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(54) **Hinge**

(57) The present invention relates to a hinge (1) comprising a first fastening member (2), to which a first hinge arm (4) is attached, and a second fastening member (3), to which a second hinge arm (5) is attached which is hingedly connected to the first hinge arm (4), in which the first fastening member (2) comprises a fixed portion (6) and a portion (7) which is hingedly displaceable with

respect to the fixed portion (6) and to which the first hinge arm (4) is attached, and adjusting means (8, 9) for adjusting the position of the displaceable portion (7) with respect to the fixed portion (6), so that a stable adjustment of the position of a door to a wall or piece of furniture is possible in a direction virtually at right angles to the hinge axis (A) and virtually at right angles to the plane of the door or the wall or the piece of furniture.

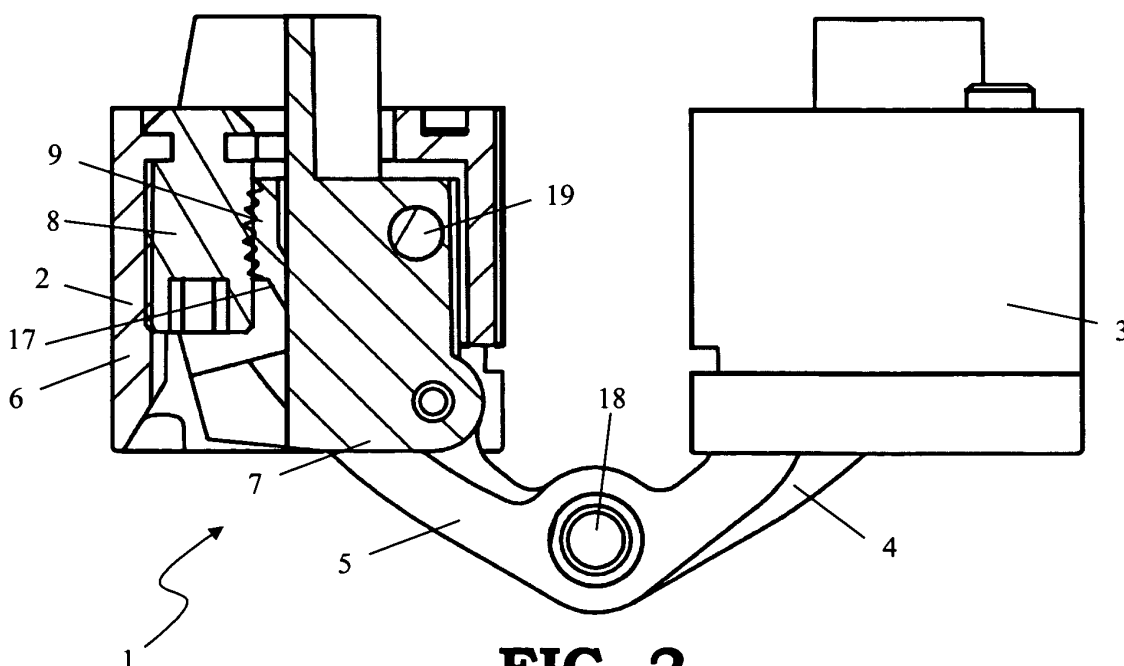


FIG. 2

Description

[0001] The present invention relates to a hinge for hingedly connecting a door to a wall or a piece of furniture, comprising:

- a first fastening member which is designed to be attached to said door or to the wall or the piece of furniture;
- and a second fastening member which is designed to be attached to the wall or the piece of furniture or to the door, respectively;
- at least one first hinge arm which is attached to the first fastening member;
- and at least one second hinge arm which is attached to the second fastening member,

in which the first and the second hinge arm are hingedly connected to one another for hingedly connecting the door to the wall or the piece of furniture and in which the first fastening member:

- comprises a fixed portion which, in the fitted state, is fixedly attached to said door or to the wall or the piece of furniture;
- comprises a portion which is displaceable with respect to the fixed portion, in which the first hinge arm is attached to the displaceable portion in order to attach it to the first fastening member;
- and comprises adjusting means for adjusting the position of the displaceable portion with respect to the fixed portion of the first fastening member.

[0002] Several solutions already exist for adjusting the position of the displaceable portion of such hinges with respect to the fixed portion of the first fastening member in a direction virtually at right angles to the hinge axis of the hinge and virtually at right angles to the plane of the door or the wall or the piece of furniture.

[0003] In the case of a first solution, such as for example described in EP 1 308 592, the displaceable portion of the existing hinges is provided with slots which are arranged in said direction, and corresponding bores are provided in the fixed portion, screws being inserted into the slots and engaging with the bores. By moving the slots with respect to the screws, the displaceable portion can be fixed in different positions with respect to the fixed portion in said direction. However, a considerable drawback of this solution is that it is very difficult to adjust the position of the door with respect to the plane or the piece of furniture accurately.

[0004] In the case of a second solution, this adjustment can be carried out much more precisely. In CH 671 066, fine-adjustment means of the position of the door with respect to the wall or the piece of furniture is described which uses an eccentric part. Such a fine-adjustment means is also described in EP 1 308 592 as an alternative to the above-described adjustment means using slots.

However, this solution which uses an eccentric part for adjustment has the considerable drawback that this results in a setting which is not very stable. On account of the force of gravity, the eccentric part will sag after some time and thus the position of the door with respect to the wall or the piece of furniture will be affected.

[0005] It is therefore an object of the present invention to provide a hinge, by means of which a door can be attached to a wall or a piece of furniture and in which the position of the door with respect to the wall or the piece of furniture can be readjusted after fitting in a stable and accurate manner in a direction virtually at right angles to the hinge axis and virtually at right angles to the plane of the door or the wall or the piece of furniture.

[0006] This object of the invention is achieved by providing a hinge, for hingedly connecting a door to a wall or a piece of furniture, comprising:

- a first fastening member which is designed to be attached to said door or to the wall or the piece of furniture;
- and a second fastening member which is designed to be attached to the wall or the piece of furniture or to the door, respectively;
- at least one first hinge arm which is attached to the first fastening member;
- and at least one second hinge arm which is attached to the second fastening member,

[0007] in which the first and the second hinge arm are hingedly connected to one another for hingedly connecting the door to the wall or the piece of furniture and in which the first fastening member:

- comprises a fixed portion which, in the fitted state, is fixedly attached to said door or to the wall or the piece of furniture;
- comprises a portion which is displaceable with respect to the fixed portion, in which the first hinge arm is attached to the displaceable portion in order to attach it to the first fastening member;
- and comprises adjusting means for adjusting the position of the displaceable portion with respect to the fixed portion of the first fastening member;

in which the displaceable portion is hingedly attached to the fixed portion.

[0008] By means of such a hingedly displaceable portion, the position can be adjusted again accurately in a direction virtually at right angles to the hinge axis and virtually at right angles to the plane of the door or the wall or the piece of furniture, without said drawback of having to achieve adjustment by means of an eccentric part. In view of the fact that the displaceable portion here is hingedly attached to the fixed portion, the force of gravity does not - during normal use of the hinge in order to attach a door to a wall or a piece of furniture - affect the adjustment of the position of the displaceable portion with

respect to the fixed portion.

[0009] Preferably, the second fastening member of a hinge according to the present invention comprises:

- a fixed portion which, in the fitted state, is attached to the wall or the piece of furniture or to the door, respectively;
- a first displaceable portion, in which the second hinge arm is attached to the first displaceable portion in order to attach it to the second fastening member;
- and adjusting means for adjusting the position of the first displaceable portion with respect to the fixed portion of the second fastening member.

[0010] In this way, it becomes possible to adjust the position of the door with respect to the wall or the piece of furniture in several directions.

[0011] With a first specific embodiment of such a hinge according to the present invention, the first displaceable portion of the second fastening member is linearly displaceable with respect to the fixed portion, virtually at right angles to the hinge axis of the hinge and, in the fitted state, virtually in the plane of the wall or the piece of furniture or the door.

[0012] In most cases, this plane of the door coincides with the plane of the wall or the plane of the piece of furniture.

[0013] By means of such a linearly displaceable portion and associated adjusting means, a depth adjustment of the second fastening member is provided. After fitting, the displaceable portion of said second fastening member can be moved forwards or backwards with respect to the fixed portion. Together with the arrangement of the hingedly displaceable portion of the first fastening member with respect to the fixed portion thereof, adjustment in all directions in a horizontal plane is thus made possible after the hinge has been fitted - and during normal use thereof.

[0014] With a second specific embodiment of such a hinge according to the present invention, the first displaceable portion of the second fastening member is hingedly attached to the fixed portion.

[0015] This also makes complete adjustment in a horizontal plane possible after fitting of the hinge and during normal use thereof. Moreover, this offers the additional advantage that when the hinge is designed to be reversible, the adjusting means of the hingedly displaceable portion of the first fastening member can be arranged virtually mirrored in the hinge with respect to the hinge axis of the adjusting means of the hingedly displaceable portion of the second fastening member, so that, in a straight position of the hinge and in a reversed position of the hinge, the adjustment of the hingedly displaceable portions can take place in the same manner. This considerably simplifies the installation thereof by a person skilled in the art.

[0016] The second fastening member of a hinge according to these embodiments then comprises more spe-

cifically:

- a second portion which is displaceable with respect to the fixed portion and is linearly displaceable with respect to the fixed portion, parallel to the hinge axis of the hinge, with the first displaceable portion being attached to the second displaceable portion in order to attach it to the fixed portion;
- and adjusting means for adjusting the position of the second displaceable portion with respect to the fixed portion of the second fastening member.

[0017] In this way, the door can also be accurately adjusted vertically with respect to the wall or the piece of furniture after fitting.

[0018] Preferably, the second displaceable portion of a such hinge comprises slots which are arranged parallel to the hinge axis of the hinge, with the fixed portion comprising corresponding bores, and with the adjusting means comprising screws which engage with the corresponding bores through the slots so that, by moving the slots with respect to the screws, the second displaceable portion can be fixed with respect to the fixed portion in different positions parallel to the hinge axis by means of these screws.

[0019] Said drawback from the prior art when using slots does not apply when using height adjustment. With height adjustment, the person skilled in the art will always bring the door into the desired position by means of, for example, wedges, after which he fixes this position with the aid of the adjusting means. In practice, a person skilled in the art will not readjust this position any further. Slots and screws are therefore also very simple adjusting means for adjusting the height of a door with respect to a wall or a piece of furniture.

[0020] Said adjusting means of a hinge according to the present invention preferably comprise at least one adjusting screw.

[0021] Still more preferably, said adjusting means comprise a worm and a portion of a worm wheel, with said displaceable portion, which is hingedly attached to the corresponding fixed portion, being designed as the portion of the worm wheel and engaging with the worm, with the displaceable portion being hingedly displaceable with respect to the corresponding fixed portion by displacement of the worm.

[0022] More specifically, said displaceable portion then comprises a convexly curved surface, said curved surface being at least partially provided with essentially parallel slots, or being provided with a screw thread in order to configure this displaceable portion as the portion of the worm wheel and said worm being configured as an adjusting screw.

[0023] With a further preferred embodiment of a hinge according to the present invention, the at least one first hinge arm is, at its one end, hingedly attached to the first fastening member and this at least one first hinge arm is guided, at its other end, in guide slots in the second fas-

tening member, and the at least one second hinge arm is, at its one end, hingedly attached to the second fastening member and this at least one second hinge arm is, at its other end, guided in guide slots in the first fastening member.

[0024] The present invention is now explained in more detail with reference to the following detailed description of a preferred embodiment of a hinge according to the present invention. The aim of this description is only to give illustrative examples and to indicate further advantages and features of this hinge, and can therefore not be interpreted as a limitation of the area of application of the invention or of the patent rights laid down in the claims.

[0025] In this detailed description, reference numerals are used to refer to the attached drawings, in which:

- **Fig. 1** shows a preferred embodiment of a hinge according to the present invention in top view;
- **Fig. 2** shows the hinge from Fig. 1 partially in cross section and partially in top view;
- **Fig. 3** shows the hinge from Fig. 1 in front view.

[0026] The hinge (1) illustrated in the figures comprises a first fastening member (2) which is designed to be attached to a door or to a wall or a piece of furniture in order to attach the hinge (1) thereto, and a second fastening member (3) which is designed to be attached, respectively, to the wall or the piece of furniture or to the door in order to attach the hinge (1) thereto.

[0027] The hinge (1) furthermore comprises a first hinge arm (4) which, at its one end (4a), is hingedly attached to the first fastening member (2) and, at its other end (4b), is guided in guide slots in the second fastening member (3) by means of a guide pin (4c).

[0028] In addition, this hinge (1) comprises two second hinge arms (5), each of which is, at its one end (5a), hingedly attached to the second fastening member (3) and, at its other end (5b), guided in guide slots in the first fastening member (2) by means of guide pins (5c).

[0029] The first hinge arm (4) is hingedly connected to the two second hinge arms (5) by means of a hinge pin (18). This hinge pin (18) determines the hinge axis (A) of the hinge (1).

[0030] Of course, the number of hinge arms (4, 5) of a hinge (1) according to the present invention can be varied and may, for example, depend on the strength of the hinge (1).

[0031] The first fastening member (2) of the illustrated hinge (1) comprises a fixed portion (6), as can clearly be seen in Figs. 2 and 3, and a displaceable portion (7), which is hingedly attached to this fixed portion (6) by means of a hinge pin (19) which is arranged parallel to the hinge pin (18) which connects the hinge arms (4, 5) to one another. In the fitted state of the hinge (1), the fixed portion (6) is fixedly connected to said door or to said wall or to the piece of furniture. The first hinge arm (4) is hingedly attached to the displaceable portion (7)

so as to hingedly attach this to the first fastening member (2).

[0032] In order to be able to adjust the position of the displaceable portion (7) with respect to the fixed portion (6) of this first fastening member (2), the displaceable portion (7) is configured as a part of a worm wheel (9) by providing this displaceable portion (7) with a convexly curved surface (17), in which this curved surface (17) is partially provided with a screw thread. With this screw thread, the displaceable portion (7) engages with the screw thread of an adjusting screw (8) which serves as worm (8). By displacing the worm (8), the displaceable portion (7) is hingedly displaceable with respect to the fixed portion (6). The convexly curved surface (17) could equally well be provided with parallel slots which engage with the adjusting screw (8) instead of said screw thread.

[0033] The second fastening member (3) of the illustrated hinge (1) also comprises a fixed portion (10) which, in the fitted state of the hinge (1), is fixedly connected to the door or the wall or the piece of furniture.

[0034] Furthermore, this second fastening member (3) comprises a first portion (11) which is displaceable with respect to this fixed portion (10). The second hinge arm (5) is hingedly attached to this first displaceable portion (11) in order to hingedly attach it to the second fastening member (3). This first displaceable portion (11) is linearly displaceable with respect to the fixed portion (10), virtually at right angles to the hinge axis (A) of the hinge (1) and, in the fitted state, virtually in the plane of the wall or the piece of furniture or the door. In the position of this hinge (1), as illustrated in Fig. 3, this first displaceable portion (11) can be moved forwards or backwards with respect to the fixed portion (10).

[0035] Alternatively, the first displaceable portion (11) can also be configured so as to be able to hinge with respect to the fixed portion (10). In particular where hinges (1) are constructed to be completely reversible, it is expedient to make the second fastening member (3) virtually point-symmetrical to the first fastening member (2), with the centre of the hinge (1) as the mirror point.

[0036] In addition, the second fastening member (3) also comprises a second portion (14) which is displaceable with respect to the fixed portion (10). This second displaceable portion (14) is linearly displaceable with respect to the fixed portion (10), parallel to the hinge axis (A) of the hinge (1). To this end, the second displaceable portion (14) comprises slots which are arranged parallel to the hinge axis (A) of the hinge (1). The fixed portion (10) comprises corresponding bores. Furthermore, the hinge (1) comprises screws which engage with the corresponding bores through the slots, so that by moving the screws (15, 16) in the slots, the second displaceable portion (14) can be fixed in different positions parallel to the hinge axis (A) with respect to the fixed portion (10) by means of these screws (15, 16). In this way, this second displaceable portion (14) can be moved vertically with respect to the fixed portion (10) in the position of the hinge (1), as is illustrated in Fig. 3. Said slots cannot be

seen in the figures. However, an adjustment by means of such slots is known from the prior art.

[0037] In order to adjust the position of the first displaceable portion (11) with respect to the fixed portion of this second fastening member (3), this hinge (1) comprises two adjusting screws (12, 13) by means of which the first displaceable portion (11) is displaceably attached to the second displaceable portion (14).

[0038] Following (vertical) fitting of a door to a wall or a piece of furniture by means of this hinge (1), an adjustment of the position of the door with respect to the wall or the piece of furniture in a horizontal plane is possible using the worm (8), the portion of a worm wheel (9) and the adjusting screws (12, 13). The height adjustment is achieved by means of the screws (15, 16) and the corresponding slots.

[0039] Instead of using these slots and screws (15, 16), the height adjustment of the door with respect to the wall or the piece of furniture could equally well be achieved by providing an adjusting screw instead of the hinge pin (18) of the hinge (1), as is the case, for example, with the height adjustment as described in CH 671 066.

Claims

1. Hinge (1) for hingedly connecting a door to a wall or a piece of furniture, comprising:

- a first fastening member (2) which is designed to be attached to said door or to the wall or the piece of furniture;
- and a second fastening member (3) which is designed to be attached to the wall or the piece of furniture or to the door, respectively;
- at least one first hinge arm (4) which is attached to the first fastening member (2);
- and at least one second hinge arm (5) which is attached to the second fastening member (3),

in which the first (4) and the second hinge arm (5) are hingedly connected to one another for hingedly connecting the door to the wall or the piece of furniture and in which the first fastening member (2):

- comprises a fixed portion (6) which, in the fitted state, is fixedly attached to said door or to the wall or the piece of furniture;
- comprises a portion (7) which is displaceable with respect to the fixed portion (6), in which the first hinge arm (4) is attached to the displaceable portion (7) in order to attach it to the first fastening member (2);
- and comprises adjusting means (8, 9) for adjusting the position of the displaceable portion (7) with respect to the fixed portion (6) of the first fastening member (2);

characterized in that the displaceable portion (7) is hingedly attached to the fixed portion (6).

2. Hinge (1) according to Claim 1, **characterized in that** the second fastening member (3):

- comprises a fixed portion (10) which, in the fitted state, is attached to the wall or the piece of furniture or to the door, respectively;
- comprises a first displaceable portion (11), in which the second hinge arm (5) is attached to the first displaceable portion (11) in order to attach it to the second fastening member (3);
- and comprises adjusting means (12, 13) for adjusting the position of the first displaceable portion (11) with respect to the fixed portion (10) of the second fastening member (3).

3. Hinge (1) according to Claim 2, **characterized in that** the first displaceable portion (11) of the second fastening member (3) is linearly displaceable with respect to the fixed portion (10), virtually at right angles to the hinge axis (A) of the hinge (1) and, in the fitted state, virtually in the plane of the wall or the piece of furniture or the door.

4. Hinge (1) according to Claim 2, **characterized in that** the first displaceable portion (11) of the second fastening member (3) is hingedly attached to the fixed portion (10).

5. Hinge (1) according to one of Claims 2 to 4, **characterized in that** the second fastening member (3):

- comprises a second portion (14) which is displaceable with respect to the fixed portion (10) and is linearly displaceable with respect to the fixed portion (10), parallel to the hinge axis (A) of the hinge (1), with the first displaceable portion (11) being attached to the second displaceable portion (14) in order to attach it to the fixed portion (10),
- and comprises adjusting means (15, 16) for adjusting the position of the second displaceable portion (14) with respect to the fixed portion (10) of the second fastening member (3).

6. Hinge (1) according to Claim 5, **characterized in that** the second displaceable portion (14) comprises slots which are arranged parallel to the hinge axis (A) of the hinge (1), **in that** the fixed portion (10) comprises corresponding bores, and **in that** the adjusting means (15, 16) comprise screws (15, 16) which engage with the corresponding bores through the slots so that, by moving the slots with respect to the screws (15, 16), the second displaceable portion (14) can be fixed with respect to the fixed portion (10) in different positions parallel to the hinge axis

(A) by means of these screws (15, 16).

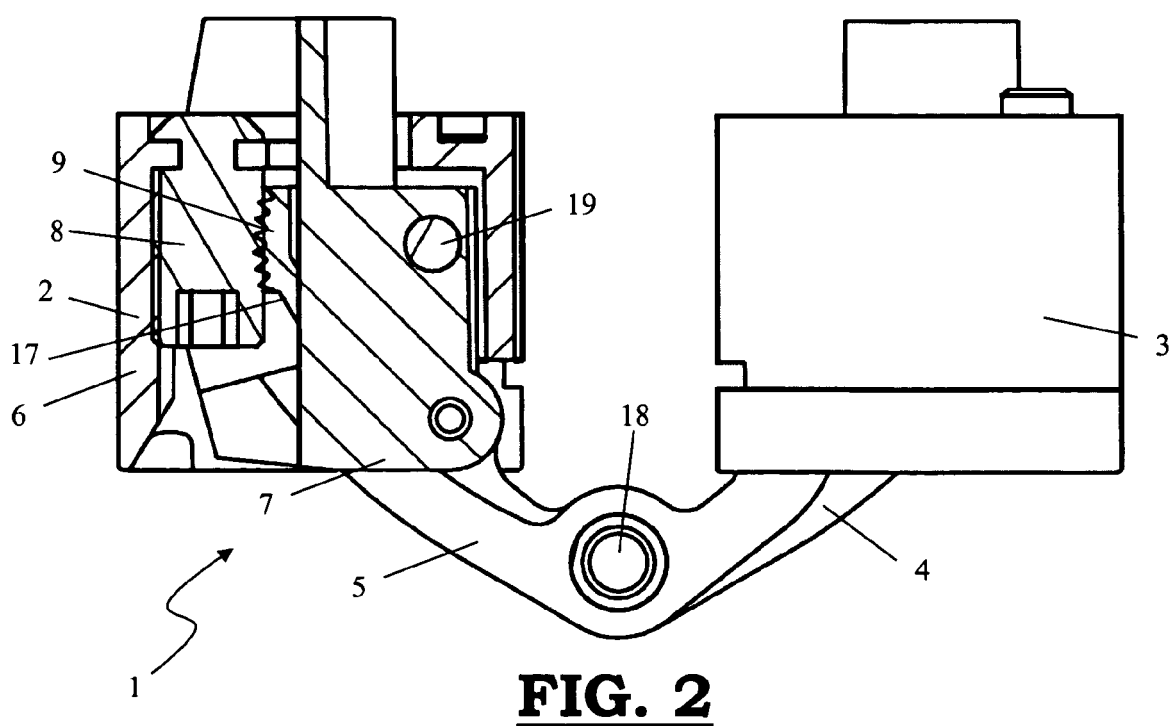
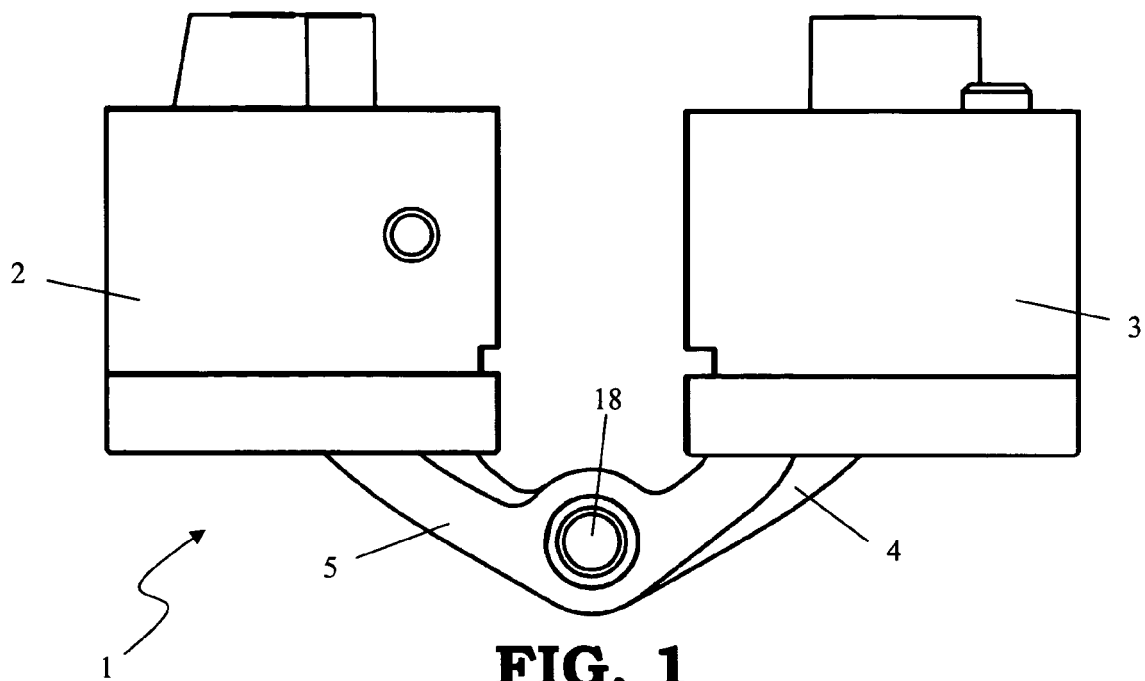
7. Hinge (1) according to one of the preceding claims,
characterized in that said adjusting means (8, 9,
12, 13, 15, 16) comprise at least one adjusting screw 5
(8, 12, 13).
8. Hinge (1) according to one of the preceding claims,
characterized in that said adjusting means (8, 9,
12, 13, 15, 16) comprise a worm (8) and a portion of 10
a worm wheel (9), with said displaceable portion (7),
which is hingedly attached to the corresponding fixed
portion (6), being designed as the portion of the worm
wheel (9) and engaging with the worm (8), with the
displaceable portion (7) being hingedly displaceable 15
with respect to the corresponding fixed portion (6)
by displacement of the worm (8).
9. Hinge (1) according to Claim 8, **characterized in**
that said displaceable portion (7) comprises a con- 20
vexly curved surface (17), said curved surface being
at least partially provided with essentially parallel
slots, or being provided with a screw thread in order
to configure this displaceable portion (7) as the por-
tion of the worm wheel (9) and **in that** said worm (8) 25
is configured as an adjusting screw (8).
10. Hinge (1) according to one of the preceding claims,
characterized in that the at least one first hinge
arm (4), at its one end (4a), is hingedly attached to 30
the first fastening member (2) and is guided, at its
other end (4b), in guide slots in the second fastening
member (3) and **in that** the at least one second hinge
arm (5) is, at its one end (5a), hingedly attached to
the second fastening member (3) and is, at its other 35
end (5b), guided in guide slots in the first fastening
member (2).

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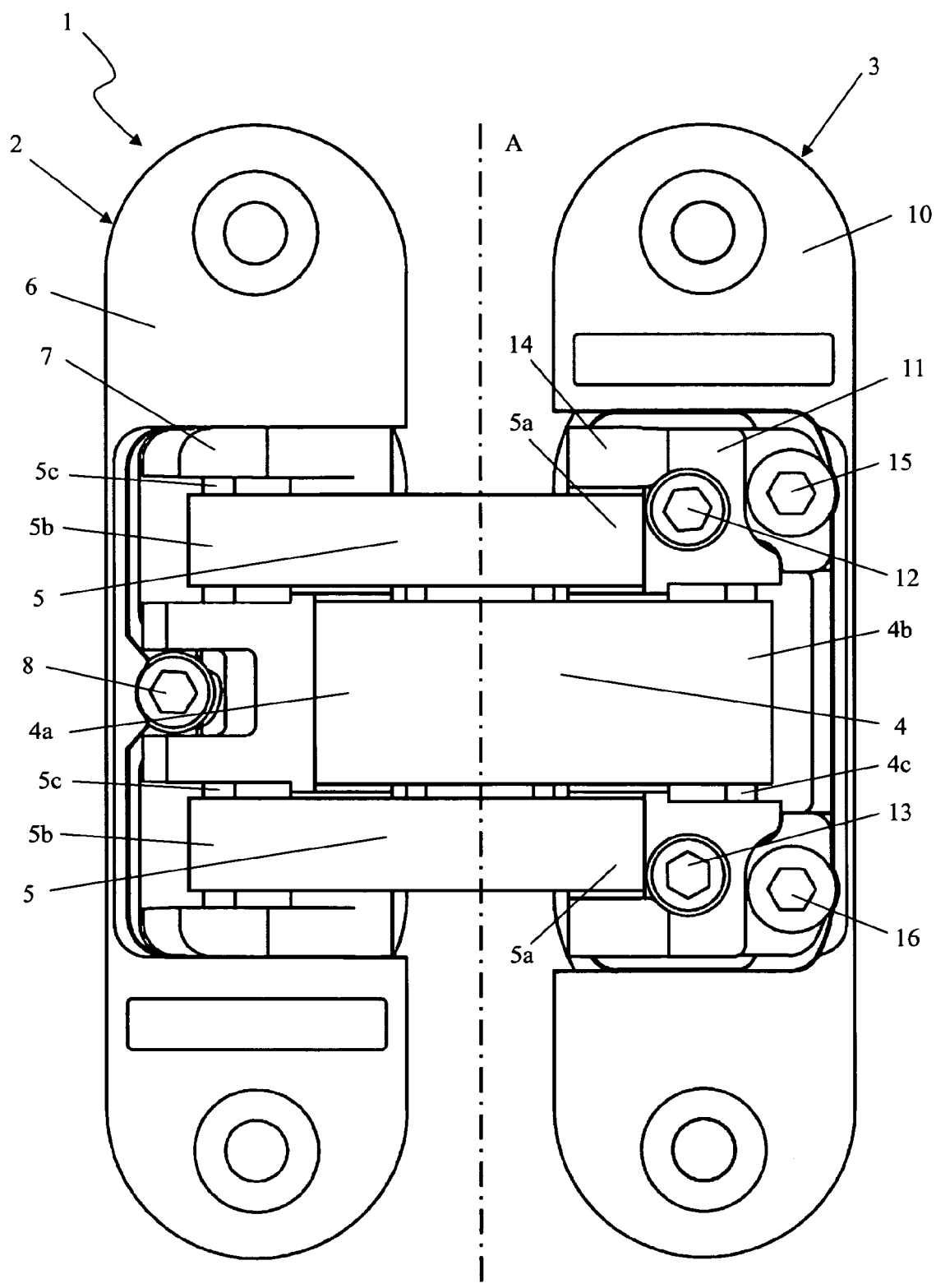


FIG. 3

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- EP 1308592 A [0003] [0004]
- CH 671066 [0004] [0039]