

(19)



(11)

**EP 2 390 446 A1**

(12)

**EUROPEAN PATENT APPLICATION**

(43) Date of publication:  
**30.11.2011 Bulletin 2011/48**

(51) Int Cl.:  
**E05D 3/18 (2006.01) E05D 7/04 (2006.01)**

(21) Application number: **11168127.6**

(22) Date of filing: **30.05.2011**

(84) Designated Contracting States:  
**AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR**  
Designated Extension States:  
**BA ME**

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(30) Priority: **31.05.2010 IT UD20100108**

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(54) **Retractable hinge for doors, windows or furniture**

(57) Retractable hinge for doors, windows, or furniture, having a movable structure (12), articulated with respect to a fixed structure (13), comprising a first hinging unit (16) and a second hinging unit (17), one able to be associated with said movable structure (12) and the other with said fixed structure (13), or vice versa, and an articulation member (20) able to articulate said two hinging units (16 and 17) with respect to each other and allow their reciprocal rotation around a central axis (Z), first adjustment means (70) able to adjust the reciprocal axial position, parallel to said central axis (Z), of said first hinging unit (16) with respect to said second hinging unit (17), and second adjustment means (80) able to adjust the longitudinal position of at least one of said hinging units (16, 17) with respect to said articulation member (20), along a longitudinal axis (X) perpendicular to said central axis (Z), and third adjustment means (76, 77) able to adjust the transverse position of said articulation member (20) with respect to one of said hinging units (17), along a transverse axis (Y) perpendicular both to said central axis (Z) and to said longitudinal axis (X) The retractable hinge also comprises fourth adjustment means (88, 89) able to also adjust the transverse position of said articulation member (20) with respect to the other one of said hinging units (16), along said transverse axis (Y)

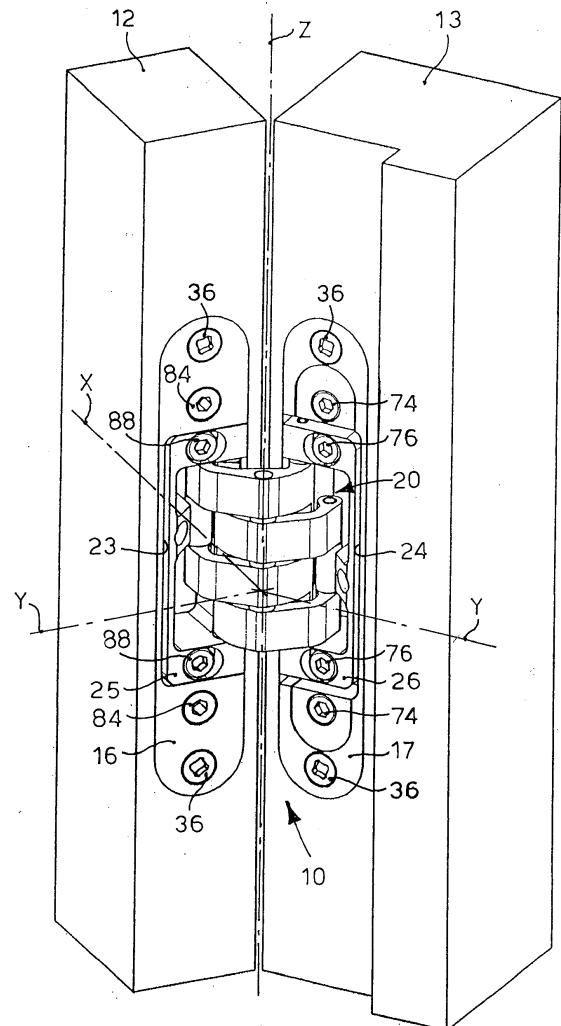


fig. 1

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## Description

### FIELD OF THE INVENTION

**[0001]** The present invention concerns a hinge of the so-called retractable type, used for doors, windows and furniture, which comprises two hinging units, articulated with respect to each other by means of a central articulation member, one able to be inserted in a seating of a fixed structure, such as for example a frame of the door, window or piece of furniture, and the other able to be inserted in a seating of a corresponding movable structure, such as for example a door, a window, a shutter or a panel of a door, window or piece of furniture. The hinge allows the movable structure to be opened by 180° with respect to the fixed structure, and is able to be completely inserted into the respective structures, fixed and movable, when the latter is in the closed position.

### BACKGROUND OF THE INVENTION

**[0002]** In the field of doors, windows and furniture, retractable hinges are known, that is, the type that, in the closed position, all the elements of which they consist are completely inserted inside the door, window or piece of furniture on which they are applied, so that they are not visible.

**[0003]** In particular, a retractable hinge is known which comprises two hinging bodies, suitable to be associated with the fixed and movable parts of the door or window, and a central articulation member, connected to the hinging bodies so as to allow them to rotate reciprocally by about 180° around a central axis. The articulation member comprises two distinct pivoting elements, different from each other and each inserted in a corresponding cavity made on each of the two hinging bodies. The position of one of the pivoting elements with respect to the corresponding hinging body is adjustable in a longitudinal direction by means of a threaded grub screw. A first pair of longitudinal guides is present to guide the pivoting element precisely and allow it to be displaced only in said longitudinal direction. The position of the other pivoting element is adjustable, with respect to the corresponding hinging body, in a transverse direction, by means of a cam. A second pair of longitudinal guides is present to guide the other pivoting element precisely and allow it to be displaced only in said transverse direction. The articulation member also comprises two curved arms, different from each other, each pivoted on one of the two pivoting elements and having a central pin in common, on which articulation occurs. In particular, the segments of the two curved arms are different from each other, which go from the central pin to the point where they are pivoted on the corresponding pivoting element. By means of another threaded grub screw it is possible to adjust the distance between the two curved arms, in a vertical direction.

**[0004]** This known hinge has the disadvantage that all

the essential elements of which it consists, like the two pivoting elements and the two curved arms of the articulation member, are different from each other, and therefore they are more expensive to make and more complicated to assemble.

**[0005]** Another disadvantage of this known hinge is the limited number of adjustments possible: in fact, the two pairs of guides, one longitudinal and the other transverse, allow only one adjustment in a longitudinal direction, that is, the adjustment of one of the two pivoting elements, and only one adjustment in a transverse direction, that is, the adjustment of the other of the two pivoting elements.

**[0006]** Another disadvantage of the known hinge is that in order to carry out the three adjustments, two different tools are required.

**[0007]** EP-A-1780357 discloses a retractable hinge which also comprises two hinging bodies, suitable to be associated with the fixed and movable parts of the door or window, and a central articulation member, connected to the hinging bodies. In this hinge a pair of adjustment mandrels are provided, which allow to adjust the depth of the articulation member with respect to one of the two hinging bodies, and a pair of adjustment screws, which are inserted with ample play in corresponding ovalized holes made in the other of the two hinging bodies and which allow to adjust simultaneously both the height and also the lateral position of the articulation member with respect to the corresponding hinging body. This known hinge has the disadvantage that at least two adjustments must be made using the same adjustment screws, and therefore the adjustments are difficult to obtain with great accuracy.

**[0008]** JP-A-2002-121955 discloses another retractable hinge, similar to the previous ones, in which toothed guide elements are provided on each pivoting element to define a plurality of grooves, which on one face are disposed parallel to the longitudinal pivoting axis and on the other face are disposed perpendicular to the pivoting axis, so as to allow a reciprocal sliding with other corresponding grooves, both longitudinally and transversely, so as to adjust both the height and also the lateral position of each pivoting element. This known hinge also has the disadvantage that the same adjustment screw is used to make two different adjustments, and therefore the adjustments are difficult to obtain with great accuracy. Furthermore, this known hinge does not provide any possibility of adjusting the depth of the pivoting elements with respect to the hinging units.

**[0009]** DE-B3-102004054708 discloses another retractable hinge in which the articulation member, which acts as an articulated connection between the two hinging bodies, has a rounded shape, like a horseshoe. This known hinge has the disadvantage that it is complex and above all very bulky.

**[0010]** One purpose of the present invention is to achieve a retractable hinge to articulate a movable structure with respect to a fixed structure, which allows to ef-

fect, autonomously one with respect to the other, different adjustments on each of the two pivoting elements.

**[0011]** Another purpose of the present invention is to achieve a retractable hinge in which adjustments can be made not only in the three Cartesian directions but also on the parallelism or on the convergence or divergence of the pivoting elements with respect to the bodies in which they are inserted.

**[0012]** Another purpose of the present invention is to achieve a retractable hinge in which the elements of which it consists are identical to each other, as much as is possible, so as to render the hinge in its entirety less costly and easier to assemble.

**[0013]** The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain these and other purposes and advantages.

### SUMMARY OF THE INVENTION

**[0014]** The present invention is set forth and characterized in the independent claim, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

**[0015]** In accordance with the above purposes, a retractable hinge according to the present invention comprises a first hinging unit and a second hinging unit, one able to be associated to the movable structure and the other to the fixed structure of a door or window or piece of furniture or vice versa, and an articulation member, able to articulate the two hinging units with respect to each other so as to allow a reciprocal rotation thereof, for example by 180°, around a central axis (Z). First adjustment means are provided to adjust the reciprocal axial position, parallel to the central axis (Z), of the first hinging unit with respect to the second hinging unit. Second adjustment means are provided to adjust the longitudinal position of at least one of the two hinging units with respect to the articulation member, along a longitudinal axis (X) perpendicular to the central axis (Z), and third adjustment means are provided to adjust the transverse position of the articulation member with respect to one of the hinging units along a transverse axis (Y) perpendicular both to the central axis (Z) and also to the longitudinal axis (X).

**[0016]** According to a characteristic feature of the present invention, the retractable hinge also comprises fourth adjustment means, able to adjust the transverse position of the articulation member with respect to the other hinging unit along the transverse axis (Y).

**[0017]** According to another characteristic feature of the present invention, with the four adjustment means it is possible to adjust not only the reciprocal position of the articulation member with respect to the two hinging units along the three Cartesian axes (X, Y and Z), but also to adjust the inclination of the hinging units both frontally and laterally, so as to obtain the desired parallelism, or a possible convergence or divergence, of the individual

parts, depending on the specific assembly requirements of the door or window or piece of furniture.

**[0018]** More specifically, the articulation member comprises two pivoting elements able to be inserted slidingly, one in the first and the other in the second hinging unit. According to another characteristic feature of the present invention, the two pivoting elements are structurally identical to each other, and are assembled in the two hinging units rotated by 180° one with respect to the other.

**[0019]** According to another characteristic feature of the present invention, the articulation member also comprises two comb elements, structurally identical to each other, but assembled on the two pivoting elements rotated by 180° with respect to each other and interconnected with each other. In this case, each of the two comb elements comprises a lateral stem, parallel to the central axis (Z), pivoted on one of the pivoting elements and from which two curved arms branch off cantilevered, both perpendicular to the lateral stem and each having a through hole coaxial to the central axis (Z), in which a central pin is inserted, common to both the comb elements.

**[0020]** According to another characteristic feature of the present invention, each of the two lateral stems is rotatable on a lateral pin disposed in a corresponding pivoting element, parallel to the central axis, and each of the two curved arms comprises a first segment with an equal length, comprised between the through hole and the corresponding lateral pin.

**[0021]** In this case, the first adjustment means comprise two first guide blocks, disposed in one of the hinging units and inserted with play in corresponding slits of one of the pivoting elements. Furthermore, the first guide blocks are each provided with an eyelet inside which a first adjustment screw is inserted, with ample play.

**[0022]** The second adjustment means comprise two second guide blocks, disposed with ample play in the other hinging unit, and two second adjustment screws each cooperating with one of the second guide blocks in order to move it autonomously along the longitudinal axis (X).

**[0023]** The third adjustment means comprise two third adjustment screws, each through, with ample play, in a first pair of transverse eyelets of the second pivoting element and screwed onto the first guide blocks.

**[0024]** The fourth adjustment means comprise two fourth adjustment screws, each through, with ample play, in a second pair of transverse eyelets of the first pivoting element and screwed onto the second guide blocks.

**[0025]** According to another characteristic feature of the present invention, the guide blocks are all identical.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0026]** 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 a three-dimensional view of a retractable hinge according to the present invention to articulate a panel with respect to a fixed frame, in a partly open position;
- fig. 2 is a plane view of the hinge in fig. 1, in a closed position;
- fig. 3 is a plane view of the hinge in fig. 1, in a completely open position;
- fig. 4 is a front view of the hinge in fig. 1, in a completely open position;
- fig. 5 is a section from V to V of fig. 4;
- fig. 6 is a section from VI to VI of fig. 4;
- fig. 7 is a section from VII to VII of fig. 4;
- fig. 8 is a section from VIII to VIII of fig. 4;
- fig. 9 is a section from IX to IX of fig. 4;
- fig. 10 is an exploded view of the hinge in fig. 1.

**[0027]** To facilitate comprehension, the same reference numbers have been used, where possible, to identify identical common elements in the drawings. It is understood that elements and characteristics of one form of embodiment can conveniently be incorporated into other forms of embodiment without further clarifications.

#### DETAILED DESCRIPTION OF A PREFERENTIAL FORM OF

#### EMBODIMENT

**[0028]** With reference to fig. 1, a hinge 10 of the retractable type, according to the present invention is used to articulate a movable structure 12, for example the panel of a door or window or piece of furniture, with respect to a fixed structure 13, for example the frame of the door or window or piece of furniture, between a first position (fig. 2), in which the movable structure 12 is closed with respect to the fixed structure 13, and a second position (figs. 1 and 3) in which the movable structure 12 is open with respect to the fixed structure 13. In the position of maximum opening (fig. 3), the movable structure 12 is rotated by 180° with respect to when it is in its closed position (fig. 2). Furthermore, in this last position, the hinge 10 is completely inside the structures 12 and 13 and therefore is not visible.

**[0029]** The hinge 10 comprises a first hinging unit 16, able to be inserted in a hollow seating 18 (figs. 2 and 3) of the movable structure 12, and a second hinging unit 17 able to be inserted in a hollow seating 19 of the fixed structure 13.

**[0030]** The hinge 10 also comprises an articulation member 20 (figs. 1 to 4 and 7 to 10) connected to the two hinging units 16 and 17 in order to articulate them and allow a reciprocal rotation of 180° around a central axis Z (figs. 1 and 4).

**[0031]** Each hinging unit 16 and 17 comprises a body 21 (figs. 4 and 10), respectively 22, for example made of metal, provided with a cavity 23, respectively 24, inside which is inserted, with play and slidingly, a first pivoting

element 25, respectively a second pivoting element 26 of the articulation member 20. In particular, the height of the cavity 24 is greater than that of the cavity 23.

**[0032]** Each body 21 and 22 is provided with an upper fin 31, respectively 32, and a lower fin 33, respectively 34, provided with flared holes 35 in which screws 36 (fig. 1) are able to be disposed in order to attach the bodies 21 and 22 to the structures 12 and 13.

**[0033]** The two pivoting elements 25 and 26 (figs. 4 and 10) of the articulation member 20 are identical to each other and each comprise a block, for example metal, provided with an internal cavity 41, respectively 42, in which a lateral pin 43 is disposed (figs. 4, 7, 8 and 9), respectively 44, parallel to the central axis Z.

**[0034]** The first pivoting element 25 can slide in the cavity 23 of the body 21 both along a longitudinal axis X (figs. 1 and 5), perpendicular to the central axis Z, and also along a transverse axis Y (figs. 1 and 4), perpendicular to the central axis Z and to the longitudinal axis X, as will be described in more detail hereafter.

**[0035]** The second pivoting element 26 slides in the cavity 24 of the body 22 both along the central axis Z, and also along the transverse axis Y, as will be described in more detail hereafter.

**[0036]** Each of the two pivoting elements 25 and 26 is provided with an adjustment hole 45 (fig. 4), through which it is possible to insert a tool to move the pivoting element 25 or 26 along the transverse axis Y with respect to the body 21, respectively 22.

**[0037]** As well as the two pivoting elements 25 and 26, the articulation member 20 also comprises two comb elements 51 and 52 (figs. 4 and 10), identical to each other, which each comprise a lateral stem 53, respectively 54, parallel to the central axis Z and pivoted on the lateral pin 43, respectively 44, of the pivoting element 25, respectively 26. From each lateral stem 53 and 54 two curved arms 55, respectively 56, branch off, cantilevered and perpendicular thereto, each one having a through hole 57 respectively 58, coaxial to the central axis Z, in which a central pin 59 (fig. 4) is inserted, common to the two comb elements 51 and 52.

**[0038]** Each of the two comb elements 51 and 52 also comprises a roller 61, respectively 62, mounted at the end of the two curved arms 55, respectively 56, parallel to the central axis Z and sliding in a corresponding longitudinal seating 66 (figs. 7 to 9), respectively 65, made in the internal cavity 42, respectively 41, of the corresponding pivoting element 26 and 25.

**[0039]** Each curved arm 55 and 56 comprises a first segment 55a (fig. 7), respectively 56a, comprised between the through hole 57, respectively 58, in which the central pin 59, and the lateral pin 43, respectively 44, is inserted, and having a determinate distance d, which is the same for all four arms 55 and 56.

**[0040]** The two internal cavities 41 and 42 of the pivoting elements 25 and 26 are able to completely accommodate the two comb elements 51 and 52 when the hinge 10 is in the closed position (fig. 2).

**[0041]** The hinge 10 also comprises first adjustment means 70 (figs. 6 and 10), which allow to adjust the reciprocal axial position, parallel to the central axis Z, of the first hinging unit 16 with respect to the second hinging unit 17. The first adjustment means 70 comprise two guide blocks 71, one disposed in the upper part 26a and the other in the lower part 26b of the cavity 24 of the body 22 and inserted with play in two corresponding slits 72 of the second pivoting element 26. The two guide blocks 71 are each provided with an eyelet 75 and are held in the two parts 26a and 26b of the cavity 24 by two closing elements 73 and by two corresponding adjustment screws 74, but can slide with respect to the cavity 24 thanks to the ample play, in the range of several millimeters, between the eyelet 75 and the adjustment screw 74.

**[0042]** We must point out that, while the height of the cavity 23 is substantially the same as that of the first pivoting element 25, the height of the cavity 24 is greater, by some millimeters, for example 4 to 8, than the height of the second pivoting element 26, and therefore the latter and hence the whole articulation member 20 can slide with respect to the second hinging unit 17, parallel to the central axis Z.

**[0043]** The second pivoting element 26 is clamped in the desired position with respect to the body 22 of the second hinging unit 17 by means of two adjustment screws 76, each passing through a pair of transverse eyelets 77 of the pivoting element 26 and screwed onto the corresponding guide block 71. The amplitude of the transverse eyelets 77, some millimeters greater than the diameter of the adjustment screws 76, allows to adjust the second pivoting element 26 along the transverse axis Y with respect to the second hinging unit 17.

**[0044]** The hinge 10 also comprises second adjustment means 80 (figs. 5 and 10), which allow to adjust the longitudinal position of the first pivoting element 25, and hence of the whole articulation member 20, with respect to the first hinging unit 16 along the longitudinal axis X. The second adjustment means 80 comprise two guide blocks 81, one disposed in the upper part and the other in the lower part of the cavity 23 of the body 21. The two guide blocks 81 are housed with ample play, in the range of several millimeters, for example 4 to 8, in two slits of the cavity 23. Two adjustment screws 84 are freely rotatable in corresponding longitudinal holes 85 of the body 21 and are held in a longitudinal position by two transverse pegs 86. The two adjustment screws 84 are screwed into two corresponding threaded holes 87 each made on a guide block 81.

**[0045]** The two guide blocks 81 are also inserted with play into two corresponding slits 82 of the first pivoting element 25. The latter is held constrained to the two guide blocks 81 by means of two adjustment screws 88, each passing through a pair of transverse eyelets 89, made in correspondence with the slits 82 of the pivoting element 25 and screwed onto the corresponding guide block 81.

**[0046]** In this way, by turning the two adjustment

screws 84 clockwise or anticlockwise, it is possible to move the first pivoting element 25 along the longitudinal axis X, and hence the whole articulation member 20, with respect to the first hinging unit 16. Furthermore, by adjusting autonomously each of the two adjustment screws 84 (fig. 5), it is also possible to incline frontally the first pivoting element 25, and hence the whole articulation member 20 and the associated second hinging unit 17, with respect to the first hinging unit 16, so as to align it or incline it by some degrees in one direction or the other.

**[0047]** Furthermore, the amplitude of the transverse eyelets 89, some millimeters greater than the diameter of the adjustment screws 88, allows to adjust the first pivoting element along the transverse axis Y with respect to the first hinging unit 16.

**[0048]** In addition, thanks to the ample play between the transverse eyelets 77 and 89 with respect to the corresponding adjustment screws 76 and 88, it is also possible to adjust the parallelism of the two hinging units 16 and 17 (fig. 4) with respect to the central axis Z, and/or their possible convergence or divergence.

**[0049]** The hinge 10 as described heretofore is assembled and functions as follows.

**[0050]** First of all the articulation member 20 is assembled, by pivoting the comb elements 51 and 52 in the lateral pins 43, respectively 44, of the two pivoting elements 25 and 26.

**[0051]** Then the guide blocks 71 and 81 are disposed in the upper and lower parts of the cavities 23, respectively 24, of the bodies 21 and 22, and the adjustment screws 74 are inserted, without tightening them, and the adjustment screws 84, clamping the latter longitudinally by means of the transverse pegs 86.

**[0052]** Then the two pivoting elements 25 and 26 are disposed in the cavities 23, respectively 24, of the bodies 21 and 22, making sure that the guide blocks 71 and 81 are inserted into the corresponding slits 72 and 82. Then the adjustment screws 76 and 88 are screwed into the transverse eyelets 77, respectively 89.

**[0053]** The hinge 10 thus assembled is then mounted in the structures 12 and 13, inserting the bodies 21 and 22 of the two hinging units 16 and 17 into the corresponding hollow seatings 18 and 19. The two hinging units 16 and 17 are then attached to the respective structures 12 and 13 by means of the screws 36.

**[0054]** Then the various adjustment are made to the parts of the hinge 10 along the axes X, Y and Z so as to modify, according to the requirements of the individual application, the position of one hinging unit 16 with respect to the other 17 and consequently the position of the movable structure 12 with respect to the fixed structure 13.

**[0055]** By means of the adjustment screws 74, and thanks to the ample play between them and the eyelets 75 (figs. 4 and 6) of the blocks 71, the position is thus adjusted along the central axis Z of the articulation member 20 with respect to the second hinging unit 17. In other words, by means of the adjustment screws 74 it is pos-

sible to adjust the vertical position of the movable structure 12 (fig. 1) with respect to the fixed structure 13.

**[0056]** By means of the adjustment screws 84, which are able to move each of the two guide blocks 81 in a longitudinal direction and autonomously, the position is adjusted along the longitudinal axis X of the first pivoting element 25, and hence of the whole articulation member 20, with respect to the first hinging unit 16. In other words, by means of the adjustment screws 84 it is possible to adjust the front position, in the closed position, of the movable structure 12 (fig. 2) with respect to the fixed structure 13.

**[0057]** Furthermore, operating autonomously on each of the two adjustment screws 84, it is also possible to correct the front parallelism of the movable structure 12 and the fixed structure 13, inclining the first pivoting element 25 (fig. 5) to a greater or lesser extent with respect to the corresponding body 21 of the first hinging unit 16.

**[0058]** By means of the adjustment screws 76 and 88 (fig. 4) and thanks to the ample play between them and the transverse eyelets 77, respectively 79, of the blocks 71 and 81, the position is adjusted along the transverse axis Y of each of the two pivoting elements 25 and 26 with respect to the corresponding hinging unit 16 and 17. In other words, by means of the adjustment screws 76 and 88 it is possible to adjust the horizontal or lateral position of the movable structure 12 (figs. 3 and 4) with respect to the fixed structure 13, operating both on the first pivoting element 25 and on the second pivoting element 26, and on both. Furthermore, by means of the adjustment screws 76 and 88, it is also possible to adjust the lateral parallelism, that is, with respect to the central axis Z, or the convergence or divergence from this of the movable structure 12, in the open position, with respect to the fixed structure 13.

**[0059]** From the foregoing description it is clear that the hinge 10 is provided with adjustment means that are simple, reliable and easy to use, which allow to adjust the position of the two hinging units 16 and 17 with respect to each other, with respect to the articulation member 20, both in a vertical direction (axis Z), in a front direction (axis X), in a horizontal or lateral direction (axis Y), with possible inclinations in a front direction (with respect to axis X) and/or in a convergent or divergent direction (with respect to axis Z).

**[0060]** It is understood 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.

**[0061]** It is also clear that, although the present invention has been described with reference to some specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of retractable hinge for doors, windows or furniture, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

## Claims

1. Retractable hinge for doors, windows, or furniture, having a movable structure (12), articulated with respect to a fixed structure (13), comprising a first hinging unit (16) and a second hinging unit (17), one able to be associated with said movable structure (12) and the other with said fixed structure (13), or vice versa, and an articulation member (20) able to articulate said two hinging units (16 and 17) with respect to each other and allow their reciprocal rotation around a central axis (Z), first adjustment means (70) able to adjust the reciprocal axial position, parallel to said central axis (Z), of said first hinging unit (16) with respect to said second hinging unit (17), second adjustment means (80) able to adjust the longitudinal position of at least one of said hinging units (16, 17) with respect to said articulation member (20), along a longitudinal axis (X) perpendicular to said central axis (Z), and third adjustment means (76, 77) able to adjust the transverse position of said articulation member (20) with respect to one of said hinging units (17), along a transverse axis (Y) perpendicular both to said central axis (Z) and to said longitudinal axis (X), **characterized in that** it also comprises fourth adjustment means (88, 89) able to also adjust the transverse position of said articulation member (20) with respect to the other one of said hinging units (16), along said transverse axis (Y), and **in that** said first, second, third and fourth adjustment means (70; 80; 76, 77; 88, 89) are autonomous and independent with respect to each other, so that each of said four adjustments is suitable to be carried out independently from the other three adjustments.
2. Retractable hinge as in claim 1, **characterized in that** said first adjustment means comprise at least a first adjustment screw (74), that said second adjustment means comprise at least a second adjustment screw (84), that said third adjustment means comprise at least a third adjustment screw (76) and that said fourth adjustment means comprise at least a fourth adjustment screw (88).
3. Retractable hinge as in claim 1 or 2, **characterized in that** said first adjustment means comprise a first pair of adjustment screws (74), that said second adjustment means comprise a second pair of adjustment screws (84), that said third adjustment means comprise a third pair of adjustment screws (76) and that said fourth adjustment means comprise a fourth pair of adjustment screws (88).
4. Retractable hinge as in claim 3, **characterized in that** two of said pairs of adjustment screws (84, 88) are associated with said first hinging unit (16) and that another two of said pairs of adjustment screws (84, 88) are associated with said second hinging unit

- (17).
5. Retractable hinge as in any claim hereinbefore, **characterized in that** said articulation member (20) comprises a first pivoting element (25) able to be inserted in sliding manner in said first hinging unit (16), and a second pivoting element (26), substantially equal to said first pivoting element (25) and able to be inserted in sliding manner in said second hinging unit (17). 5
6. Retractable hinge as in claim 5, **characterized in that** said articulation member (20) further comprises two comb elements (51, 52), substantially equal to each other and inter-laced. 10
7. Retractable hinge as in claim 6, **characterized in that** each of said two comb elements (51, 52) comprises a lateral stem (53, 54) parallel to said central axis (Z), pivoted on one of said pivoting elements (25 or 26) and from which two curved arms (55, 56) branch off, both perpendicular to said lateral stem (53, 54) and each having a through hole (57, 58) coaxial to said central axis (Z), into which a first pin (59) is inserted, common to said two comb elements (51, 52). 15 20 25
8. Retractable hinge as in claim 7, **characterized in that** each of said two comb elements (51, 52) comprises a roll (61, 62) mounted at the end of said two curved arms (55, 56), parallel to said central axis (Z) and sliding in a corresponding seating (65, 66) made in a corresponding one of said pivoting elements (25, 26). 30 35
9. Retractable hinge as in claim 7 or 8, **characterized in that** each of said two lateral stems (53, 54) is rotatable on a lateral pin (43, 44) disposed in a corresponding one of said pivoting elements (25, 26), parallel to said central axis (Z), and that each of said curved arms (55, 56) comprises a first segment (55a, 56a) of equal length, comprised between said through hole (57, 58) and said lateral pin (43, 44). 40
10. Retractable hinge as in any claim from 5 to 9, **characterized in that** said first adjustment means (70) comprise two first guide blocks (71), disposed in one of said hinging units (17) and inserted with play in corresponding slits (72) of one of said pivoting elements (26), each one of said first guide blocks (71) being provided with an eyelet (75) inside which said first adjustment screw (74) is inserted with ample play. 45 50
11. Retractable hinge as in claim 10, **characterized in that** said second adjustment means (80) comprise two second guide blocks (81) disposed, with ample play, in the other of said hinging units (16), and that each of said second adjustment screws (84) cooperates with one of said second guide blocks (81) so as to move said second guide block autonomously along said longitudinal axis (X). 55
12. Retractable hinge as in claim 10 or 11, **characterized in that** each of said third adjustment screws (76) is disposed through, with ample play, in a corresponding first transverse eyelet (77) of said second pivoting element (26), and is screwed onto a corresponding one of said first guide blocks (71).
13. Retractable hinge as in claim 11 or 12, **characterized in that** each of said fourth adjustment screws (88), is disposed through, with ample play, in a corresponding second transverse eyelet (89) of said first pivoting element (26), and is screwed onto a corresponding one of said second guide blocks (81).
14. Retractable hinge as in claims 10 and 11, **characterized in that** said first and second guide blocks (71, 81) are equal to each other.

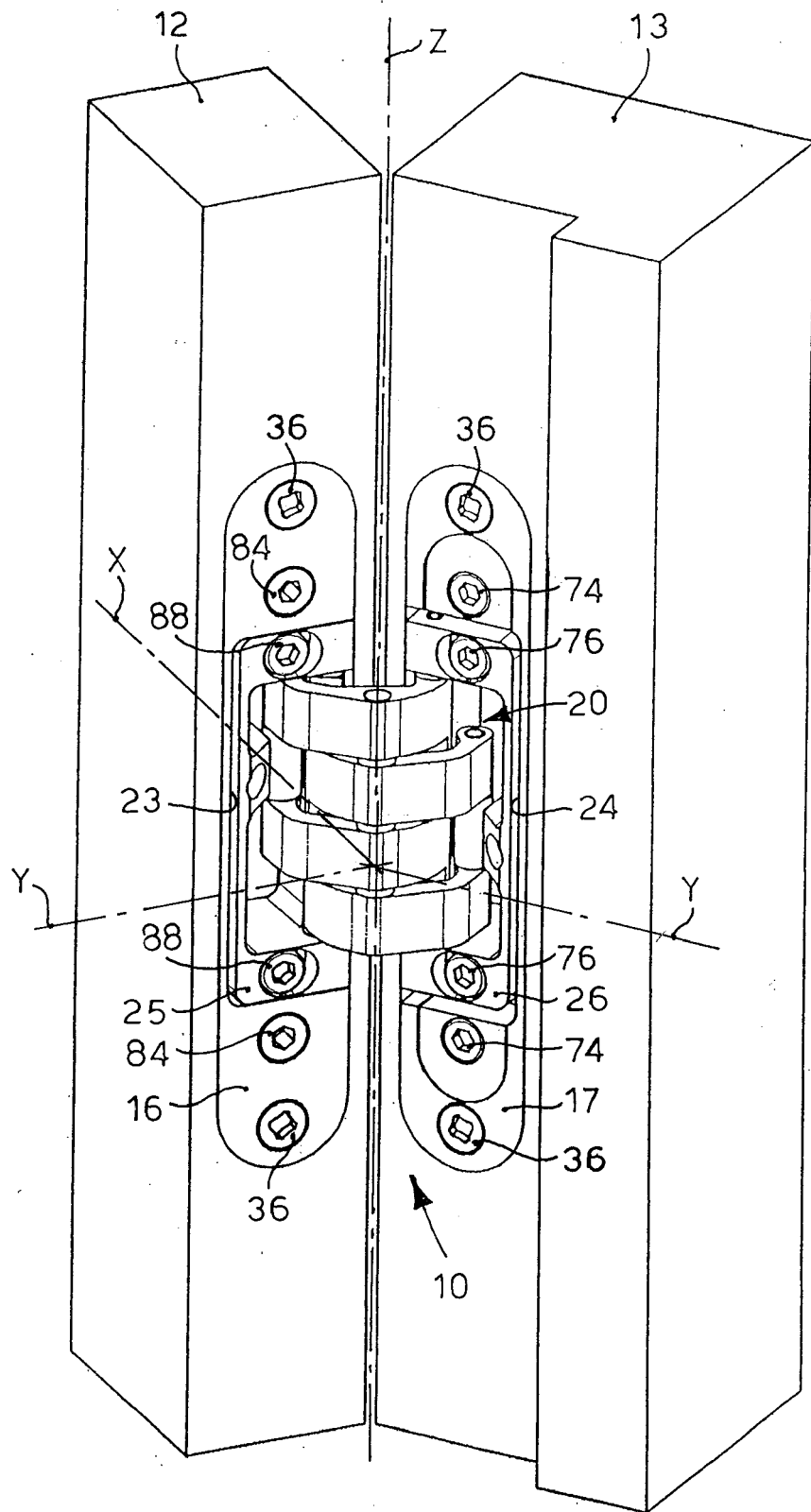


fig. 1



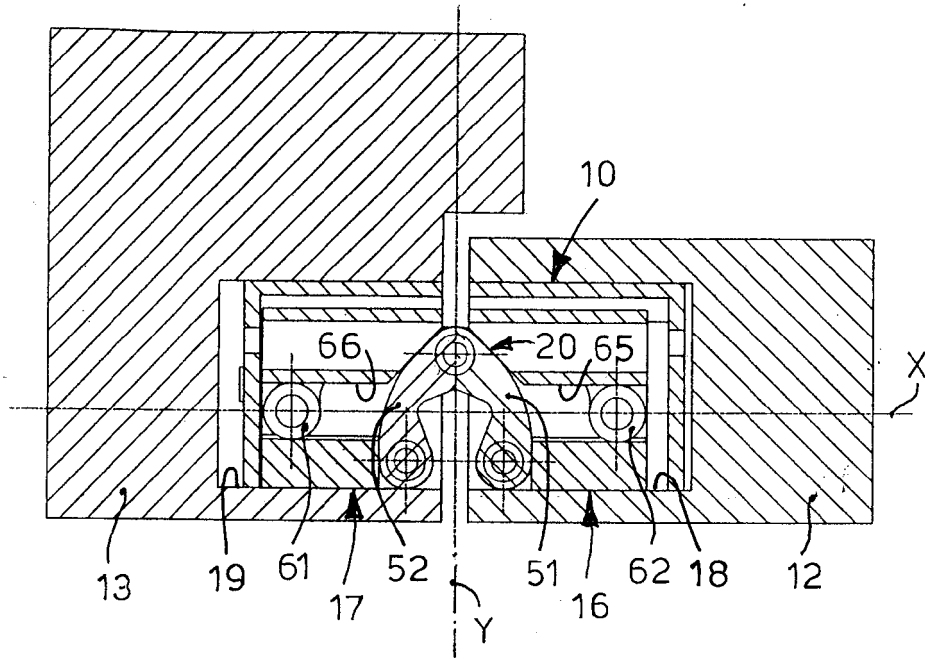


fig. 2

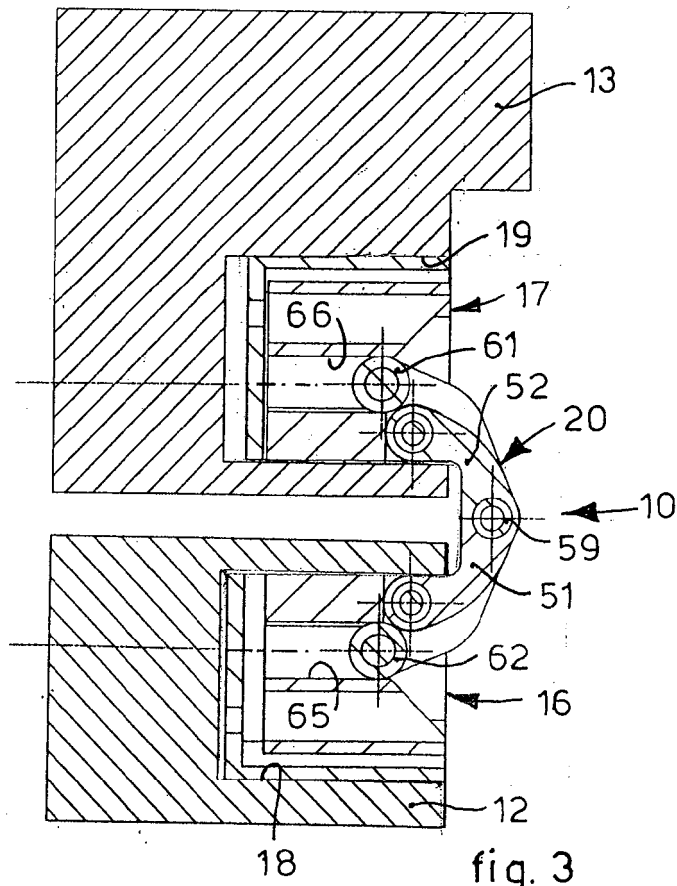


fig. 3

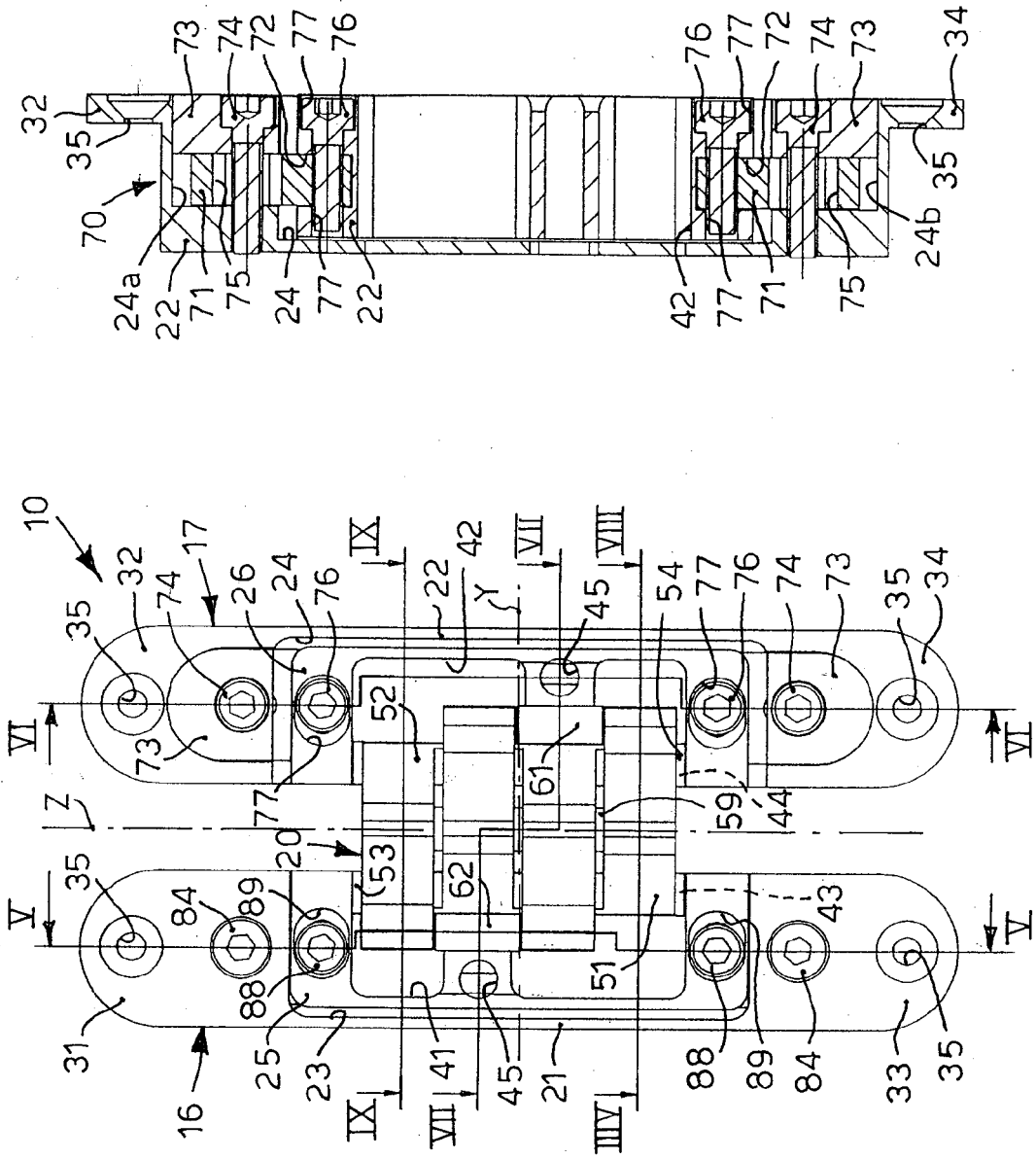


fig. 4

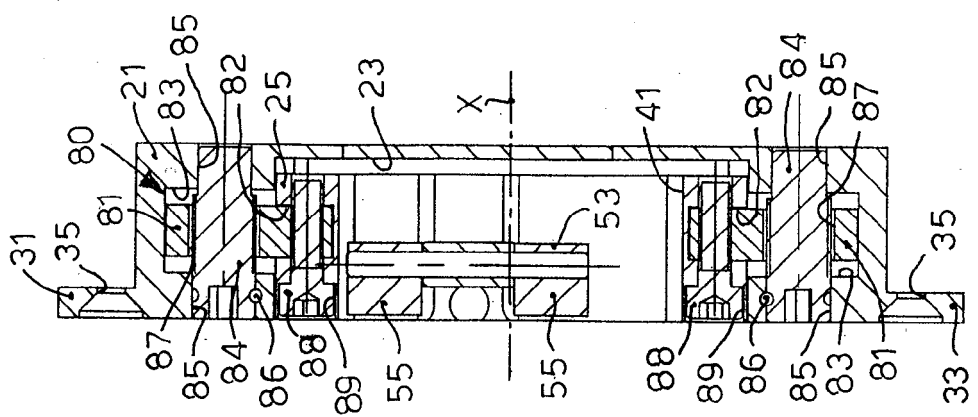


fig. 5

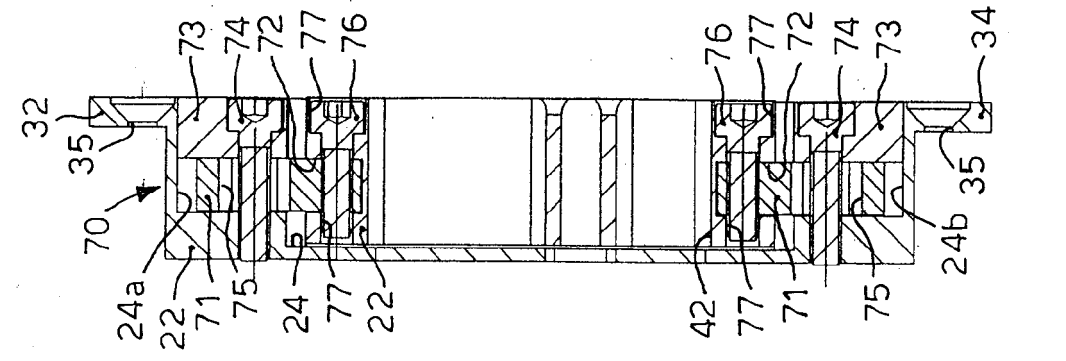


fig. 6

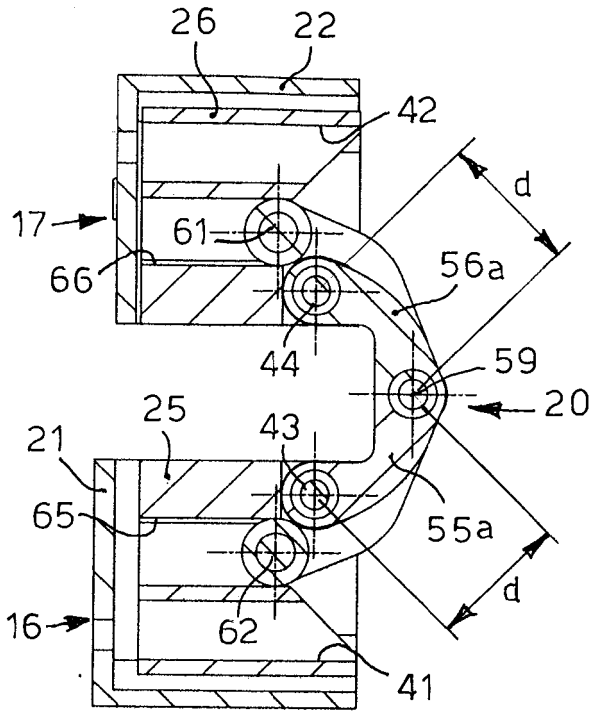


fig. 7

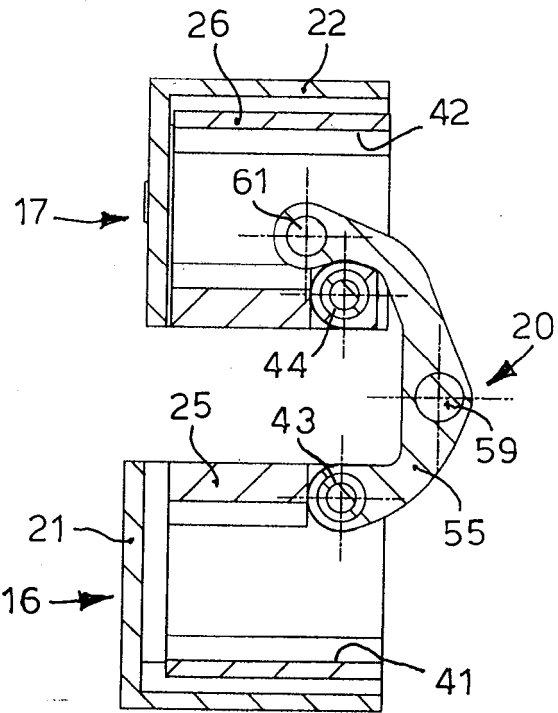


fig. 8

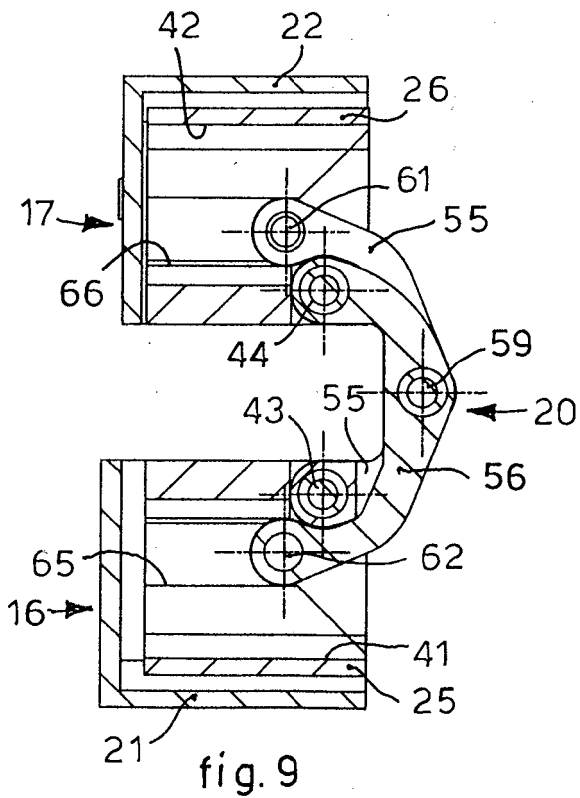


fig. 9

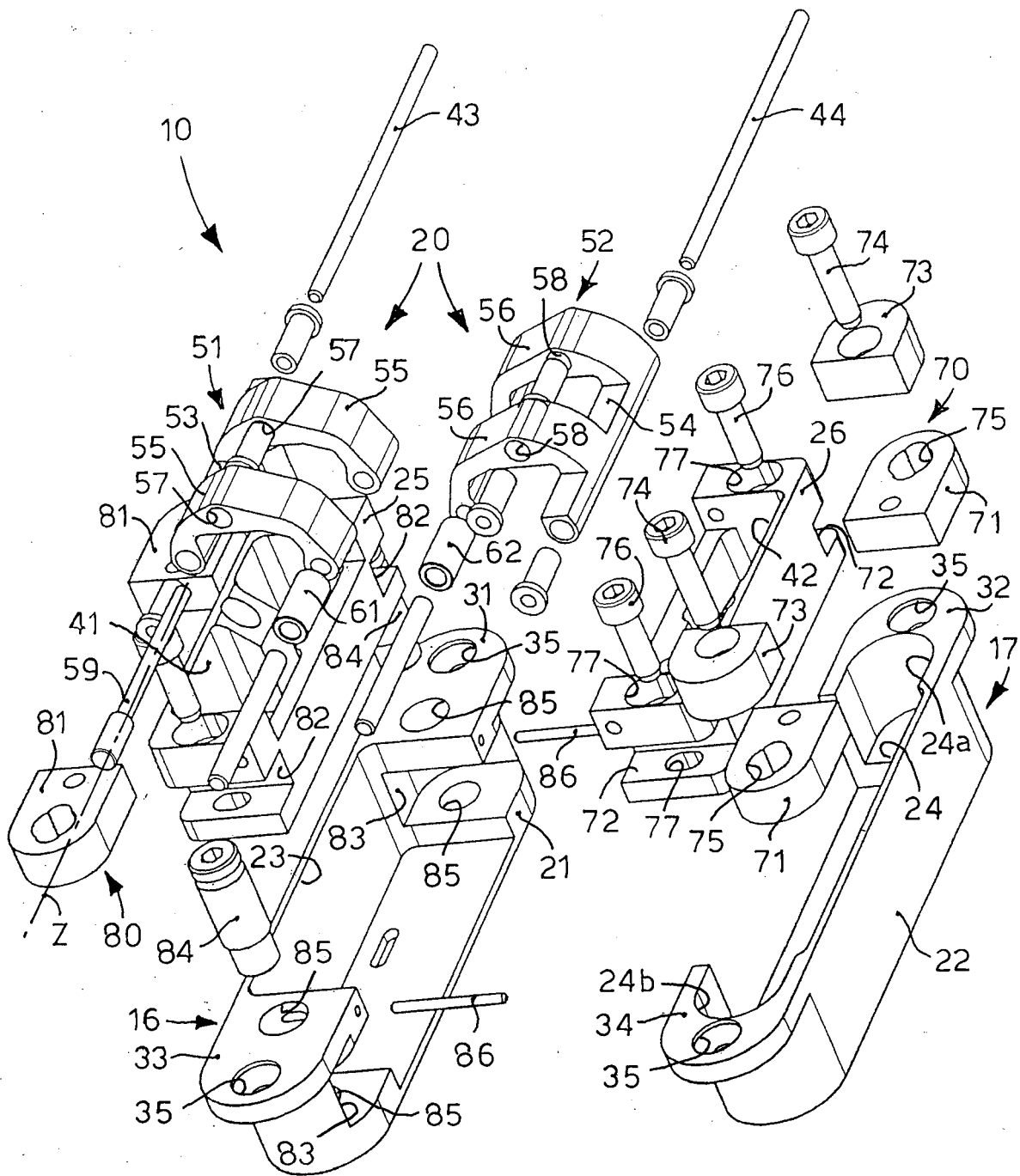


fig. 10



EUROPEAN SEARCH REPORT

Application Number  
EP 11 16 8127

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			E05D
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 13 July 2011	Examiner Wagner, Andrea
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	

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