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(54) Hinge

(57) The invention relates to a hinge (1) comprising at least one first and a second hinge arm (4, 5) for attachment to a door and a wall or piece of furniture, which are hingedly connected to one another, it being possible to adjust the intermediate distance between the hinge arms (4, 5) in a direction parallel to their common hinge pin (A) by means of an adjusting screw (6), with this hinge (1) being invertible due to being provided with a first (7) and a second securing element (8) for securing the adjusting screw (6) during displacement in a first or a second direction with respect to one another, respectively.

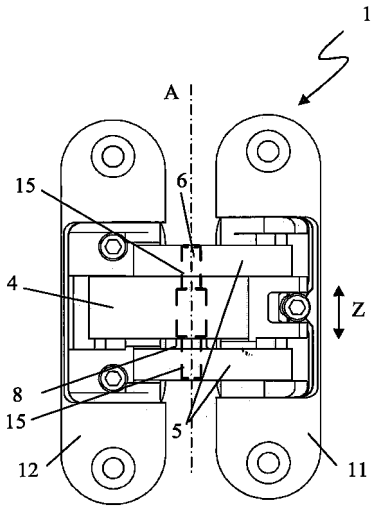

FIG. 11

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Description

[0001] The present invention relates to a hinge for hingedly connecting a door to a wall or a piece of furniture, comprising at least one first hinge arm which is designed to be attached to said door and at least one second hinge arm which is designed to be attached to said wall or said piece of furniture, with the first and the second hinge arm being hingedly connected to one another for hingedly connecting the door to the wall or the piece of furniture, it being possible to adjust the intermediate distance between the hinge arms in a direction parallel to their common hinge pin by means of an adjusting screw, with the hinge arms being moved in a first direction with respect to one another in a first rotary movement of the adjusting screw and the hinge arms being moved in a second direction with respect to one another in a second rotary movement of the adjusting screw.

[0002] In practice, several hinges of this type are already known and have also been described in patent literature. By means of this adjustment function, it is possible to adjust the position of a door with respect to the wall or the piece of furniture in a direction parallel to the hinge pin after such a hinge has been fitted between this door and the wall or piece of furniture.

[0003] Thus, for example, it can clearly be seen in CH 671 066 A5 in Figs. 2 and 2A how, using the adjusting screw (8"), the intermediate distance between the hinge arms (2, 4) can be adjusted in a direction (Z) parallel to the common hinge pin of these hinge arms (2, 4).

[0004] In EP 1 063 376 A2 a similarly adjustable hinge is described. Fig. 7 thereof, for example, shows that, using the adjusting screw (16), the intermediate distance between the hinge arms (5', 5") can be adjusted in a direction (Z) parallel to the common hinge pin of these hinge arms (5', 5").

[0005] A problem with such prior-art hinges is that, when these hinges are fixed inversely between a door and a wall or a piece of furniture, said adjustability is lost. Figs. 1 to 5 diagrammatically show the action of such a hinge (1) from the prior art and clearly illustrate this problem. This hinge (1) is provided with mounting bodies (11, 12) for attaching respective hinge arms (4, 5) to the door and the wall or the piece of furniture. In Figs. 1 and 2, this hinge (1) is illustrated diagrammatically in front view in a normal position. The mounting body (11) is designed to be attached to a door, while the mounting body (12) is provided to be attached to a wall or piece of furniture. After fitting, the distance between the hinge arms (4, 5) can be adjusted by rotating the adjusting screw (6) in the hinge arm (4), resting on hinge arm (5), in a direction (Z) parallel to their common hinge pin (A) as illustrated. In Figs. 3 to 5, this hinge (1) is inverted, with the mounting body (11) which is designed to be attached to a door again being attached to a door and the mounting body (12) which is designed to be attached to a wall or piece of furniture again being attached to a wall or piece of furniture. In this situation, the distance between the hinge arms (4, 5) as illustrated can no longer be adjusted. If the adjusting screw (6), from the starting position as illustrated in Fig. 3, is rotated in order to move the hinge arms (4, 5) towards one another, as is illustrated in Fig. 4, then, under the effect of the force of gravity which acts on the door, the mounting body (11) together with the door and thus also the hinge arm (4) will be lowered, so that the distance between the hinge arms (4, 5) automatically returns to its maximum, as is illustrated in Fig. 5.

[0006] An additional problem is that said adjustability of these hinges (1) can only be ensured if the respective mounting body (11) which is designed to be attached to the door is effectively attached to this door and that the respective mounting body (12) which is designed to be attached to the wall or the piece of furniture is effectively attached to this wall or this piece of furniture. For left-hand doors, hinges modified for such left-hand doors will therefore have to be provided, while for right-hand doors, hinges modified for these right-hand doors will have to be provided. If, in Figs. 1 and 2, the mounting body (11) which is designed to be attached to a door is now attached to a wall or piece of furniture, while the mounting body (12) which is designed to be attached to a wall or piece of furniture is now attached to a door, the door can never remain in the position as illustrated in Fig. 1, but the mounting body (12) and thus also the hinge arm (5) will be lowered together with the door under the effect of the force of gravity which acts on this door, so that the distance between the hinge arms (4, 5) automatically returns to its maximum, as is illustrated in Fig. 2.

[0007] WO 94/27008 A and DE 100 01 264 C1 describe hinges which already offer a solution to the abovementioned problems. These hinges are provided with a first and a second securing element, with the first securing element being designed to secure the adjusting screw in the direction of said first rotary movement of the adjusting screw and the second securing element is designed to secure the adjusting screw in the direction of said second rotary movement of the adjusting screw.

[0008] It is an object of the present invention to provide an alternative hinge which can be used for both left-hand and right-hand doors, which can also be fitted upside down without losing the hinge function of this hinge and without losing the adjustability of the height between the arms by means of said adjusting screw, with the adjustability of the mounting arms being simplified.

[0009] 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 at least one first hinge arm which is designed to be attached to said door and at least one second hinge arm which is designed to be attached to said wall or said piece of furniture, with the first and the second hinge arm being hingedly connected to one another for hingedly connecting the door to the wall or the piece of furniture, it being possible to adjust the intermediate distance between the hinge arms in a direction parallel to their common hinge pin by means of an adjusting screw, with the hinge arms being moved in

a first direction with respect to one another in a first rotary movement of the adjusting screw and the hinge arms being moved in a second direction with respect to one another in a second rotary movement of the adjusting screw, with this hinge being provided with a first and a second securing element, with the first securing element being designed to secure the adjusting screw in the direction of said first rotary movement of the adjusting screw and the second securing element being designed to secure the adjusting screw in the direction of said second rotary movement of the adjusting screw, and with this hinge comprising mounting bodies for attaching this hinge to said door and said wall or said piece of furniture, with said hinge arms being hingedly attached to these mounting bodies at their one end, and being guided at their other end in guide slots in these mounting bodies and being hingedly connected to one another between these ends.

[0010] By providing a first and a second securing element for securing the adjusting screw in each direction, an invertible hinge is produced in a simple manner.

[0011] Preferably, said adjusting screw is at least partly provided with an external screw thread, and at least one of said hinge arms is provided with a corresponding internal screw thread with which said external screw thread of the adjusting screw engages, and with said adjusting screw being arranged freely rotatably in at least one other hinge arm.

[0012] In first specific embodiments of a hinge according to the present invention, the first securing element and/or the second securing element is attached to or forms an integral part of said hinge arm.

[0013] This first and/or this second securing element is in this case preferably attached to or forms an integral part of said hinge arm which is provided with internal screw thread.

[0014] With a particular embodiment of such a hinge, the first and the second securing element are each designed as an obstacle to prevent further movement of the adjusting screw which is situated at one end of said internal screw thread transversely to this screw thread in accordance with the first or the second rotary movement, respectively.

[0015] With second specific embodiments of a hinge according to the present invention, the first and/or the second securing element is attached to or forms an integral part of said adjusting screw.

[0016] The first and the second securing element of a particular embodiment of such a hinge are each designed as an obstacle to prevent further movement of the adjusting screw which is situated at one end of said external screw thread transversely to this screw thread in accordance with the first or the second rotary movement, respectively.

[0017] With a third specific embodiment of a hinge according to the present invention, one or more hinge arms are designed as a securing element.

[0018] More specifically, a hinge according to the embodiments listed above is designed as a blind hinge.

[0019] Preferably, the position of the hinge arms with respect to said mounting body is adjustable in a first direction, perpendicular to the hinge pin of these hinge arms.

[0020] More preferably, the position of the hinge arms with respect to said mounting body is then adjustable in a second direction, perpendicular to the hinge pin of these hinge arms and perpendicular to said first direction.

[0021] The present invention will now be explained in more detail with reference to the following detailed description of some preferred embodiments of hinges according to the present invention. The sole aim of this description is to give illustrative examples and to indicate further advantages and details of these hinges and can therefore in no case be interpreted as a limitation of the area of application of the invention or of the patent rights claimed in the claims.

[0022] In this detailed description, reference numerals are used to refer to the attached drawings, in which

- ***Figs. 1-5*** diagrammatically illustrate the action of a prior-art hinge in front views, as described in the introduction;
- ***Fig. 6*** diagrammatically illustrates a first embodiment of a hinge according to the present invention with two hinge arms in front view;
- ***Fig. 7*** diagrammatically shows the hinge from Fig. 6 in front view, with the hinge arms being adjusted towards one another;
- ***Fig. 8*** diagrammatically shows the hinge from Fig. 6 inverted and in front view;
- ***Fig 9*** diagrammatically shows the hinge from Fig. 8 in front view, with the hinge arms being adjusted towards one another;
- ***Fig* 10** shows a second embodiment of a hinge according to the present invention with three hinge arms in front view;
- ***Fig 11*** shows the hinge from Fig. 10 in front view, with the central hinge arm being adjusted towards the top hinge arm and away from the bottom hinge arm;
- ***Fig. 12*** shows the hinge from Fig. 10 inverted and in front view, with the central hinge arm in this position being adjusted towards the bottom hinge arm and away from the top hinge arm;
- ***Fig. 13*** illustrates a cross section of the hinge from Fig. 10 along the axis B-B'.

[0023] The hinges (1) illustrated in Figs. 1 to 13 are hinges (1) for hingedly connecting a door to a wall or piece of furniture, comprising at least one first hinge arm (4) which is designed to be attached to said door and at least one second hinge arm (5) which is designed to be attached to said wall or said piece of furniture. This first and this second hinge arm (4, 5) are in each case hingedly connected to one another in order thus to hingedly attach the door to the wall or the piece of furniture by fixing this

hinge (1) between the door and the wall or the piece of furniture. These hinges (1) are furthermore provided with mounting bodies (11, 12) for attaching the respective hinge arms (4, 5) to the respective door and wall or piece of furniture. All these hinges (1) are provided with an adjusting screw (6) in order to be able to adjust the intermediate distance between the hinge arms (4, 5) in a direction (Z) parallel to their common hinge pin (A), with the hinge arms (4, 5) being moved with respect to one another in a first direction with respect to one another in a first rotary movement of the adjusting screw (6) and the hinge arms (4, 5) being moved in a second direction with respect to one another in a second rotary movement of the adjusting screw (6).

[0024] With the prior-art hinge (1) as illustrated in Figs. 1 to 5, the intermediate distance between the hinge arms (4, 5) in a direction (Z) parallel to their common hinge pin (A) can, however, only be adjusted if this hinge (1) is mounted in the correct direction, as has been described in the introduction of this patent application.

[0025] With the embodiments of hinges (1) according to the present invention as illustrated in Figs. 6 to 13, the intermediate distance between the hinge arms (4, 5) can always be adjusted in a direction (Z) parallel to their common hinge pin (A), irrespective of the direction in which the hinge (1) is mounted.

[0026] The first embodiment of a hinge (1) according to the present invention, as illustrated in Figs. 6 to 9, is provided with two hinge arms (4, 5). In order to ensure the adjustability of the distance between these hinge arms (4, 5) in said direction (Z), irrespective of the direction in which this hinge (1) is mounted, the adjusting screw (6) of this first hinge (1) is provided with a narrowing (15) which is provided in a corresponding bore in the second hinge arm (5). The lateral surface of this narrowing (15) does not have any external screw thread, so that it is thus arranged freely rotatably in the bore of the second hinge arm (5). On the side of the first hinge arm (4), this adjusting screw (6) is provided with an external screw thread on its lateral surface. This first hinge arm (4) is provided with a corresponding internal screw thread with which said external screw thread of the adjusting screw (6) engages. On the side opposite the side of the first hinge arm (4), the adjusting screw (6) is provided with a cylindrical thickening with respect to said narrowing, with this cylindrical thickening in this case having an outer diameter which virtually corresponds to the diameter of the end of the adjusting screw (6) which is provided with external screw thread. The transition between the narrowing and said cylindrical thickening forms a first securing element (7) which is designed to secure the adjusting screw (6) in the direction of the first rotary movement. The transition between the narrowing and the end of the adjusting screw (6) which is provided with external screw thread forms a second securing element (8) which is designed to secure the adjusting screw (6) in the direction of the second rotary movement.

[0027] Fig. 6 illustrates this embodiment of a hinge (1) according to the present invention, with the hinge arms (4, 5) being situated at their maximum, physically limited intermediate distance with respect to one another. This maximum intermediate distance is here limited physically by the mounting bodies (11, 12). If, in this position, an attempt is made to turn the adjusting screw (6) further upwards, this will no longer be possible, because the adjusting screw (6) is secured by means of the second securing element (8). By turning the adjusting screw (6) in the opposite direction of rotation, the hinge arms (4, 5) are moved towards one another up to their minimum, physically limited intermediate distance, as can be seen in Fig. 7. This minimum intermediate distance is reached when these hinge arms (4, 5) touch one another, with parts of the hinge possibly being present between these hinge arms (4, 5). When these hinge arms (4, 5) have been moved together up to their minimum, physically limited intermediate distance in this manner, the corresponding rotary movement of the adjusting screw (6) is limited further, due to the fact that this adjusting screw (6) is now secured by the first securing element (7).

[0028] In Figs. 8 and 9, this hinge (1) is now inverted. In Fig. 8, this embodiment of a hinge (1) according to the present invention is illustrated again, in a position in which the hinge arms (4, 5) are at their maximum, physically limited intermediate distance with respect to one another. If, in this position, an attempt is made to turn the adjusting screw (6) further upwards, this will no longer be possible, because the adjusting screw (6) is secured by means of the second securing element (8). By turning the adjusting screw (6) in the opposite direction of rotation, the hinge arms (4, 5) are moved towards one another again, as can be seen in Fig. 9. When these hinge arms (4, 5) have been moved together up to their minimum, physically limited intermediate distance in this manner, the corresponding rotary movement of the adjusting screw (6) is limited further, due to the fact that the adjusting screw (6) is again secured by means of the first securing element (7) abutting the second hinge arm (5).

[0029] It should be noted that attaching the respective mounting bodies to a door and wall or piece of furniture does not limit the hinge action or the adjustability of the distance between the hinge arms (4, 5) in said direction (Z). Even if, in both positions, the mounting bodies which were attached to a door and a wall or piece of furniture, respectively, are now attached to the wall or the piece of furniture and the door, respectively, the hinge action and the adjustability of the distance between the hinge arms (4, 5) in said direction (Z) parallel to their corresponding hinge pin (A) is ensured.

[0030] The second embodiment of a hinge (1) according to the present invention, as illustrated in Figs. 10 to 13, is provided with three hinge arms (4, 5). In order to ensure the adjustability of the distance between these hinge arms (4, 5) in said direction (Z), irrespective of the direction in which this hinge (1) is fitted, the adjusting screw (6) of this first hinge (1) is provided with two narrowings (15) at both ends of this adjusting screw (6) which

are provided in corresponding bores in the second hinge arms (5). The lateral surface of these narrowings (15) does not have any external screw thread, and so these are thus provided freely rotatably in the bore of the respective second hinge arm (5). The part of the adjusting screw (6) which extends through the first hinge arm (4) is provided with an external screw thread on its lateral surface. This first hinge arm (4) is provided with a corresponding internal screw thread with which said external screw thread of the adjusting screw (6) engages. The transition between a respective narrowing and that part of the adjusting screw (6) which is provided with an external screw thread has an additional widening which forms a first (7) and a second (8) securing element, respectively, for securing the adjusting screw (6). Due to these securing elements (7, 8), further rotary movement of the adjusting screw (6) is again limited with this hinge (1) when the hinge arms (4, 5) reach their physically limited end positions. In this way, this hinge (1) can again be fitted for both left-hand and right-hand doors and both in the intended position and in the inverse position, with the hinge action and the adjustability of the distance between the hinge arms (4, 5) in said direction (Z) parallel to their corresponding hinge pin (A) being ensured.

Claims

1. Hinge (1) for hingedly connecting a door to a wall or a piece of furniture, comprising at least one first hinge arm (4) which is designed to be attached to said door and at least one second hinge arm (5) which is designed to be attached to said wall or said piece of furniture, with the first and the second hinge arm (4, 5) being hingedly connected to one another for hingedly connecting the door to the wall or the piece of furniture, it being possible to adjust the intermediate distance between the hinge arms (4, 5) in a direction (Z) parallel to their common hinge pin (A) by means of an adjusting screw (6), with the hinge arms (4, 5) being moved in a first direction with respect to one another in a first rotary movement of the adjusting screw (6) and the hinge arms (4, 5) being moved in a second direction with respect to one another in a second rotary movement of the adjusting screw (6), with this hinge (1) being provided with a first (7) and a second securing element (8), and with the first securing element (7) being designed to secure the adjusting screw (6) in the direction of said first rotary movement of the adjusting screw (6) and the second securing element (8) being designed to secure the adjusting screw (6) in the direction of said second rotary movement of the adjusting screw (6), **characterized in that** this hinge (1) comprises mounting bodies (11, 12) for attaching this hinge (1) to said door and said wall or said piece of furniture, with said hinge arms (4, 5) being hingedly attached to these mounting bodies (11, 12) at their one end, and being guided at their other end in guide slots in these mounting bodies (11, 12) and being hingedly connected to one another between these ends.

2. Hinge (1) according to Claim 1, **characterized in that** said adjusting screw (6) is at least partly provided with an external screw thread, **in that** at least one of said hinge arms (4, 5) is provided with a corresponding internal screw thread with which said external screw thread of the adjusting screw (6) engages, and **in that** said adjusting screw (6) is arranged freely rotatably in at least one other hinge arm (5 and 4, respectively).

3. Hinge (1) according to one of the preceding claims, **characterized in that** the first securing element (7) and/or the second securing element (8) is attached to or forms an integral part of said hinge arm (4, 5).

4. Hinge (1) according to Claims 2 and 3, **characterized in that** the first and/or second securing element (7, 8) is attached to or forms an integral part of said hinge arm (4, 5) which is provided with an internal screw thread.

5. Hinge (1) according to Claim 4, **characterized in that** the first and the second securing element (7, 8) are each designed as an obstacle to prevent further movement of the adjusting screw (6) which is situated at one end of said internal screw thread transversely to this screw thread (6) in accordance with the first or second rotary movement, respectively.

6. Hinge (1) according to one of Claims 1 to 4, **characterized in that** the first and/or the second securing element (7, 8) is attached to or forms an integral part of said adjusting screw (6).

7. Hinge (1) according to one of Claims 1 or 2 and 6, **characterized in that** the first and the second securing element (7, 8) are each designed as an obstacle to prevent further movement of the adjusting screw (6) which is situated at one end of said external screw thread transversely to this screw thread (6) in accordance with the first or the second rotary movement, respectively.

8. Hinge (1) according to one of Claims 1 to 4 or 6, **characterized in that** one or more hinge arms (4, 5) are designed as a securing element (7, 8).

9. Hinge (1) according to one of the preceding claims, **characterized in that** said hinge (1) is a blind hinge.

10. Hinge (1) according to one of the preceding claims, **characterized in that** the position of the hinge arms (4, 5) with respect to said mounting body (11, 12) is

adjustable in a first direction, perpendicular to the hinge pin (A) of these hinge arms (4, 5).

11. Hinge (1) according to Claim 10, **characterized in that** the position of the hinge arms (4, 5) with respect to said mounting body (11, 12) is adjustable in a second direction, perpendicular to the hinge pin (A) of these hinge arms (4, 5) and perpendicular to said first direction.

STATE OF THE ART

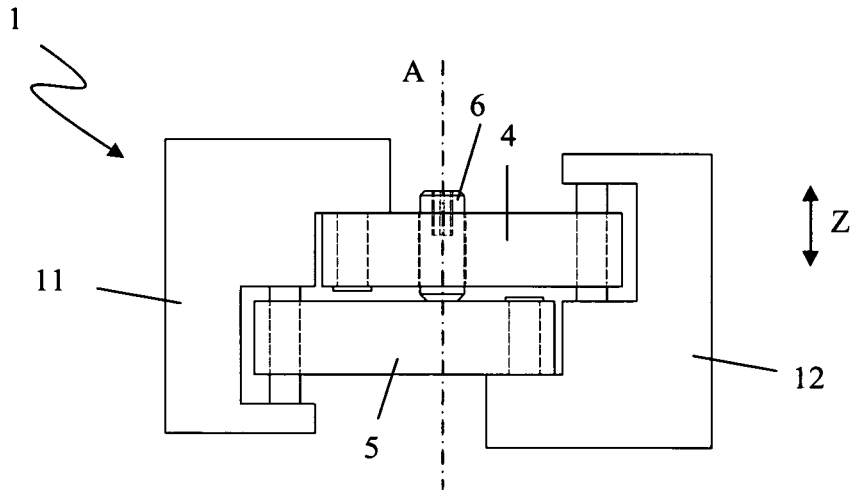

FIG. 1

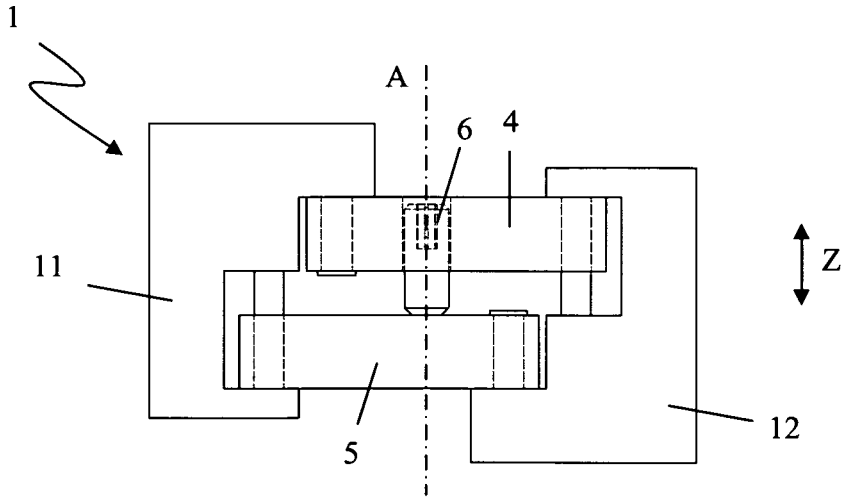

FIG. 2

STATE OF THE ART

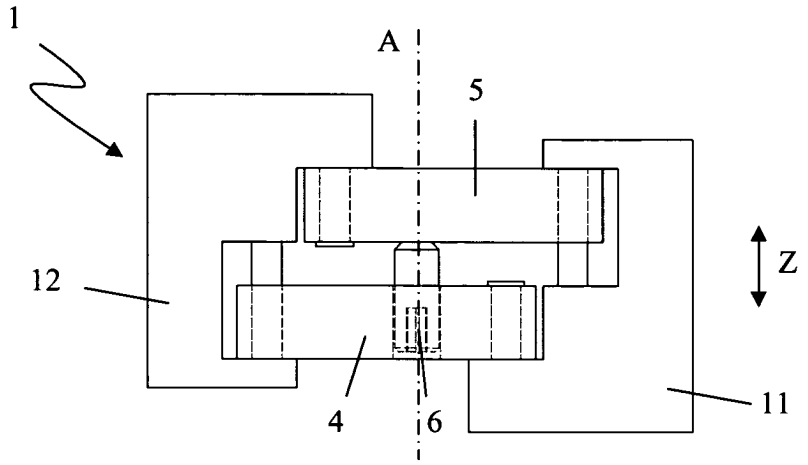

FIG. 3

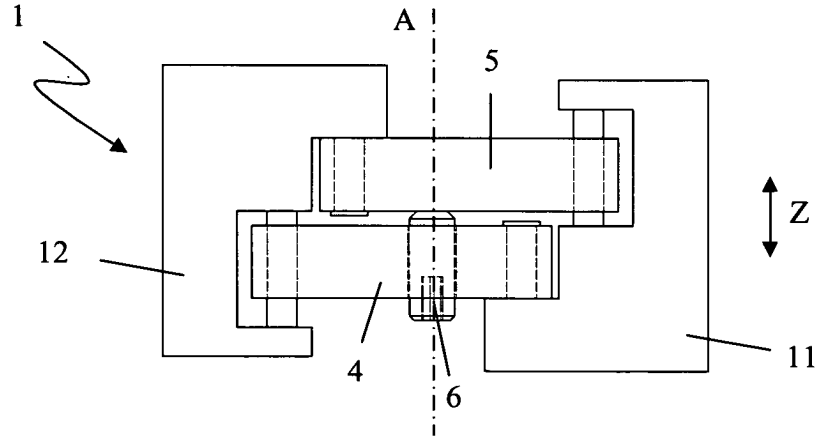

FIG. 4

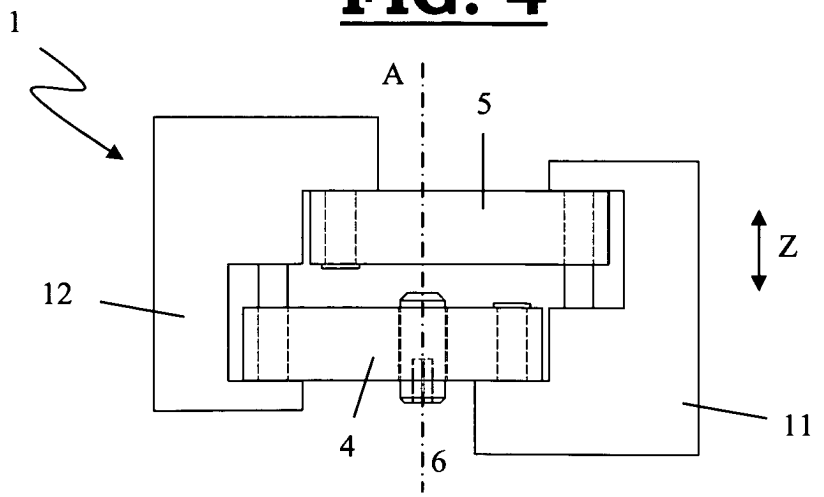

FIG. 5

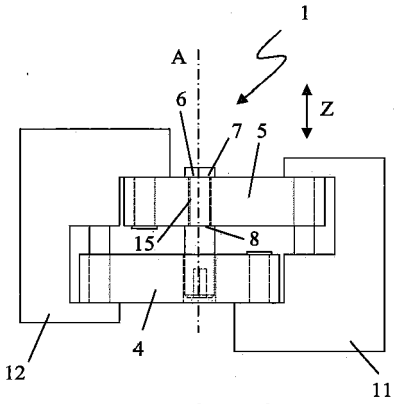

FIG. 6

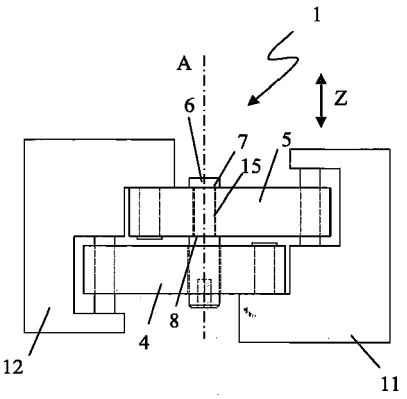

FIG. 7

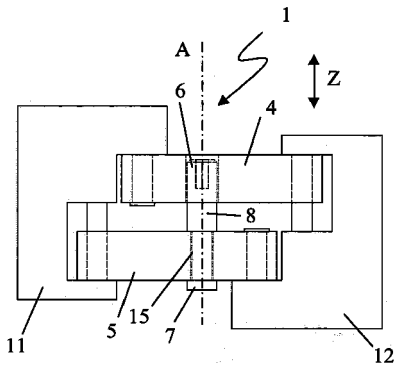

FIG. 8

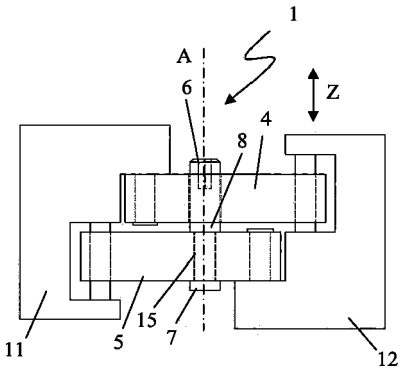

FIG. 9

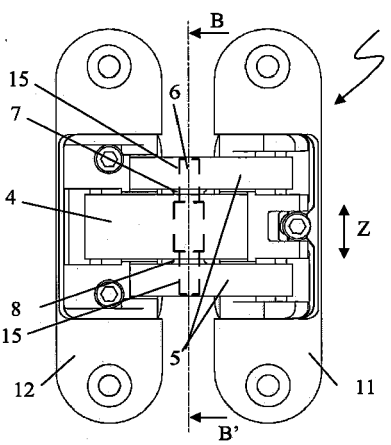

FIG. 10

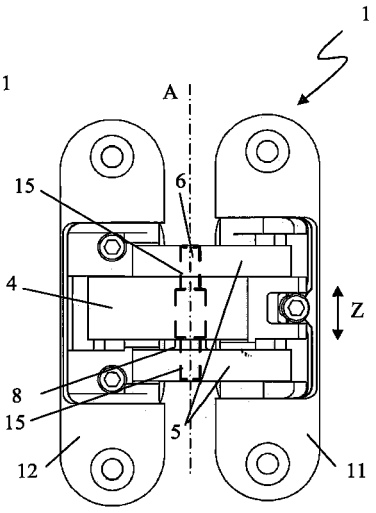

FIG. 11

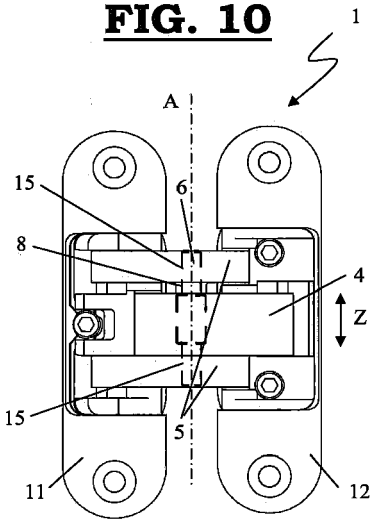

FIG. 12

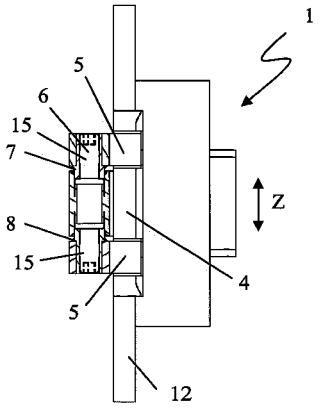

FIG. 13

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European Patent Office
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EUROPEAN SEARCH REPORT

Application Number
EP 09 18 0094

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A,D	WO 94/27008 A (ROSSMO WILLIAM [CA]) 24 November 1994 (1994-11-24) * page 9, paragraph 4 - page 11, paragraph 3; figures 7-11 *	1-8	INV. E05D3/18 E05D7/00
A,D	DE 100 01 264 C1 (DAIMLER CHRYSLER AG [DE]) 19 October 2000 (2000-10-19) * column 3, line 49 - column 4, line 17; figures 1-3 *	1-3,5-8	
A,D	EP 1 063 376 A (KOBLENZ S P A [IT]) 27 December 2000 (2000-12-27) * claims 1,2,4,5; figures 1-7 *	9-11	

TECHNICAL FIELDS SEARCHED (IPC)

E05D

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	18 March 2010	Guillaume, Geert

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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P : intermediate document

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