



Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11) **EP 1 452 679 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**01.09.2004 Bulletin 2004/36**

(51) Int Cl.7: **E05D 7/00**

(21) Application number: **04100794.9**

(22) Date of filing: **01.03.2004**

(84) Designated Contracting States:  
**AT BE BG CH CY CZ DE DK EE ES FI FR GB GR  
HU IE IT LI LU MC NL PL PT RO SE SI SK TR**  
Designated Extension States:  
**AL LT LV MK**

(72) Inventors:  
• **Spinazzè, Guido**  
**31010, MARENO DI PIAVE (TV) (IT)**  
• **Piccolo, Lorenzo**  
**31040, GIAVERA DEL MONTELLO (TV) (IT)**

(30) Priority: **28.02.2003 IT UD20030046**

(74) Representative: **Petraz, Gilberto Luigi et al**  
**GLP S.r.l.**  
**Piazzale Cavedalis 6/2**  
**33100 Udine (IT)**

(71) Applicant: **OTLAV S.p.A.**  
**31025 SANTA LUCIA DI PIAVE (TV) (IT)**

(54) **Hinge for mobile elements or furniture wings with mechanism to adjust height**

(57) Hinge (10) for articulating a mobile structure (11) with respect to a fixed frame (22) comprises two hinge elements (12, 15) to be fixed together to the mobile structure (11), or to the fixed frame (22), and a central hinge element (13) disposed between the two hinge elements (12, 15) and to be fixed to the fixed frame (22) or, respectively, to the mobile structure (11). A pivot (16) is axially inserted in the three hinge elements (12, 13,

15) and an intermediate threaded bushing (17) is axially disposed between the central hinge element (13) and one of the two hinge elements (12, 15). The threaded bushing (17) is provided with first coupling means (35a) coupled, without reciprocal rotation, with second coupling means (31) provided on the pivot (16), so that the rotation of the latter commands the axial movement of the two hinge elements (12, 15) with respect to the central hinge element (13).

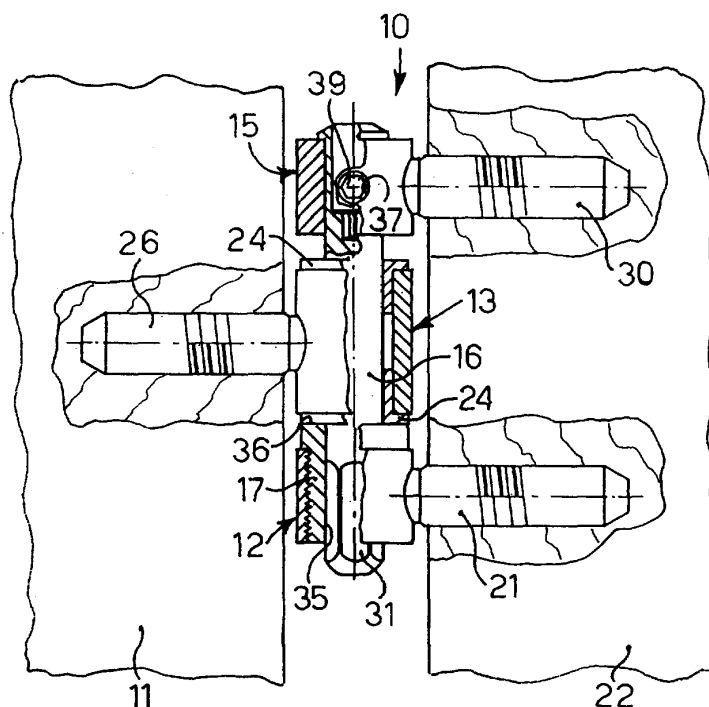


fig. 2

EP 1 452 679 A2

## Description

### FIELD OF THE INVENTION

**[0001]** The present invention concerns a hinge for mobile elements, for example for doors, main doors, windows or suchlike, or for wings of items of furniture. In the following text, the term wing shall be taken to mean any mobile structure intended to close an aperture, whether of a fixture, as in the case of doors or windows, or of an item of furniture. The hinge according to the invention is provided with a mechanism that allows to adjust the height of the wing with respect to the fixed frame to which it is applied. Such mechanism can be applied both in hinges with two elements, of the male-female type, and also in hinges with three elements rotating around a central pivot. According to the invention, a bushing is screwed to one of the elements of the hinge, advantageously the lower one. The bushing is screwed in, or unscrewed, by acting directly on the central pivot, to adjust the position in height of one element with respect to the other.

### BACKGROUND OF THE INVENTION

**[0002]** It is known that, to allow the selective opening and closing of wings, such as doors, main doors, gates, windows or other structures mobile with respect to a fixed frame, especially if they are particularly heavy, such as for example reinforced doors, hinges are used which are formed by three coaxial elements hinged on a single central pivot.

**[0003]** The element arranged in the central position is usually attached to the wing, while the two elements arranged laterally, respectively one above and one below the central one, are attached to the frame of the fixture. More rarely, the connection between the three elements is inverted, so that the central one is attached to the fixed frame and the lateral ones are attached to the wing.

**[0004]** One of the shortcomings of such known hinges is that, to allow the central element to be adjusted in height, in order to distance the base of the wing from the floor or from the base of the piece of furniture, spacer washers are arranged between the lower element and the central element in order to raise the latter by some millimeters.

**[0005]** The aforesaid adjustment, however, involves at least partly removing the pivot, lifting the wing, inserting one or more spacer washers between the lower element and the central element, and re-assembling the whole.

**[0006]** Another disadvantage of this known adjustment system is that the washers have particular thicknesses and the adjustment in height can occur only for defined increases and not continuously, with a consequent impreciseness of the adjustment itself.

**[0007]** A simpler hinge is also known, with only two, male-female elements, which is provided with an inte-

grated adjustment mechanism, comprising an adjustment bushing screwed onto the lower element. In this known hinge the adjustment bushing is provided with an annular part on which the upper element rests.

**[0008]** In this way, by acting radially on the annular part the adjustment bushing is screwed or unscrewed with respect to the lower element, thus determining an axial movement of the upper element and consequently the wing is lifted or lowered with respect to the floor, or with respect to the base of the item of furniture.

**[0009]** The radial action on the edge of the adjustment bushing is difficult to carry out, and in some cases needs specific tools. Moreover, due to the generally limited spaces between the hinge and the door frame, and the limited size of the hinge itself, the operator is obliged to make many, brief radial actions which considerably increase the time needed to perform a simple operation, such as adjusting the height of the wing with respect to the floor, or to the base of the piece of furniture.

**[0010]** One purpose of the present invention is to achieve a hinge, with one or two elements, for mobile elements or suchlike, which is provided with a mechanism to adjust the height of the mobile element or suchlike, which is simple and economical to make and at the same time allows to adjust, with maximum precision, the height of the wing simply and quickly, in order to reduce the times and costs of the operators' intervention.

**[0011]** Another purpose of the present invention is to achieve a hinge for mobile elements or suchlike, whose adjustment mechanism does not provide the use of specific tools in order to actuate it.

**[0012]** The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain other purposes and advantages.

### SUMMARY OF THE INVENTION

**[0013]** The present invention is set forth and characterized in the main claim, while the dependent claims describe other innovative characteristics of the invention or variants to the idea of the main embodiment.

**[0014]** In accordance with the aforesaid purposes, the hinge for fixtures according to the present invention comprises a couple of hinge elements able to be fixed together to the mobile structure or to the fixed frame, and a central hinge element disposed between the couple of hinge elements and able to be fixed to the fixed frame or, respectively, to the mobile structure. Said three hinge elements are axially hinged therebetween by means of a pivoting element inserted in corresponding axial holes thereof. An intermediate element, provided with a through axial hole, is disposed between the a central hinge element and a first hinge element of the couple of hinge elements, coaxial to the pivoting element, for regulating the reciprocal axial position of the couple of hinge elements with respect to the central hinge element.

**[0015]** According to a feature of the present invention, the said intermediate element comprises a bushing having at least a substantially cylindrical portion externally threaded, which is screwed on a corresponding internal thread provided in one of the axial holes of said first hinge element or of said central hinge element; moreover said bushing is provided in its axial hole with first coupling means able to couple, without reciprocal rotation, with second coupling means provided on the pivoting element in order to command, by means of the rotation of said pivoting element, the selective screwing or unscrewing of the bushing with respect to the first hinge element or to the central hinge element on which said bushing is screwed, whereby causing the reciprocal axial movement of the couple of hinge elements with respect to the central hinge element.

**[0016]** The pivoting element is also provided with at least a radial protuberance, which is able to interfere elastically with a wall of the hole of one of the elements, to determine the clamping thereof during the normal functioning of the hinge.

**[0017]** With the hinge according to the present invention it is possible to adjust the distance between the various elements, and consequently the position of the wing with respect to its fixed frame, by acting directly on the pivoting element, before the latter is clamped inside the holes of the hinge elements.

**[0018]** Moreover, the adjustment can be made with any type of known tool, for example an Allen key able to operate in a hexagonal hollow made on the head of the pivoting element.

**[0019]** Alternately, the pivoting element can be provided with a knurling, a transverse notch made on the head, or otherwise.

#### BRIEF DESCRIPTION OF THE DRAWINGS

**[0020]** These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example, with reference to the attached drawings wherein:

- fig. 1 is an exploded view of a hinge for fixtures according to the present invention;
- fig. 2 is a lateral view, partly in section, of the hinge in fig. 1 in its assembled condition.

#### DETAILED DESCRIPTION OF A PREFERENTIAL FORM OF EMBODIMENT

**[0021]** With reference to figs. 1 and 2, a hinge 10 according to the present invention for a wing 11 comprises a first hinge element 12, a second hinge element 13 and a third hinge element 15, mounted rotatable axially on a central pivot 16.

**[0022]** The first hinge element 12 and the third hinge element 15 form a couple of hinge elements which is

able to be fixed together to a fixed frame 22 with respect to which the wing 10 has to be hinged, while the second hinge element 13 is able to be disposed centrally between the couple of hinge elements 12 and 15 and fixed to wing 11. Of course, the couple of hinge elements 12 and 15 can be fixed to wing 11, while the second, or central, hinge element 13 can be fixed to the fixed frame 22.

**[0023]** More in particular, the first hinge element 12 is arranged below the central hinge element 13 and comprises a tubular body 19 provided with an axially threaded through hole 20 and with an external radial threaded pin 21, transversal to the axis of the threaded through hole 20 and by means of which the same first hinge element 12 can be fixed to the fixed frame 22, or to the wing, as explained above.

**[0024]** The central hinge element 13 comprises a tubular body 23 provided with an axial through hole 25 having a larger diameter than that of the pivot 16. In fact, at the ends of the through hole 25 are provided two anti-friction brasses 24 which improve the conditions of reciprocal axial rotatability between the central hinge element 13 and the pivot 16. Bearings or other anti-friction elements of any suitable material and shape may be provided instead of the brasses 24, provided that this is not essential for the present invention. Moreover, on the circular outer surface of the tubular body 23, a radial threaded pin 26 is also provided, which is able to allow to attach the central hinge element 13 to the wing 11, or to the fixed frame 22, as explained above.

**[0025]** The third hinge element 15 is arranged above the central hinge element 13 and comprises a tubular body 27 provided with an axial through hole 29 with a diameter mating with that of the pivot 16 and with an external radial threaded pin 30, identical to the pin 21, and able to allow to attach the same third hinge element 15, together with the first hinge element 12, to the fixed frame 22, or to the wing, as explained above.

**[0026]** The third hinge element 15 can also comprise, possibly, a transversal hole 37 inside which a clamping grub screw 39 is able to be screwed with a blocking function.

**[0027]** The hinge 10 also comprises a substantially cylindrical bushing 17 which has an external threaded portion 17a axially screwed to the threaded through hole 20 of the first hinge element 12. The bushing 17 is also provided with an axial through hole 35 having a portion 35a provided with a polygonal transversal section, for example hexagonal.

**[0028]** The pivot 16 is substantially cylindrical, except for one lower end which comprises a shaped segment 31, with a polygonal transversal section, for example hexagonal, able to cooperate during use with the mating portion 35a of the through hole 35 of the bushing 17, in order to avoid any reciprocal rotation between the pivot 16 and the bushing 17.

**[0029]** The pivot 16 is also provided at one upper end with one or more radial protuberances 34 which interfere

elastically with the through hole 29 of the third element 15 in order to determine the clamping of the pivot 16 itself with respect to the elements 12, 13 and 15, during the normal functioning of the hinge 10.

[0030] The radial protuberances 34 can be made either by molding or by mechanical deformation of the upper end of the pivot 16, for example as described in the European Patent application EP-A-1030020 in the name of the same Applicant hereof.

[0031] At the upper end of the pivot 16 there is also a dead hole 32, on whose bottom wall 32a there is in turn a polygonal seating 33, for example hexagonal, functioning as an interface, to allow to insert a suitable tool, for example a mating Allen key, with which it is possible to act easily on the pivot 16 in order to determine, as will be explained hereafter, the adjustment of the second element 13 with respect to the first element 12 and the third element 15.

[0032] The bushing 17 further comprises a transversal shoulder 36 which cooperates by contact with an edge of the central hinge element 13 to move it axially upwards or downwards with respect to the first hinge element 12.

[0033] The functioning of the hinge 10 described is as follows.

[0034] First of all the bushing 17 is screwed, at least partially, inside the hole 20 of the first hinge element 12. This operation is advantageously performed in the factory, so that the operator who has to install the hinge 10 on site will find the bushing 17 already screwed into the first hinge element 12.

[0035] Then both the first and third hinge elements 12 and 15 are attached to the fixed frame 22, by means of their threaded pins 21 and 30. The axial distance between the couple of hinge elements 12 and 15 must be such as to allow to insert, with appropriate play, the central hinge element 13 between the couple of hinge elements 12 and 15.

[0036] The central hinge element 13 is then positioned axially, having been previously attached to the wing 11 by means of its own threaded pin 26, between the couple of hinge elements 12 and 15.

[0037] Then the pivot 16 is inserted inside the through holes 29 and 25 so that its shaped segment 31 is inserted inside the mating shaped portion 35a of the through hole 35 of the bushing 17.

[0038] By inserting a suitable key inside the seating 33 and rotating the pivot 16 in one direction or the other, the bushing 17 is either screwed or unscrewed on the first hinge element 12, with a consequent upwards or downwards movement of the central hinge element 13 and of the wing attached thereto, with respect to the couple of hinge elements 12, 15 and to the fixed frame 22.

[0039] Once the operations to regulate the position of the central hinge element 13 with respect to the other two hinge elements 12, 15 are terminated, the pivot 16 is completely inserted forcefully inside the hole 29, so that the protuberances 34 cooperate elastically with the

inner surfaces of the hole 29, in order to exclude possible axial and radial movements of the pivot 16.

[0040] It is clear, however, that modifications and/or additions of parts may be made to the hinge 10 as described heretofore, without departing from the field and scope of the present invention.

[0041] For example, according to a variant, the shaped segment 31 could be fork-shaped and cooperate with a mating seating made in the bushing 17, or have any other type of shaping which prevents the reciprocal rotation between the pivot 16 and one of the hinge elements 12, 13 and 15 of the hinge 10.

[0042] According to another variant, the first hinge element 12 and the third hinge element 15 can be connected to each other, with a pre-determined distance, by means of a plate element, not shown in the drawings, provided with through holes, inside which respective attachment screws are able to be inserted, which determine the attachment of the couple of hinge elements 12, 15 to the fixed frame 22, thus replacing the threaded pins 21 and 30.

[0043] According to another variant the bushing 17 could be screwed to the central hinge element 13 or to the third hinge element 15.

[0044] It is also clear that, although the invention has been described with reference to specific examples, a skilled person in the art shall be able to achieve many other equivalent forms of hinge for wings, all of which shall come within the field and scope of the invention.

## Claims

1. Hinge for articulating a mobile structure (11) with respect to a fixed frame (22), comprising a couple of hinge elements (12, 15) able to be fixed together to said mobile structure (11) or to said fixed frame (22), a central hinge element (13) disposed between said couple of hinge elements (12, 15) and able to be fixed to said fixed frame (22) or, respectively, to said mobile structure (11), said three hinge elements (12, 13, 15) being axially hinged therebetween by means of a pivoting element (16) inserted in corresponding axial holes (20, 25, 29) of said three hinge elements (12, 13, 15), an intermediate element (17), provided with a through axial hole (35), being disposed between said a central hinge element (13) and a first hinge element (12) of said couple of hinge elements (12, 15), coaxial to said pivoting element (16), for regulating the reciprocal axial position of said couple of hinge elements (12, 15) with respect to said central hinge element (13), **characterized in that** said intermediate element comprises a bushing (17) having at least a substantially cylindrical portion externally threaded which is screwed on a corresponding internal thread provided in one of said axial holes (20, 25) of said first hinge element (12) or of said central hinge element (13), and **in**

**that** said bushing (17) is provided in its axial hole (35) with first coupling means (35a) able to couple, without reciprocal rotation, with second coupling means (31) provided on said pivoting element (16) in order to command, by means of the rotation of said pivoting element (16), the selective screwing or unscrewing of said bushing (17) with respect to said first hinge element (12) or to said central hinge element (13) on which said bushing (17) is screwed, whereby causing the reciprocal axial movement of said couple of hinge elements (12, 15) with respect to said central hinge element (13).

2. Hinge as in claim 1, **characterized in that** said bushing (17) further comprises a shoulder (36) able to cooperate by contact with said first hinge element (12) or with said central hinge element (13).
3. Hinge as in claim 2, **characterized in that** said substantially cylindrical portion of said bushing (17) is screwed on said first hinge element (12) and said shoulder (36) cooperates by contact with said central hinge element (13) .
4. Hinge as in claim 1, 2, or 3, **characterized in that** said first coupling means (35a) and said second coupling means (31) have a substantially polygonal transversal section.
5. Hinge as in any claim hereinbefore, **characterized in that** said pivoting element comprises a substantially cylindrical pivot (16) provided at a first end with said second coupling means (31), and at a second end with at least a radial protuberance (34) able to elastically interfere with a wall of the axial hole (29) made in a second hinge element (15) of said couple of hinge elements (12, 15) in order to determine the clamping of said cylindrical pivot (16) with respect to said second hinge element (15) during the normal functioning of the hinge (10) and to avoid further rotations of said bushing (17) with respect to said first hinge element (12) or to said central hinge element (13).
6. Hinge as in claim 5, **characterized in that** said pivot (16), in correspondence of its second end, is provided with an axial interface (33) by means of which said pivot (16) is rotatable by means of a corresponding traditional tool.

