slide member.

Other objects, functions and advantageous effects will be explained with reference to the draw-

ings described below.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 shows a plan view, partially broken, of a floor hinge accommodated in a cement case in which a position adjusting device according to this invention is received;

Figure 2 is a side elevational view, partially broken, of the floor hinge as shown in Figure 1;

Figure 3 is a bottom view of the floor hinge, as shown in Figures 1 and 2, in a state wherein positional adjustment is performed; and

Figure 3 is a plan view, partially broken, of the floor hinge as shown in Figure 3.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

One embodiment of the present invention will now be explained with reference to the drawings.

In FIGS. 1 and 2, a floor hinge F is accommodated in a rectangular cement case or outer case B which is embedded under a door D in a cement floor. The floor hinge F has a main shaft a connected to the door D so as to be rotated in response to movement of the door D. The main shaft a is connected to a rotational motion-linear motion converting mechanism M for converting rotational motion of the main shaft a into linear motion of a piston b. The mechanism M comprises a known cam member through which a connecting rod 20A is moved reciprocally. The connecting rod 20A has, at its distal end, the piston b which is urged by a return spring c toward a direction where the door D is closed. Working oil is accommodated in a body case A of the floor hinge F so as to be moved between piston front and rear chambers which are formed on the front and rear sides of the piston b. When the door D is opened, the piston b is moved to the left as viewed in the drawings to compress the spring c. At this time, if the door is quickly opened, the left end of the mechanism M abuts against a back check piston d to thereby restrict a door opening speed. The back check piston d is urged by a spring 21A toward the mechanism M. When the door D is released after the door D is opened, the door D is closed by the repulsive force of the returning spring c. The floor hinge F has a control oil pressure circuit (not shown) for controlling a delayed action, a first speed door closing action, a second speed door closing action, and a latching action.

The floor hinge F has a long recess 1 at a position, corresponding to the main shaft a, of the bottom surface of the floor hinge F. The long recess 1 is extended in the longitudinal direction of the cement case B which is embedded in the

cement floor F. The longitudinal axis of the long recess 1 coincides with the longitudinal axis of the cement case B. An engaging piece 2 is integrally formed on the bottom plate 22 of the cement case B. The piece 2 is engaged with the long recess 1 so as to be slidable in the longitudinal direction and pivotable in the long recess 1. That is, the floor hinge F can be moved adjustably in the longitudinal direction of the case B and rotated adjustably about the piece 2 as a pivot point. In other words, the long recess 1 and the engaging piece 2 form a guide means for guiding the body case A in the widthwise direction of the door D and for functioning as a pivot point when the body case A is rotated in the opening and closing direction of the door D. At two positions close to the main shaft 1 on both sides of the body case A of the floor hinge F, two fastening projections 3, 3 are formed integrally with the body case A in order to receive the head portion 5a of each fastening screw 5 whose lower end is fixed to a fixing block 10A so as to be screw-engaged with a screw portion 4 in the fixing block 10A. The fixing block 10A is fixed by welding to the bottom plate 22 of the cement case B. Each fastening projection 3 has a hole 3a through which the fastening screw 5 passes loosely. That is, the diameter of the hole 3a is larger than that of the fastening screw 5 so that the body case A can be adjustably located in the cement case B.

On the side of the piston b of the cement case B is provided a position adjustment means E for adjusting a position of the body case A with respect to the cement case B in the longitudinal direction thereof. The position adjustment means E has a slide holding member 6 which is slidable in the longitudinal direction of the cement case B along two pairs of guide plates 10, 10 --- 10 fixed horizontally to the side walls of the cement case B. The slide holding member 6 holds a hanging bolt 7 for hanging thereon a hook portion 12a of a holding plate 12 fixed to the bottom surface of the body case A.

On one end face of the cement case B is provided a supporting plate 8 weld-supported by two bracket members 20, 21, and an adjusting bolt 9 is provided between the slide holding member 6 and the supporting plate 8.

The slide holding member 6 comprises a main portion 6a extended perpendicularly to the longitudinal axis of the cement case B and a pair of engaging portions 6b, 6b provided at the opposite ends of the main portion 6a so as to be slidably engaged with the guide plates 10. Each engaging portion 6b holds one end of the hanging bolt 7 which has a pair of fastening nuts 13, 13 for fastening the hook portion 12a of the holding plate 12 onto the hanging bolt 7 from both sides in the lateral direction of the cement case B. The hook

portion 12a is extended upwardly from two branched bottom portions 12b, 12b which are fixed to the bottom surface of the body case A by a plurality of screws 11, 11 --- 11.

The adjusting bolt 9 comprises two screw portions 9a, 9b whose screws are formed opposite to each other, for example, the screw 9a is a right-hand screw while the screw 9b is a lefthand screw. Between the screws 9a, 9b is provided an operating nut portion 9c with which a rotating tool is engaged to rotate the adjusting bolt 9 when the position of the body case A is adjusted. When the adjusting bolt 9 is rotated, the slide holding plate 6 and the supporting plate 8 are moved close to and away from each other.

The operation for adjusting the position of the body case A in the cement case B will now be explained.

First, the two fastening screws 5, 5 are loosened by a tool (not shown) engaged with the head 5a thereof. When the body case A is adjustably moved in the widthwise direction of the door D, the adjusting bolt 9 is rotated in such a manner that the tool is engaged with the nut portion 9c. If the adjusting bolt 9 is rotated in one rotational direction, the slide holding member 6 is pulled toward the supporting plate 8 to thereby pull the body case A toward the support plate 8 through the bolt 7 and the holding plate 12, while the long hole 1 provided on the bottom surface of the body case A is guided by the engaging piece 2. If the adjusting bolt 9 is rotated in the opposite direction, the slide holding member 6 is moved away from the support plate 8 to thereby push back the body case A in the opposite direction.

In addition to the adjustment of the body case A in the widthwise direction, in case that the body case A is adjustably moved in the rotating (opening and closing) direction of the door D, one nut 13 engaging the hanging bolt 7 on the moving side of the body case A is loosened while the other nut 13 on the opposite side is tightened to thereby rotate the body case A about the engaging piece 2 through a predetermined angle in the rotating direction thereof as shown in FIGS. 3 and 4. At this time, the body case A is located in a position corresponding to a fully closed door position. After the positional adjustment of the body case A is completed, the fastening screws 5 are respectively fastened to thereby fix completely the body case A to the cement case B at a predetermined position.

In the above description, two positional adjustments of the body case A in the widthwise and rotational directions of the door D are performed successively in a state wherein the fastening screws 5 are loosened. However, either adjustment can be first performed, and those adjustments can be performed independently.

Instead of the fastening screws 5, a bolt and nut assembly may be used. Further, instead of the long recess 1, a long hole for loosely receiving a bolt may be used.

Claims

1. A floor hinge (F) accommodated in an outer case (B) adapted to be embedded in a floor and including a body case (A), a main shaft (a) for connection to a door (D), a position adjusting device (E) for adjusting a longitudinal position of the main shaft in the longitudinal direction of the outer case (B) and an angular position thereof and fastening means (3, 4, 5) for fastening the body case (A) to the outer case (B) after position adjustment, characterised in that said position adjusting device includes a guide means (1,2) provided between a bottom surface of the body case (A) and a bottom plate (22) of the outer case (B), for guiding movement of the body case (A) of the floor hinge (F) in the longitudinal direction of the outer case (B) and acting as a pivot point when the body case (A) is rotated in the lateral direction of the outer case (B); and in that said position adjusting means (E) comprises a slide holding member (6) slidable in the longitudinal direction of the outer case (B) while holding the body case (A) of the floor hinge (F), a first adjusting means (9) connected between the slide holding member (6) and the outer case (B) for adjustably moving the slide holding member (6) in the longitudinal direction of the outer case (B), and a second adjusting means (7, 12, 13) connected between the body case (A) and the slide member (6) for adjustably rotating the body case (A) about the pivot point in a lateral direction of the outer case (B) relative to the slide member (6).
2. A position adjusting device according to Claim 1, wherein said guide means comprises: a long recess (1) at said bottom surface extended in the longitudinal direction of outer case (B) and provided at a position approximately corresponding to the main shaft (a) in such a manner that a longitudinal axis of the long recess (1) coincides with a longitudinal axis of the outer case (B); and an engaging projection projected from said bottom plate (22) of the outer case (B) for engaging with the long recess (1).
3. A position adjusting device according to Claim 1 or Claim 2 characterised in that said fastening means comprises a pair of projections (3,3) each provided on a side wall of the body case

(A) for receiving a head portion of a fastening screw (5) which is screw-engaged with a fixing block (10A) fixed to the bottom plate (22) of the outer case (B).

4. A position adjusting device according to any of Claims 1 to 3 characterised in that said first adjusting member is an adjusting bolt (9) which comprises: a lefthand screw (9a); a right-hand screw (9b); and an operating nut (9c) provided between the two screws (9a, 9b), one of the screws being engaged with the slide holding member (6) while the other of the screws being engaged with a support member (8) fixed to an end face of the outer case (B).
5. A position adjusting device according to any of Claims 1 to 4 characterised in that said second adjusting means comprises: a hanging bolt (7) bridged between two opposite ends (6b, 6b) of the slide holding member (6); and a pair of nuts (13, 13) meshed with the bolt (7) at opposite ends of a hook portion (12a) of the holding member (12), the hook portion (12a) being hung on the hanging bolt (7).

Patentansprüche

1. Fußbodentürschließer (F), der in einem äußeren, in einem Fußboden einbettbaren Gehäuse (B) aufgenommen ist und ein Körpergehäuse (A), eine mit einer Tür (D) verbundene Hauptwelle (a), eine Positionseinstellvorrichtung (E) zum Einstellen einer Längsposition der Hauptwelle in Längsrichtung des äußeren Gehäuses (B) und deren Winkelposition und eine Befestigungsvorrichtung (3, 4, 5) zur Befestigung des Körpergehäuses (A) an dem äußeren Gehäuse (B) nach der Positionseinstellung aufweist, dadurch gekennzeichnet, daß die Positionseinstellvorrichtung eine Führungseinrichtung (1, 2) aufweist, die zwischen einer Bodenfläche des Körpergehäuses (A) und einer Bodenplatte (22) des äußeren Gehäuses (B) angeordnet ist und die Bewegung des Körpergehäuses (A) des Fußbodentürschließers (F) in Längsrichtung des äußeren Gehäuses (B) dient, und daß die Positionseinstellvorrichtung (E) ein Gleit-Halteteil (6), das in Längsrichtung des äußeren Gehäuses (B) verschiebbar ist und das Körpergehäuse (A) des Fußbodentürschließers (F) hält, eine erste Einstellvorrichtung (9), die das Gleit-Halteteil (6) in Längsrichtung des äußeren Gehäuses (B) einstellend bewegt, und eine zweite Einstellvorrichtung (7, 12, 13) aufweist, die das Körpergehäuse (A) und das Gleit-Halteteil (6) verbindet und das Körpergehäuse (A) um den Schwenkpunkt in

Querrichtung des äußeren Gehäuses (B) relativ zu dem Gleit-Teil (6) einstellend verschwenkt.

2. Positionseinstellvorrichtung nach Anspruch 1, dadurch gekennzeichnet, daß die Führungseinrichtung in der Bodenfläche eine langgestreckte Ausnehmung (1), die sich in Längsrichtung des äußeren Gehäuses (B) erstreckt und an einer annähernd der Hauptwelle (a) entsprechenden Position derart angeordnet ist, daß eine Längsachse der langgestreckten Ausnehmung (1) mit der Längsachse des äußeren Gehäuses (B) zusammenfällt, und einen Eingriffsvorsprung aufweist, der von der Bodenplatte (22) des äußeren Gehäuses (B) zum Eingriff mit der langgestreckten Ausnehmung (1) vorsteht.
3. Positionseinstellvorrichtung nach Anspruch 1 oder 2, dadurch gekennzeichnet, daß die Befestigungsvorrichtung ein Paar von Vorsprüngen (3, 3) umfaßt, die jeweils an einer Seitenwand des Körpergehäuses (A) zur Aufnahme eines Kopfabschnitts einer Befestigungsschraube (5) angeordnet sind, die mit einem an der Bodenplatte (22) des äußeren Gehäuses (B) befestigten Fixierblock (10A) in Schraubeingriff steht.
4. Positionseinstellvorrichtung nach einem der Ansprüche 1 bis 3, dadurch gekennzeichnet, daß die erste Einstellvorrichtung ein Einstellbolzen (9) ist, der eine linksgängige Schraube (9a), eine rechtsgängige Schraube (9b) und eine Betätigungsmutter (9c) aufweist, die zwischen den beiden Schrauben (9a, 9b) angeordnet ist, wobei eine der Schrauben mit dem Gleit-Halteteil (6) in Eingriff steht, während die andere Schraube mit einem an einer Endfläche des äußeren Gehäuses (B) angebrachten Tragteil (8) in Eingriff steht.
5. Positionseinstellvorrichtung nach einem der Ansprüche 1 bis 4, dadurch gekennzeichnet, daß die zweite Einstellvorrichtung einen Hängebolzen (7), der zwischen zwei entgegengesetzten Enden (6b, 6b) des Gleit-Halteteils (6) überbrückend angeordnet ist, und ein Paar von Muttern (13, 13) aufweist, die mit dem Bolzen (7) an entgegengesetzten Enden eines Hakenabschnitts (12a) des Halteteils (12) in Eingriff stehen, wobei der Hakenabschnitt (12a) auf den Hängebolzen (7) gehängt ist.

Revendications

1. Ferme-porte (F) placé dans un boîtier extérieur (B) adapté pour être encastré dans un plancher et comportant un corps de boîtier (A), un

arbre principal (a) pour le raccordement à une porte (D), un dispositif de réglage de position (E) pour l'ajustement d'une position longitudinale de l'arbre principal (a) dans la direction longitudinale du boîtier extérieur (B) et une position angulaire de celui-ci, ainsi que des moyens de fixation (3, 4, 5) pour la fixation du corps de boîtier A au boîtier extérieur (B) à la suite de l'ajustement de la position, caractérisé en ce que ledit dispositif de réglage de la position comporte un moyen de guidage (1, 2), aménagé entre une surface du fond du corps de boîtier (A) et une plaque de fond (22) du boîtier extérieur (B), pour guider le mouvement du corps de boîtier (A) du ferme-porte de sol (F) dans la direction longitudinale du boîtier extérieur (B) et agissant comme un point de pivotement quand le corps de boîtier (A) est tourné dans la direction latérale du boîtier extérieur (B); et en ce que ledit moyen pour l'ajustement de la position (E) comporte un élément de maintien glissant (6) coulissable dans la direction longitudinale du boîtier extérieur (B) alors qu'il retient le corps de boîtier (A) du ferme-porte de sol (F), un premier dispositif d'ajustement (9) relié entre l'élément de maintien glissant (6) et le boîtier extérieur (B) pour déplacer de manière ajustable l'élément de maintien glissant (6) dans la direction longitudinale du boîtier extérieur (B), ainsi qu'un deuxième dispositif d'ajustement (7, 12, 13) relié entre le corps de boîtier (A) et l'élément de maintien glissant (6) pour tourner de manière ajustable le corps de boîtier (A) autour du point de pivotement dans une direction latérale du boîtier extérieur (B) par rapport l'élément de maintien glissant (6).

2. Dispositif de réglage de position suivant la revendication 1, dans lequel ledit moyen de guidage comporte: une longue encoche (1) dans ladite surface du fond qui s'étend dans la direction longitudinale du boîtier extérieur (B) et qui est prévue dans une position correspondant approximativement à celle de l'arbre principal (a) de telle manière qu'un axe longitudinal de la longue encoche (1) coïncide avec un axe longitudinal du boîtier extérieur (B); et une pièce d'engagement s'étendant à partir de ladite plaque de fond (22) du boîtier extérieur (B) pour entrer en prise dans la longue encoche (1).
3. Dispositif de réglage de position suivant la revendication 1 ou la revendication 2, caractérisé en ce que ledit moyen de fixation comprend une paire de projections (3, 3), chacune prévue sur une paroi latérale du corps de

boîtier A pour recevoir la partie de tête d'une vis de fixation (5) qui est en prise par son filetage avec un bloc d'ancrage (10A) fixé à la plaque de fond (22) du boîtier extérieur (B).

4. Dispositif de réglage de position suivant une quelconque des revendications 1 à 3, caractérisé en ce que ledit premier membre d'ajustement est un boulon de réglage (9) qui comprend : un filetage à gauche (9a); un filetage à droite (9b); et un écrou de manoeuvre (9c) aménagé entre les deux filetages (9a, 9b), un des deux filetages étant en prise avec l'élément de maintien glissant (6), alors que l'autre des filetages est en prise avec un membre de soutènement (8) fixé à une face terminale du boîtier extérieur (B).
5. Dispositif de réglage de position suivant une quelconque des revendications 1 à 4, caractérisé en ce que ledit deuxième membre d'ajustement comprend: un boulon de suspension (7) reliant les deux extrémités opposées (6b, 6b) de l'élément de maintien glissant (6); et une paire d'écrous (13, 13) engagés sur le boulon (7) aux extrémités opposées d'une partie à crochet (12a) de la tôle d'attache (12), la partie en crochet (12a) étant suspendue au boulon de suspension (7).

FIG. 1

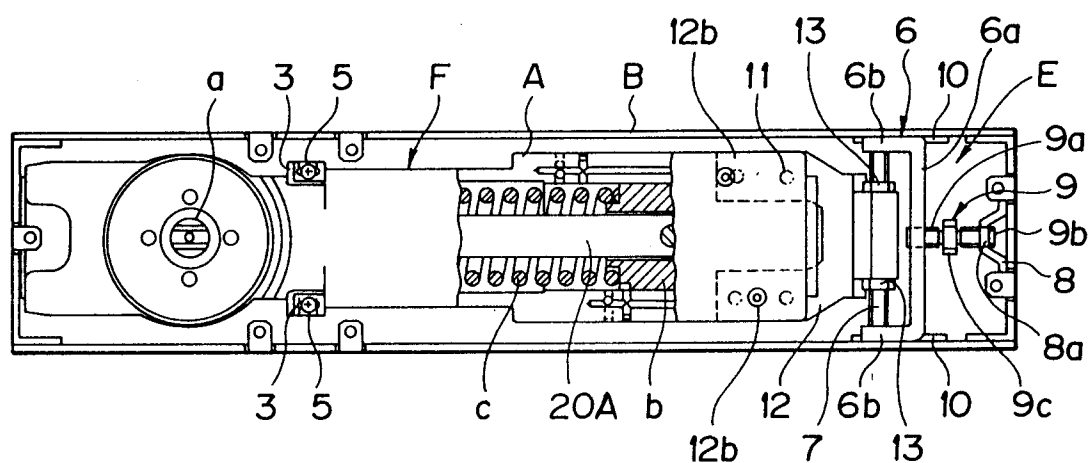


FIG. 2

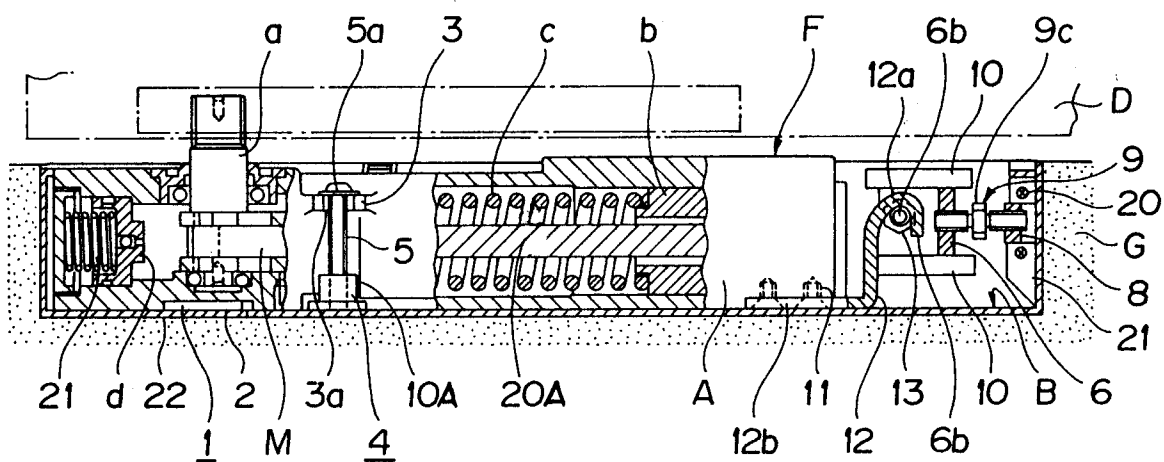


FIG. 3

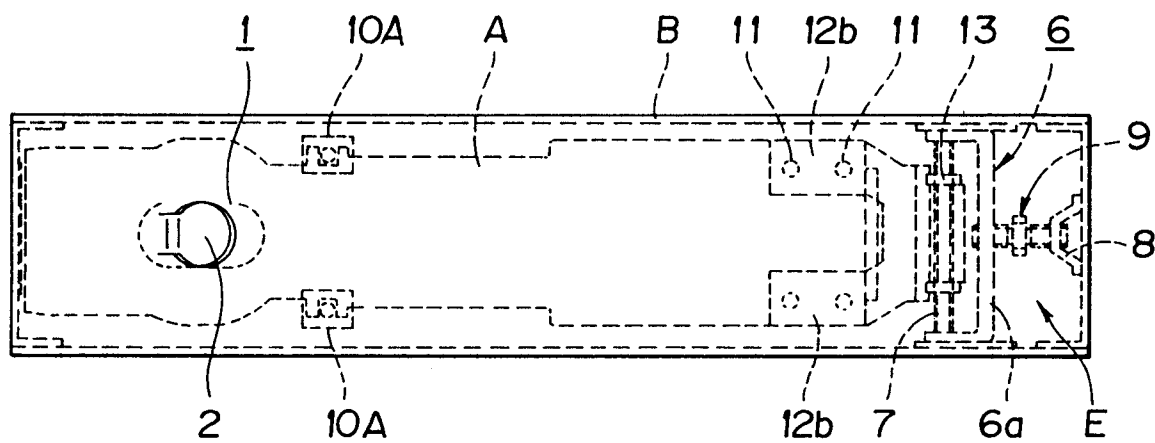


FIG. 4

