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(54) **CONCEALED HINGE FOR FURNITURE DOORS AND DOORS**

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## Description

**[0001]** The invention relates to a concealed hinge for furniture doors and doors and windows; it finds application in the field of furnishings as well as interior and exterior doors.

## Scope and prior art

**[0002]** In prior art hinges are known that allow the opening and closing of furniture doors and hinges for the opening and closing of doors and therefore within the scope of the technical sector of doors and windows.

**[0003]** The technical field of interest in the present invention concerns in particular concealed hinges, which allow the furniture door or the door to be opened up to an angle of approximately 180° in relation to an angle of 0° when the door is closed in relation to the jamb or upright of the door frame.

**[0004]** In prior art, the hinges for the door sector and particularly of furniture comprise two bodies, one fastened to the jamb and one to the door leaf, said bodies joined together by one or more connecting arms.

**[0005]** In the technical sector of concealed hinges, hinges are also known that are fitted with means of adjustment along the three Cartesian axes as described for example in EP2110502 (Ceam), in EP2390446 (Otlav) or in DE10239446 (Simonswerk), for the purpose of allowing - once mounted on the door and on the jamb - small adjustments to allow optimal opening of the door, without the possibility of interference with the structure of the actual furniture.

**[0006]** Further to the aim of providing support for the door and simultaneously guaranteeing a smooth swivelling movement of the same in opening and closing, at the same time combining the aesthetic factor with the purpose of limiting the overall size of the actual hinge inside the furniture to a minimum, mechanisms have been actuated, the so-called concealed hinges, that is, hinges whose parts are recessed into the furniture frame and the furniture door or the door and the jamb, there being - in this specific prior art - only portions of the arms connecting the two bodies of the same hinge protruding beyond the outer edge of the door or the jamb.

**[0007]** The known concealed hinges generally have one body recessed on the flat of the jamb, that is at right angles to the main face of the actual jamb, while the other body is recessed onto the door edge, that is, on the surface which represents the thickness of the actual door.

**[0008]** Concealed hinges called offset hinges are also known, which are applicable in installations where in the closed hinge position the recessed bodies of the actual hinge are not aligned. Such a type of hinge is described in DE102011000150 (Simonswerk) where in fact an offset hinge is described, not adjustable along any of the Cartesian axes and which has guide paths inside the actual hinge along which the pins of the articulating arms slide, said paths whose characteristic is that they are not

parallel to any reference axis and in certain cases are in the shape of an arch, thereby allowing, according to the drafter, the dimensions of one of the two fastening elements of an offset hinge to be reduced, in particular the dimensions of the element that is intended to be fastened to the jamb.

**[0009]** A hinge is also known that is described in EP1754848 (Simonswerk), which does not allow optimal adjustments and moreover not along all the Cartesian axes and which presents guide paths fully curved in an "S" shape as indicated in paragraph 21 of the text of the same patent.

## Drawbacks and problems of the known art

**[0010]** In the technical sector of concealed hinges, prior art presents a series of drawbacks and technical problems that the present invention intends solving.

**[0011]** A first technical problem is represented by the fact that the current concealed hinges, that is, in EP2110502 (Ceam), in EP2390446 (Otlav) or in DE10239446 (Simonswerk), due to the way they are structured, require that the slots in which both hinge bodies will be housed, must necessarily be made at a limited distance from the outer edge of the jamb or the door leaf, this distance, which is designated by Q 5 in Fig. 9, generally being around 4 mm. This technical necessity stems from the need to combine a smooth and non-interfering movement of the door with the reduced gap between leaf and jamb during closing and opening, said gap being enforced by dimensional factors of the hinge itself.

**[0012]** This circumstance is often remedied by the technician resorting to increasing the thickness between the external wall of the recess slot and the outer edge of the jamb or door, being obliged, however, to bevel and/or radius the sharp edges of the external side face of the jamb and the door to avoid interference between door and jamb during operation, this being a circumstance, however, that reduces the strength of said bevelled and/or radiused edges, making it possible for there to be breakages or chipping of the material of which the actual furniture is made.

**[0013]** The hinge forming the subject matter of the present patent resolves the aforementioned problem of breakages/deformation, thanks to the innovative internal conformation requiring housing slots at a greater distance from the surface of the door or of the jamb, and therefore allowing the dimension Q 5 indicated in Fig. 9 to be increased. Whereas in other cases architrave panels are installed as indicated in DE102011000150 (Simonswerk) to offset the installation of the element flush with the jamb, being obliged to create an offset hinge.

**[0014]** Also with regard to the guide paths described in the hinge forming the subject matter of patent DE102011000150 (Simonswerk), in the opinion of the drafter, since for their whole length they must necessarily have a certain inclination in relation to the Cartesian axes of reference, whether the path made in the element ap-

plied onto the door or the one made in the element applied onto the jamb and again, whether in the 45° version or the arched version, they do not have a straight portion of path parallel to any axis of reference and in particular provide for the initial portion of the guide path nearest the bottom of the housing element of the frame (6) to be totally curved - being a portion of arch - and even more so for it not to be parallel to the Y axis of reference indicated in patent DE102011000150 (Simonswerk). It is also pointed out that the excessive inclination of the guide path of the jamb in both versions illustrated in patent DE102011000150 (Simonswerk) in which the initial and final position in any case are located along a line at almost 45° does not allow the depth of the element that is installed on the jamb to be reduced, at variance with the latest demands of the furniture industry.

**[0015]** A further problem of known prior art also concerns the application of concealed hinges to plasterboard or dry walls; insistence on having such reduced thickness of the material enclosing the hinge slot results in it being exposed to breakages, even immediately upon mounting the hinges or to wear from the very first use.

**[0016]** Lastly, another problem of known prior art lies in the fact that the depth of the hinge body which must be accommodated in the jamb is too great for it to be mounted on jambs of limited thickness, since the path of the ends of the arms, which slide in suitable guides made in the hinge bodies, must have dimensions that cannot be avoided in order to guarantee 180° opening of the same hinge.

**[0017]** A similar circumstance as described in the preceding paragraph also concerns the width of the bodies of current hinges.

### Summary of the invention

**[0018]** The present invention relates to a concealed hinge for mounting between furniture doors and jambs and windows and doors, comprising two fixed bodies, the first for inserting into a slot in the door and the second for inserting into a slot in the jamb. The two bodies are connected together by two arms rotating around a common pin, the first arm with one end pivoted into the first body and the other end guided in a path made inside the second body. The second arm has one end pivoted into the second body and the other end guided in a path made inside the first body.

**[0019]** At least one of said guide paths is not straight, so that, thanks to the studied innovative conformation, an unprecedented reduction in size of the bodies making up the hinge is possible.

**[0020]** More specifically, housing slots can be shallower, thereby avoiding time-consuming adaptations during mounting, and less wide, avoiding having to weaken the door and the jamb excessively in the hinge areas, and also ensuring a greater distance from the outer edge of both door and jamb (see dimension Q5 in figure 2 and figure 8 and 9), which prior art shows as the critical area

in the use of this type of hinge.

### Objects of the invention

**[0021]** A first object of the present invention is to make a concealed hinge for furniture doors and/or doors, which due to its technical characteristics is able to be installed in a slot made in the door and in the jamb and that said slot is made with an external wall - the thickness of which is shown in figures 2 and 8 and 9 by the dimension Q5 - a thickness that is greater than the state required by known hinges of prior art, although maintaining a reduced gap between door and jamb in operating conditions of full opening and closing of the hinge.

**[0022]** A second object of the present invention is to make a concealed hinge for furniture doors and/or doors characterised in that it reduces the dimensions, particularly the width and depth, of the bodies of the same hinge that will be recessed in the jamb and the door, without prejudice to the performance in terms of strength, duration and therefore reliability and smoothness of movement of the same hinge, or to the stability of the hinge in the stage of complete closure of the same.

**[0023]** Lastly, another object of the present invention is to make a concealed hinge for economical furniture doors and/or doors and which provides an alternative to prior art.

### Drawings

**[0024]** The following drawings are given purely by way of non-exhaustive detailed illustration:

- figure 1: three-dimensional view of the hinge according to the invention in its first embodiment
- figure 2: section of the hinge mounted on a door and a jamb in the fully closed position in its first embodiment
- figure 3: three-dimensional view of the hinge according to the invention in its second embodiment
- figure 4: three-dimensional exploded view of the hinge according to the invention of its second embodiment
- figure 5: three-dimensional view of the second adjustable body (8)
- figure 6: front view of the second adjustable body (8) with A-A section indicated
- figure 7: A-A section of the second adjustable body (8)
- figure 8: section of the hinge in its second embodiment mounted on a door and a jamb in the fully closed position
- figure 9: section of the door - hinge - jamb system with the innovative path 83, the core of the patent, highlighted, as well as the critical thickness Q 5 between the slot and the outer surface of the door or jamb, area of frequent breakages/deformation.

### Description of the preferred embodiments

**[0025]** With particular reference to the detailed but non-exhaustive figures given, the present invention relates to a concealed hinge (100) for furniture doors and/or doors.

**[0026]** By way of example, with particular reference to figure 2, a system of reference X, Y, Z is used. Where axis of reference Z is the axis vertical and parallel to the axis of rotation of the door (200) in relation to the jamb (300), therefore the vertical axis around which 2 arms are hinged and rotate and which connect the 2 bodies making up the hinge, while axis of reference X is the axis which identifies the full depth of the two bodies (1,2) of the hinge in closed position, as well as the slots that will house said bodies (1,2) on the jamb (300) and on the door (200), axis parallel to the dimension designated with Q 1 in Fig. 9, and lastly axis of reference Y is the one which completes the indicated Cartesian group of three (cf. fig. 2).

**[0027]** The concealed hinge (100) in the embodiment shown in figures 1 and 2 has a first body (1) destined to be housed in a special slot made in the edge of door (200), that is, on the smaller surface of the door (200) as indicated in figure 2, and a second body (2) destined to be housed in a special slot made on the flat of the jamb (300), that is, on the larger internal surface of the jamb (300) as shown in figure 2.

**[0028]** The first body (1) has a pair of slotted housings (12) projecting from the opposite side faces (13) of the first body (1); said slotted housings (12) lie along the axis of reference Z and allow the movement and the adjustment of the hinge (100) along the axis of reference Z fastening it with conventional screws.

**[0029]** The first body (1) also has holes (37) aligned with each other along the direction of the axis of reference Z designed to receive a pin (5a) designed to pivot the end of a first arm (6) which connects the first body (1) to the second body (2) with a pivot-sliding movement.

**[0030]** The first body (1) has a pair of equal and opposite first guides (36) running straight and parallel to the axis of reference X with particular reference to figure 2; a pair of opposite teeth (71), made at the free end of the second arm (7), are obliged to slide inside said opposite first guides (36) from a fully open position of the hinge (100), in which the teeth (71) are placed in a position at the top of the opposite first guides (36) in relation to the increasing direction of the axis of reference X, to a fully closed position of the hinge (100) in which the teeth (71) are placed in the exact opposite position in relation to the increasing direction of the axis of reference X of the opposite first guides (36), and therefore in the exact opposite position compared to that of the fully open position of the hinge (100).

**[0031]** The second body (2) also has holes (82) aligned with each other along the direction of the axis of reference Z designed to receive a second pin (5b) designed to pivot the end of a second arm (7) which connects the second body (2) to the first body (1) with a pivot-sliding movement

(1).

**[0032]** The first arm (6) is also pivoted to the second arm (7) through another pin (51) and a bearing (52), said pin (51) parallel to the axis of reference Z and which allows the relative rotation between the two arms (6,7).

**[0033]** The second body (2) has a pair of opposite second guides (83); a pair of opposite teeth (61) of the first arm (6) are obliged to slide inside said opposite second guides (83) from a fully open position of the hinge (100), in which the teeth (61) are placed in a position at the top in relation to the increasing direction of the axis of reference X of the opposite second guides (83), to a fully closed position of the hinge (100).

**[0034]** With particular reference to figure 2 the opposite second guides (83) consist of a curving path comprising a first straight portion parallel to the X axis, said first straight portion near the bottom of the second body (2), and comprising a curved intermediate portion similar to an open letter C adjacent to the first straight portion and adequately connected thereto. Said intermediate portion deviates from the ideal line joining the exact opposite positions of the curving path inside the second guides (83). In the embodiment the path of each of the second guides (83) is curved, that is, it comprises curved and straight portions, and the curved intermediate portion is made with concavity facing the decreasing direction of the axis of reference Y (cf. figure 2 and figure 8 and 9).

**[0035]** All the positions taken by the teeth (61) when they travel along the second guides (83) recreate a gradual curved geometry and not a broken line, this being a condition which guarantees the smooth movement of the hinge (100) in all its operating stages.

**[0036]** The curving line of the path of the second guides (83) can differ in reference to the initial and final positions, but always has a more or less pronounced deviation of the intermediate position from the ideal line joining the initial and final position, thereby making it possible to change - in particular reducing - the dimension, designated by Q1 in figure 2 and figure 8 and 9 of the second body (2), so as to adapt it to the door or jamb in which it will be installed and at the same time making it possible to increase the dimension Q5 of figure 2 and figure 8 and 9, that is, the external wall of the recess slot for the hinge (100) on the door (200) and on the jamb (300), therefore reinforcing the critical points against possible deterioration of the material.

**[0037]** In a second embodiment shown in figures 3, 4, 5, 6, 7, 8, the invention provides that the concealed hinge (100) has a first body (1) comprising a first cup (10) and an adjustable first body (3), said first cup (10) intended to be housed in a special slot made in the door edge (200), that is, on the smaller surface of the door (200) as shown in figure 8, and a second body (2) comprising a second cup (20) and an adjustable second body (8), said second cup (20) intended to be housed in a special slot made in the flat of the jamb (300), that is, on the larger internal surface of jamb (300) as shown in figure 8.

**[0038]** The first cup (10) has a pair of slotted housings

(12) projecting from the opposite side faces (13) of the first cup (10); said slotted housings (12) lie along the axis of reference Z and permit the movement and adjustment of the hinge (100) along the axis of reference Z fastening it with conventional screws.

**[0039]** Inside the first cup (10) in the relative housing is inserted an adjustable first body (3) with two crests (31) projecting from the opposite side faces (33) which lie along the direction of the axis of reference X and which are designed to slide along the direction of the axis of reference X inside joined seats (11), this sliding allowing the adjustment of the installed hinge along the axis of reference X, with particular reference to figure 8.

**[0040]** The adjustable first body (3) also has a flared hole (32) designed to accommodate a screw (4) whose vertical movement in relation to the adjustable first body (3) along the axis of reference X is prevented by a pair of pins (53) inserted parallel to the Y axis in the relative holes (34) made on the side surface (35) of the adjustable first body (3), said pins (53) designed to hold back the head (41) of the screw (4) from possible movements along the axis of reference X in relation to the adjustable first body (3). Fully aligned with the axis of reference X in relation to the hole (34,) a threaded hole is made on the cup (10) into which the screw (4) is screwed, the degree of tightening of which guarantees the adjustment of the depth of the adjustable first body (3) inside the first cup (10), therefore allowing the adjustment of the hinge (100) along the X axis.

**[0041]** The adjustable first body (3) has a pair of equal and opposite first guides (36) running straight and parallel to the axis of reference X; a pair of opposite teeth (71), made at the free end of the second arm (7), are obliged to slide inside said opposite first guides (36) from a fully open position of the hinge (100), in which the teeth (71) are placed in a position at the top of the opposite first guides (36) in relation to the increasing direction of the axis of reference X, to a fully closed position of the hinge (100) in which the teeth (71) are placed in the exact opposite position in relation to the increasing direction of the axis of reference X of the opposite first guides (36), and therefore in the exact opposite position compared to that of the fully open position of the hinge (100).

**[0042]** The adjustable first body (3) also has holes (37) aligned with each other along the direction of the axis of reference Z designed to receive a pin (5a) designed to pivot the end of a first arm (6) which connects the adjustable first body (3) to the adjustable second body (8), accommodated inside the relative housing in the second cup (20), with a pivot-sliding movement.

**[0043]** The adjustable second body (8) has a pair of slotted housing (81) parallel to the axis of reference Y, made on the opposite faces (84) of the adjustable second body (8) inside each of which is inserted a screw (42) and a washer (43), each said screw (42) is screwed into a threaded hole not shown in the figures and made on second cup (20). By loosening the screws (42) the adjustable second body (8) is released from the second cup

(20) allowing the position of the adjustable second body (8) to change in relation to the second cup (20) along the axis of reference Y within a certain range defined by the shape of the slotted housings (81) which move parallel to the axis of reference Y inside seats (22) made inside the second cup (20).

**[0044]** The adjustable second body (8) also has holes (82) aligned with each other along the direction of the axis of reference Z designed to receive a second pin (5b) designed to pivot the end of a second arm (7) which connects the adjustable second body (8) to the first body (3), accommodated inside the relative housing in the first cup (10), with a travel-sliding movement.

**[0045]** The first arm (6) is also pivoted to the second arm (7) through another pin (51) and a bearing (52), said pin (51) parallel to the axis of reference Z and which allows the relative rotation between the two arms (6,7).

**[0046]** The adjustable second body (8) has a pair of opposite second guides (83); a pair of opposite teeth (61) of the first arm (6) are obliged to slide inside said opposite second guides (83) from a fully open position of the hinge (100), in which the teeth (61) are placed in a position at the top in relation to the increasing direction of the axis of reference X of the opposite second guides (83), to a fully closed position of the hinge (100) in which the teeth (61) are placed in the exact opposite position in relation to the increasing direction of the axis of reference X of the opposite second guides (83).

**[0047]** With particular reference to figure 5 the opposite second guides (83) consist of a curving path comprising a first straight portion parallel to the X axis, said first straight portion near the bottom of the adjustable second body (8), and comprising a curved intermediate portion similar to an open letter C adjacent to the first straight portion and adequately connected to it, in which said intermediate portion deviates from the ideal line joining the exact opposite positions of the curved section inside the second guides (83). In the embodiment the path of each of the second guides (83) is curved, that is, it comprises curved and straight portions, and the curved intermediate portion is made with concavity facing the decreasing direction of the axis of reference Y (cf. figure 2 and figure 8).

**[0048]** All the positions taken by the teeth (61) when they travel along the second guides (83) recreate a gradual curved geometry and not a broken line, this being a condition which guarantees the smooth movement of the hinge (100) in all its operating stages.

**[0049]** The curving line of the path of the second guides (83) can differ in reference to the initial and final positions, but always has a more or less pronounced deviation of the intermediate position from the ideal line joining the initial and final position, thereby making it possible to change - in particular reducing - the dimension, designated by Q1 in figure 2 and figure 8 and 9 of the second body (2), so as to adapt it to the door or jamb in which it will be installed and at the same time making it possible to increase the dimension Q5 of figure 2 and figure 8 and 9, that is, the thickness of the external wall of the instal-

lation slot of both bodies (1, 2) of the actual hinge, therefore reinforcing the critical points against possible deterioration of the material with which they are made.

**[0050]** In a third embodiment the invention provides that a circular housing is made on the adjustable second body (8) to accommodate a cam (9) with a tooth (91) designed to engage with a longitudinal seat parallel to the axis of reference Y and made on the bottom of the second cup (20), this being a condition which would allow the position of the adjustable second body (8) to be adjusted in the direction of the axis of reference Y in relation to the second cup (20), by turning the cam (9) once the screws have been loosened.

**[0051]** In a fourth embodiment also the first guides (36) present the same curving path of the second guides (83) described in the first embodiment, that is, in a further embodiment both the first guides (36) and the second guides (83) have the same curving path as the second guides (83) described in the first and second embodiment, therefore reducing the dimension both of the first body (1) and of the second body (2).

**[0052]** The concealed hinge forming the subject matter of the invention is therefore made according to all that is described in the appended claims.

## Claims

### 1. Concealed hinge for furniture doors and doors and windows comprising:

- a first body (1, 10, 3) applicable to a door (200)
- a second body (2, 3) applicable to a jamb (300)
- the first body (1, 10, 3) receives a pin (5) for pivoting a first end of a first arm (6), the second end of which has teeth (61) engaged in a path defined by each of the second guides (83) made inside a second body (2, 20, 8)
- the second body (2, 20, 8) receives a second pin (5) for pivoting a first end of a second arm (7), the second end of which has teeth (71) engaged in a path defined by each of the first guides (36) made inside said first body (1, 10, 3),
- said first arm (6) being pivoted to the second arm (7) through a pin (51) parallel to the axis of reference Z that is parallel to the axis of rotation of the door in relation to the jamb

#### characterised in that

the path defined by the second guides (83) comprises:

- a straight first portion parallel to the X axis, that identifies the full depth of the second body (2), said straight first portion being near the bottom of the second body (2, 20, 8),
- a curved intermediate portion adjacent to the first straight portion and adequately connected

to it, in which said intermediate portion deviates from the ideal line joining the exact opposite positions of the curving path inside the second guides (83) and in which said curved intermediate portion is made with concavity facing a decreasing direction of the axis of reference Y completing the Cartesian group of said X and Z axes, said decreasing direction of the axis of reference Y being opposite to the one for the opening of said door

- a straight final portion that is parallel to the X axis, adjacent to the curved intermediate portion and adequately connected to it, said straight final portion being near the top of the second body (2, 20, 8).

### 2. Concealed hinge according to claim 1 WHEREIN:

- the first body (1) comprises a first cup (10) and an adjustable first body (3) that is housed in said first cup (10), said adjustable first body (3) has said first guides (36) and receives said first pin (5),
- the second body (2) comprises a second cup (20) and an adjustable second body (8) that is housed in said second cup (20), said adjustable second body (8) has said second guides (83) and receives said second pin (5),

### 3. Concealed hinge according to claim 2 WHEREIN, when the door is closed, the first guides (36) are straight and parallel to the axis of reference X.

### 4. Concealed hinge according to one of the foregoing claims **CHARACTERISED IN THAT** it comprises means of adjustment of the position of the hinge along the axis of reference Z, said means consisting of a pair of slotted housings (12) parallel to the axis of reference Z and projecting from the opposite side faces (13) of the first body (1).

### 5. Concealed hinge according to either of claims 3 and 4 WHEREIN the adjustable first body (3) comprises a pair of crests (31) parallel to the axis of reference X and projecting from the opposite side faces (33) of the adjustable first body (3) and sliding inside corresponding joined seats (11) made inside the first cup (10).

### 6. Concealed hinge according to claim 5 WHEREIN the adjustable first body (3) comprises a flared hole (32) designed to house a screw (4) whose movement in relation to the adjustable first body (3) along the axis of reference X is prevented by a pair of pins (53) inserted parallel to the Y axis in relative holes (34) made in the side surface (35) of the adjustable first body (3), said pins (53) designed to hold back the head (41) of the screw (4) from possible movements

along the axis of reference X in relation to the adjustable first body (3), said screw (4) the degree of tightening of which inside a convenient threaded hole made on the first cup (10), guarantees the adjustment of the depth of the adjustable first body (3) inside the first cup (10) and consequently the adjustment of the hinge (100) along the axis of reference X.

7. Concealed hinge according to any of claims 4, 5, 6 WHEREIN the adjustable second body (8) has a pair of slotted housings (81) parallel to the axis of reference Y, made on the opposite faces (84) of the adjustable second body (8) inside each of which is inserted a screw (42) each designed to be screwed into a convenient threaded hole made in the second cup (20), said slotted housings (81) which move parallel to the axis of reference Y inside the convenient housings (22) made inside the second cup (20), guaranteeing the adjustment of the relative deviation of the adjustable second body (8) inside the second cup (20) and consequently the adjustment of the hinge (100) along the axis of reference Y.
8. Concealed hinge according to claim 7 WHEREIN the adjustable second body (8) has a circular housing to accommodate a cam (9) with one tooth (91) designed to engage with a longitudinal seat parallel to the axis of reference Y and made on the bottom of the second cup (20).
9. Concealed hinge according to claim 8 WHEREIN the adjustable second body (8) has a pair of slotted housings (81) parallel to the axis of reference Y, made on the opposite faces (84) of the adjustable second body (8) inside each of which is inserted a screw (42) and a washer (43), each said screw (42) screwed into a threaded hole made on the second cup (20).
10. Concealed hinge according to any one of claims 2, 4, 5, 6, 7, 8, 9 WHEREIN both the path defined by the first guides (36) and the path defined by the second guides (83) comprises a first straight portion parallel to the X axis, said straight first portion near the bottom of the adjustable second body (8) or of the adjustable first body (3) respectively, and comprising a curved intermediate portion adjacent to each straight first portion and adequately connected to it, in which said intermediate portion deviates from the ideal line joining the exact opposite positions of the curving path inside the second guides (83), said curved intermediate position made with concavity facing the decreasing direction of the axis of reference Y.

## Patentansprüche

1. Verborgenes Scharnier für Möbeltüren und Türen

und Fenster, umfassend - einen ersten Körper (1, 10, 3), der an einer Tür (200) anbringbar ist,

- einen zweiten Körper (2, 3), der an einem Pfosten (300) anbringbar ist,
- wobei der erste Körper (1, 10, 3) einen Stift (5) zum Schwenken eines ersten Endes eines ersten Arms (6) aufnimmt, dessen zweites Ende Zähne (61) aufweist, die in einen Pfad eingreifen, der durch jede der zweiten Führungen (83) definiert ist, die innerhalb eines zweiten Körpers (2, 20, 8) ausgebildet sind,
- wobei der zweite Körper (2, 20, 8) einen zweiten Stift (5) zum Schwenken eines ersten Endes eines zweiten Arms (7) aufnimmt, dessen zweites Ende Zähne (71) aufweist, die in einen Pfad eingreifen, der durch jede der ersten Führungen (36) definiert ist, die innerhalb des ersten Körpers (1, 10, 3) ausgebildet sind,
- wobei der erste Arm (6) über einen Stift (51) parallel zu der Referenzachse Z, welche parallel ist zu der Drehachse der Tür in Bezug zu dem Pfosten zu dem zweiten Arm (7) geschwenkt wird,

**dadurch gekennzeichnet, dass** der Pfad, der durch die zweiten Führungen (83) definiert ist, umfasst:

- einen geraden ersten Abschnitt parallel zu der X-Achse, welcher die Gesamttiefe des zweiten Körpers (2) definiert, wobei der gerade erste Abschnitt sich in der Nähe der Unterseite des zweiten Körpers (2, 20, 8) befindet,
- einen gekrümmten Zwischenabschnitt neben dem ersten geraden Abschnitt und geeignet damit verbunden, wobei der Zwischenabschnitt von der idealen Linie, die die exakt gegenüberliegenden Positionen des gekrümmten Pfades verbindet, innerhalb der zweiten Führungen (83) abweicht, und wobei der gekrümmte Zwischenabschnitt mit einer Wölbung ausgebildet ist, die einer abnehmenden Richtung der Referenzachse Y gegenübersteht, welche die kartesische Gruppe der X- und Z-Achsen vervollständigt, wobei die abnehmende Richtung der Referenzachse Y derjenigen zum Öffnen der Tür entgegengesetzt ist,
- einen geraden Endabschnitt, welcher parallel zu der X-Achse ist, neben dem gekrümmten Zwischenabschnitt und geeignet damit verbunden, wobei sich der gerade Endabschnitt in der Nähe der Oberseite des zweiten Körpers (2, 20, 8) befindet.

2. Verborgenes Scharnier nach Anspruch 1, wobei:

- der erste Körper (1) eine erste Manschette (10)

- und einen einstellbaren ersten Körper (3) umfasst, welcher in der ersten Manschette (10) aufgenommen ist, wobei der einstellbare erste Körper (3) die ersten Führungen (36) aufweist und den ersten Stift (5) aufnimmt, 5
- der zweite Körper (2) eine zweite Manschette (20) und einen einstellbaren zweiten Körper (8) umfasst, welcher in der zweiten Manschette (20) aufgenommen ist, wobei der einstellbare zweite Körper (8) die zweiten Führungen (83) aufweist und den zweiten Stift (5) aufnimmt. 10
3. Verborgenes Scharnier nach Anspruch 2, wobei sich dann, wenn die Tür geschlossen ist, die ersten Führungen (36) gerade und parallel zu der Referenzachse X befinden. 15
4. Verborgenes Scharnier nach einem der vorhergehenden Ansprüche, **dadurch gekennzeichnet, dass** es Einstellmittel für die Position des Scharniers entlang der Referenzachse Z umfasst, wobei die Mittel aus einem Paar von gezahnten Aufnahmen (12) parallel zu der Referenzachse Z bestehen und aus gegenüberliegenden Seitenflächen (13) des ersten Körpers (1) vorstehen. 20 25
5. Verborgenes Scharnier nach einem der Ansprüche 3 und 4, wobei der einstellbare erste Körper (3) ein Paar von Kuppen (31) parallel zu der Referenzachse X umfasst, die aus den gegenüberliegenden Seitenflächen (33) des einstellbaren ersten Körpers (3) vorstehen und innerhalb entsprechender verbundener Sitze (11) gleiten, die innerhalb der ersten Manschette (10) ausgebildet sind. 30
6. Verborgenes Scharnier nach Anspruch 5, wobei der einstellbare erste Körper (3) ein gebördeltes Loch (32) aufweist, das ausgelegt ist, eine Schraube (4) aufzunehmen, deren Bewegung in Bezug auf den einstellbaren ersten Körper (3) entlang der Referenzachse X durch ein Paar von Stiften (53) verhindert wird, die parallel zu der Y-Achse in jeweilige Löcher (34) eingeführt sind, die in der Seitenfläche (35) des einstellbaren ersten Körpers (3) ausgebildet sind, wobei die Stifte (53) ausgelegt sind, den Kopf (41) der Schraube (4) vor möglichen Bewegungen entlang der Referenzachse X in Bezug auf den einstellbaren ersten Körper (3) zurückzuhalten, wobei der Grad des Anziehens der Schraube (4) innerhalb eines geeigneten Gewindelochs, das an der ersten Manschette (10) ausgebildet ist, die Einstellung der Tiefe des einstellbaren ersten Körpers (3) innerhalb der ersten Manschette (10) und folglich die Einstellung des Scharniers (100) entlang der Referenzachse X sicherstellt. 35 40 45 50 55
7. Verborgenes Scharnier nach einem der Ansprüche 4, 5, 6, wobei der einstellbare zweite Körper (8) ein Paar von gezahnten Aufnahmen (81) parallel zu der Referenzachse Y aufweist, welche an gegenüberliegenden Flächen (84) des einstellbaren zweiten Körpers (8) ausgebildet sind, in welche jeweils eine Schraube (42) eingeführt ist, die jeweils ausgelegt ist, in ein geeignetes Gewindeloch geschraubt zu werden, das in der zweiten Manschette (20) ausgebildet ist, wobei die gezahnten Aufnahmen (81), die sich parallel zu der Referenzachse Y innerhalb der geeigneten Eingebungen (22) bewegen, die innerhalb der zweiten Manschette (20) ausgebildet sind, die Einstellung der relativen Abweichung des einstellbaren zweiten Körpers (8) innerhalb der zweiten Manschette (20) und folglich die Einstellung des Scharniers (100) entlang der Referenzachse Y sicherstellen.
8. Verborgenes Scharnier nach Anspruch 7, wobei der einstellbare zweite Körper (8) eine kreisförmige Aufnahme aufweist, um einen Nocken (9) mit einem Zahn (91) aufzunehmen, der ausgelegt ist, mit einem longitudinalen Sitz parallel zu der Referenzachse Y einzugreifen und an der Unterseite der zweiten Manschette (20) ausgebildet ist.
9. Verborgenes Scharnier nach Anspruch 8, wobei der einstellbare zweite Körper (8) ein Paar von gezahnten Aufnahmen (81) parallel zu der Referenzachse Y aufweist, die an gegenüberliegenden Flächen (84) des einstellbaren zweiten Körpers (8) ausgebildet sind, in welche jeweils eine Schraube (42) und eine Scheibe (43) eingeführt sind, wobei die Schraube (42) jeweils in ein Gewindeloch eingeschraubt ist, das an der zweiten Manschette (20) ausgebildet ist.
10. Verborgenes Scharnier nach einem der Ansprüche 2, 4, 5, 6, 7, 8, 9, wobei sowohl der Pfad, der durch die ersten Führungen (36) definiert ist, als auch der Pfad, der durch die zweiten Führungen (83) definiert ist, einen ersten geraden Abschnitt parallel zu der X-Achse umfasst, wobei sich der gerade erste Abschnitt jeweils in der Nähe der Unterseite des einstellbaren zweiten Körpers (8) oder des einstellbaren ersten Körpers (3) befindet und einen gekrümmten Zwischenabschnitt neben jedem geraden ersten Abschnitt umfasst und geeignet damit verbunden ist, wobei der Zwischenabschnitt von der idealen Linie, die die exakt gegenüberliegenden Positionen des gekrümmten Pfads verbindet, innerhalb der zweiten Führungen (83) abweicht, wobei der gekrümmte Zwischenabschnitt mit einer Wölbung ausgebildet ist, die der abnehmenden Richtung der Referenzachse Y gegenübersteht.

## Revendications

1. Charnière dissimulée pour portes de meuble, portes



et fenêtres comprenant :

- un premier corps (1, 10, 3) applicable à une porte (200)
- un second corps (2, 3) applicable à un montant (300) 5
- le premier corps (1, 10, 3) reçoit un pivot (5) servant à faire pivoter une première extrémité d'un premier bras (6), dont la seconde extrémité comprend des dents (61) engagées dans un chemin défini par chacun des seconds guides (83) formés à l'intérieur d'un second corps (2, 20, 8) 10
- le second corps (2, 20, 8) reçoit un second pivot (5) servant à faire pivoter une première extrémité d'un second bras (7), dont la seconde extrémité comprend des dents (71) engagées dans un chemin défini par chacun des premiers guides (36) formés à l'intérieur dudit premier corps (1, 10, 3), 15
- ledit premier bras (6) étant pivoté par rapport au second bras (7) à travers un pivot (51) parallèle à l'axe de référence Z qui est parallèle à l'axe de rotation de la porte par rapport au montant. 20

**caractérisée en ce que** le chemin défini par les seconds guides (83) comprend :

- une première partie droite parallèle à l'axe X, qui identifie la profondeur totale du second corps (2), ladite première partie droite étant proche de la partie inférieure du second corps (2, 20, 8), 30
- une partie intermédiaire incurvée adjacente à la première partie droite et convenablement reliée à cette dernière, dans laquelle ladite partie intermédiaire s'écarte de la ligne idéale reliant les positions opposées exactes du chemin incurvé à l'intérieur des seconds guides (83) et dans laquelle la concavité de ladite partie intermédiaire incurvée est orientée dans un sens décroissant de l'axe de référence Y complétant le groupe cartésien desdits axes X et Z, ledit sens décroissant de l'axe de référence Y étant opposé à celui de l'ouverture de ladite porte 35
- une partie finale droite qui est parallèle à l'axe X, adjacente à la partie intermédiaire incurvée et convenablement reliée à cette dernière, ladite partie finale droite étant proche de la partie supérieure du second corps (2, 20, 8). 40

**2.** Charnière dissimulée selon la revendication 1 dans laquelle:

- le premier corps (1) comprend une première coupelle (10) et un premier corps ajustable (3) qui est placé dans ladite première coupelle (10), ledit premier corps ajustable (3) comprend les-

bits premiers guides (36) et reçoit ledit premier pivot (5),

- le second corps (2) comprend une seconde coupelle (20) et un second corps ajustable (8) qui est placé dans ladite seconde coupelle (20), ledit second corps ajustable (8) comprend lesdits seconds guides (83) et reçoit ledit second pivot (5),

**3.** Charnière dissimulée selon la revendication 2 dans laquelle, lorsque la porte est fermée, les premiers guides (36) sont droits et parallèles à l'axe de référence X. 10

**4.** Charnière dissimulée selon l'une quelconque des revendications précédentes **caractérisée en ce qu'**elle comprend des moyens d'ajustement de la position de la charnière le long de l'axe de référence Z, lesdits moyens comprenant une paire de boîtiers à fentes (12) parallèles à l'axe de référence Z et faisant saillie depuis les faces latérales opposées (13) du premier corps (1). 15

**5.** Charnière dissimulée selon l'une quelconque des revendications 3 et 4 **DANS LAQUELLE** le premier corps ajustable (3) comprend une paire de crêtes (31) parallèles à l'axe de référence X et faisant saillie depuis les faces latérales opposées (33) du premier corps ajustable (3) et coulissant à l'intérieur des sièges reliés correspondants (11) formés à l'intérieur de la première coupelle (10). 20

**6.** Charnière dissimulée selon la revendication 5 dans laquelle le premier corps ajustable (3) comprend un trou évasé (32) conçu pour loger une vis (4) dont le mouvement par rapport au premier corps ajustable (3) le long de l'axe de référence X est empêché par une paire de pivots (53) insérés parallèles à l'axe Y dans des trous relatifs (34) formés sur la surface latérale (35) du premier corps ajustable (3), lesdits pivots (53) étant conçus pour empêcher d'éventuels mouvements de la tête (41) de la vis (4) le long de l'axe de référence X par rapport au premier corps ajustable (3), ladite vis (4) dont le degré de serrage à l'intérieur d'un trou fileté approprié formé à l'intérieur de la première coupelle (10), garantit l'ajustement de la profondeur du premier corps ajustable (3) à l'intérieur de la première coupelle (10) et par conséquent l'ajustement de la charnière (100) le long de l'axe de référence X. 25

**7.** Charnière dissimulée selon l'une quelconque des revendications 4, 5, 6 dans laquelle le second corps ajustable (8) comprend une paire de boîtiers à fentes (81) parallèles à l'axe de référence Y, formés sur les faces opposées (84) du second corps ajustable (8) à l'intérieur de chacun desquels est insérée une vis (42) chacune étant conçue pour être vissée dans un

trou fileté approprié formé à l'intérieur de la seconde coupelle (20), lesdits boîtiers à fentes (81) qui se déplaceront parallèlement à l'axe de référence Y, à l'intérieur des boîtiers appropriés (22) formés dans la seconde coupelle (20), garantissant l'ajustement de l'écart relatif du second corps ajustable (8) dans la seconde coupelle (20) et par conséquent l'ajustement de la charnière (100) le long de l'axe de référence Y.

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8. Charnière dissimulée selon la revendication 7 dans laquelle le second corps ajustable (8) comprend un boîtier circulaire pour loger une came (9) dotée d'une dent (91) conçue pour entrer en contact avec un siège longitudinal parallèle à l'axe de référence Y et formée sur la partie inférieure de la seconde coupelle (20).

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9. Charnière dissimulée selon la revendication 8 dans laquelle le second corps ajustable (8) comprend une paire de boîtiers à fentes (81) parallèles à l'axe de référence Y, formés sur les faces opposées (84) du second corps ajustable (8) à l'intérieur de chacun desquels est insérée une vis (42) et une rondelle (43), chacune desdites vis (42) étant vissée dans un trou fileté formé sur la seconde coupelle (20).

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10. Charnière dissimulée selon l'une quelconque des revendications 2, 4, 5, 6, 7, 8, 9 dans laquelle le chemin défini par les premiers guides (36) et le chemin défini par les seconds guides (83) comprend une première partie droite parallèle à l'axe X, ladite première partie droite étant respectivement proche de la partie inférieure du second corps ajustable (8) ou du premier corps ajustable (3), et comprenant une partie intermédiaire incurvée adjacente à chaque première partie droite et convenablement reliée à cette dernière, dans laquelle ladite partie intermédiaire s'écarte de la ligne idéale reliant les positions opposées exactes du chemin incurvé à l'intérieur des seconds guides (83), la concavité de ladite position intermédiaire incurvée étant orientée dans le sens décroissant de l'axe de référence Y.

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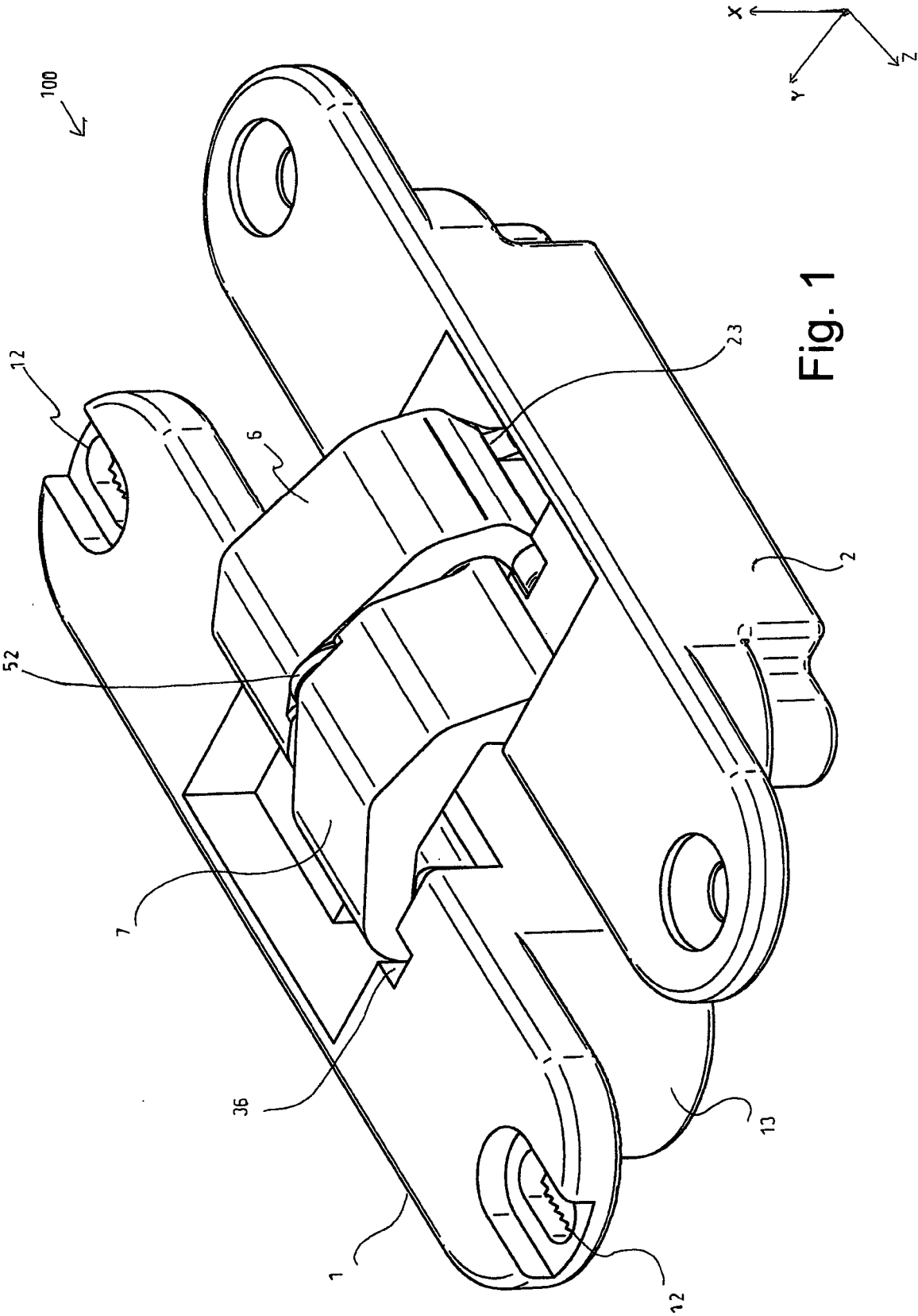
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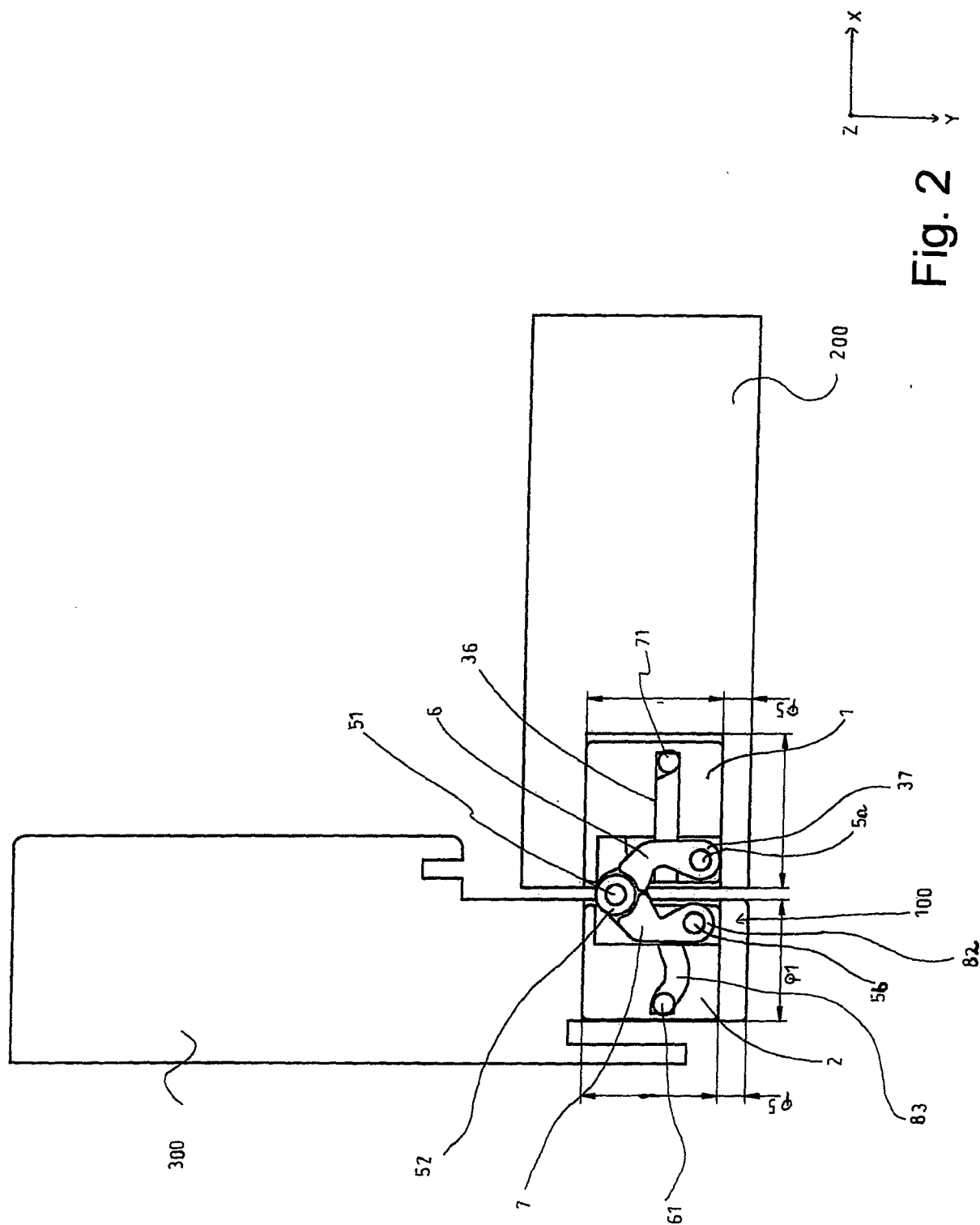
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**Fig. 2**

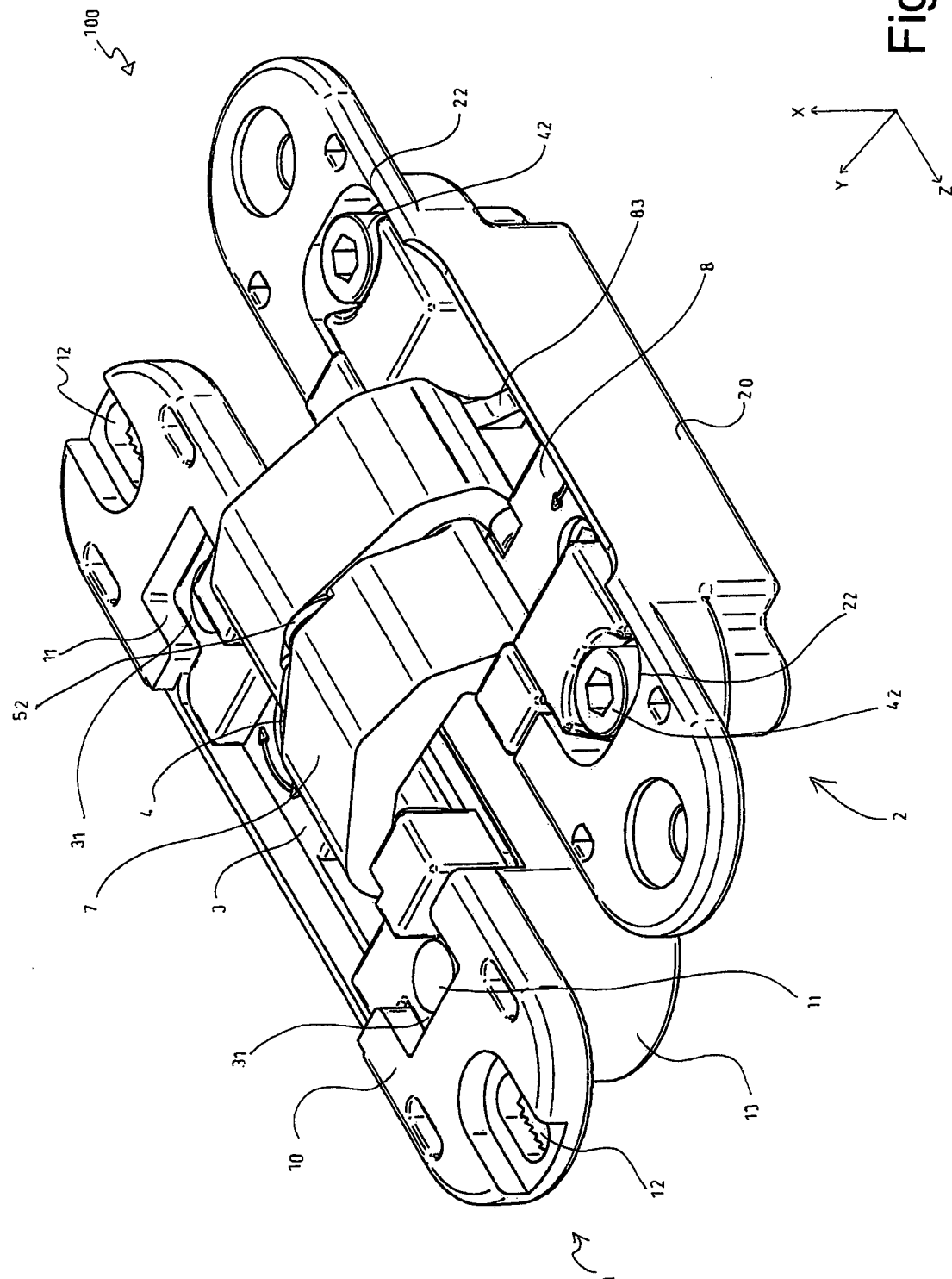


Fig. 3

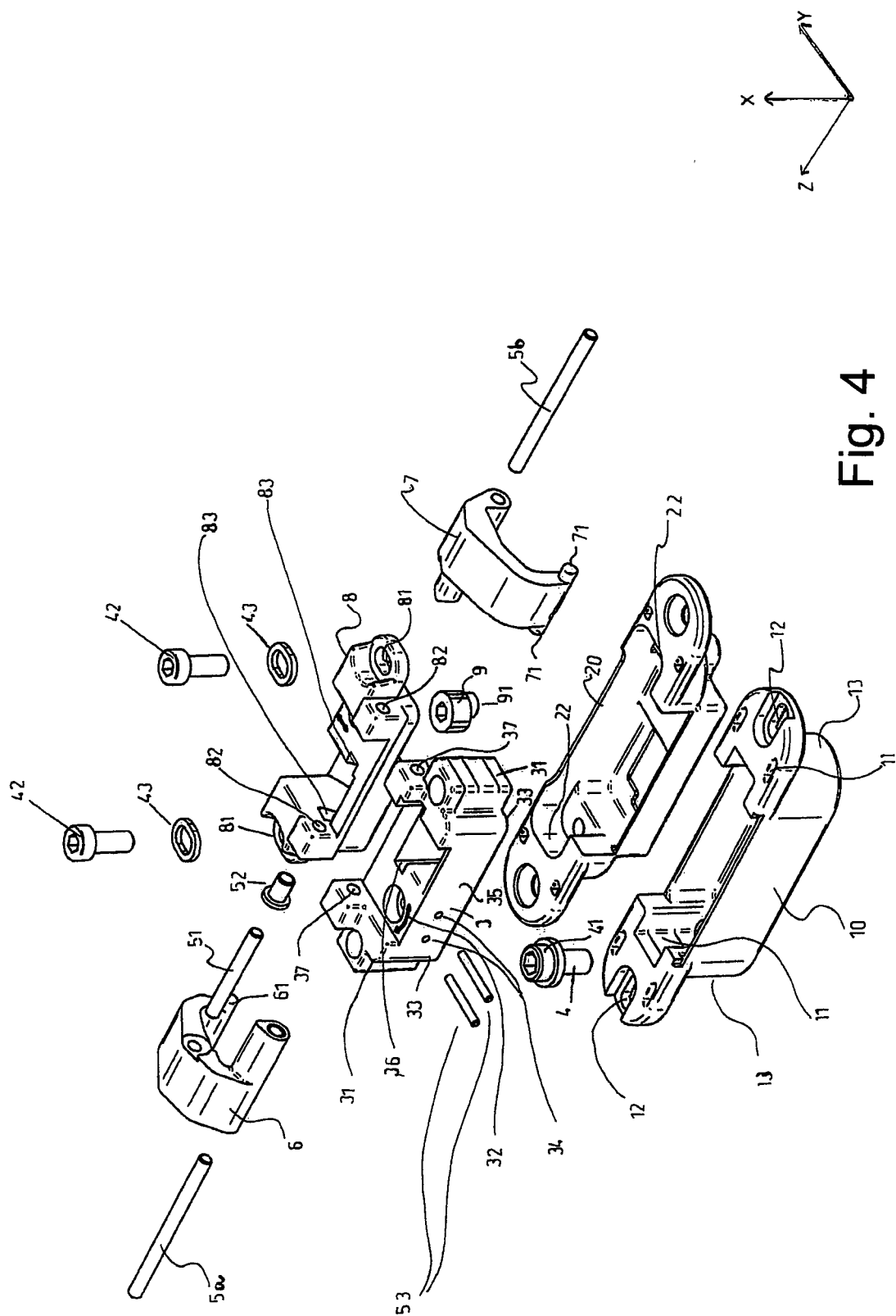


Fig. 4

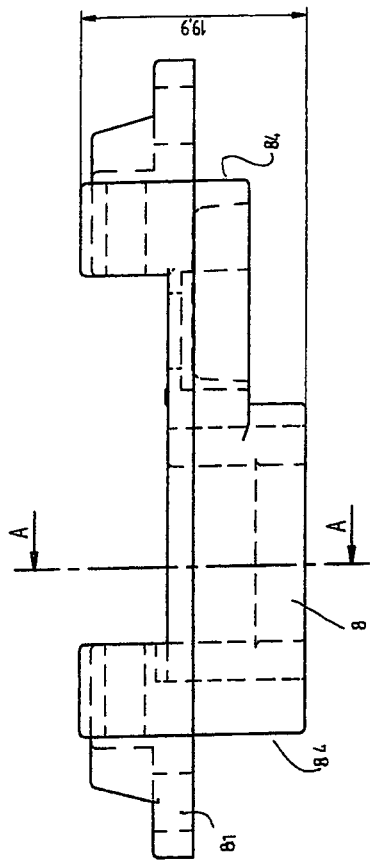


Fig. 6

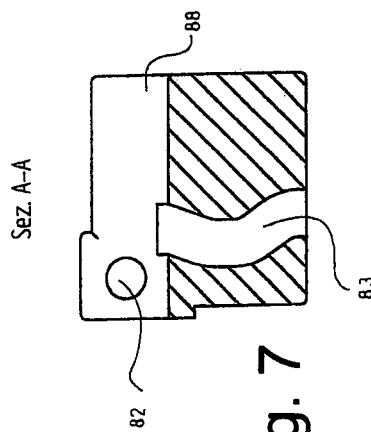


Fig. 7

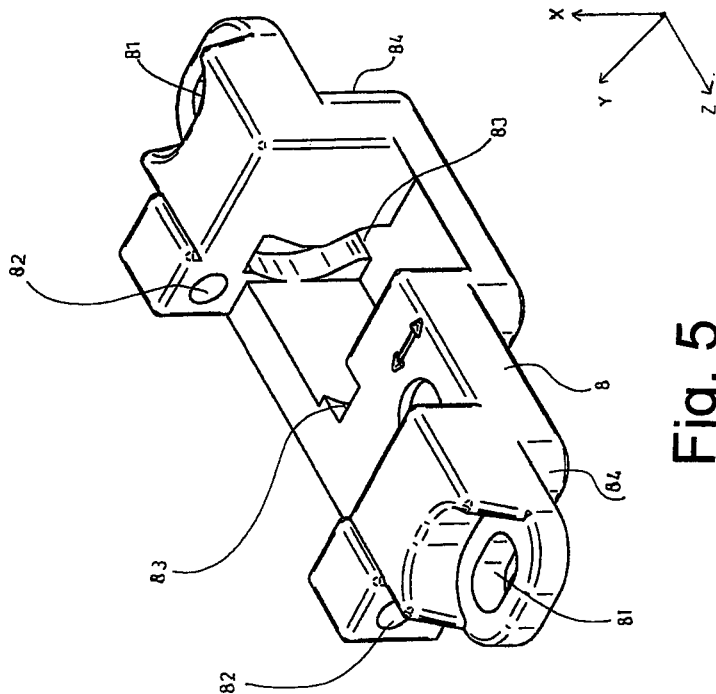


Fig. 5

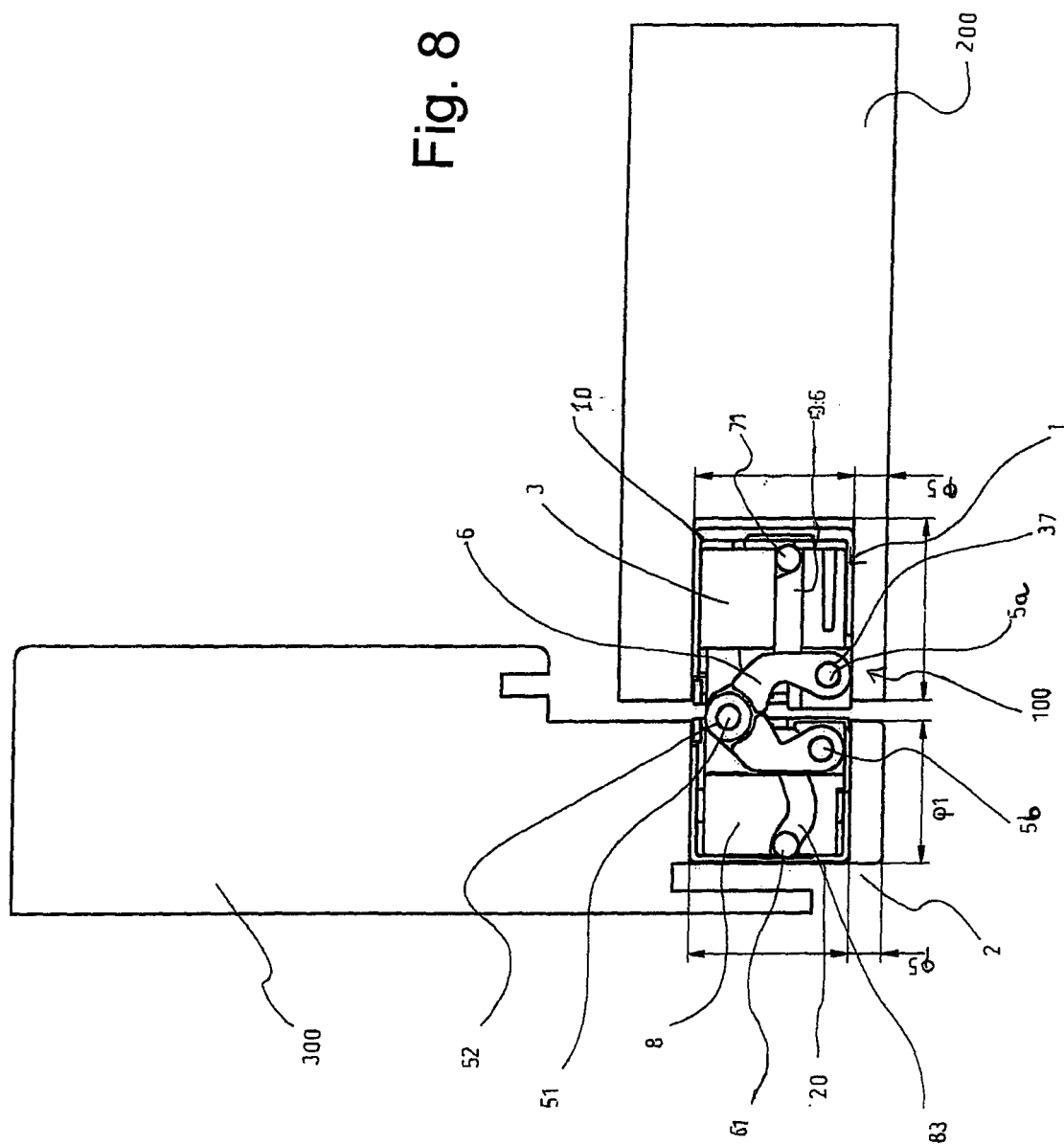


Fig. 8

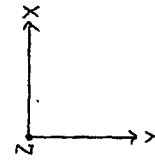
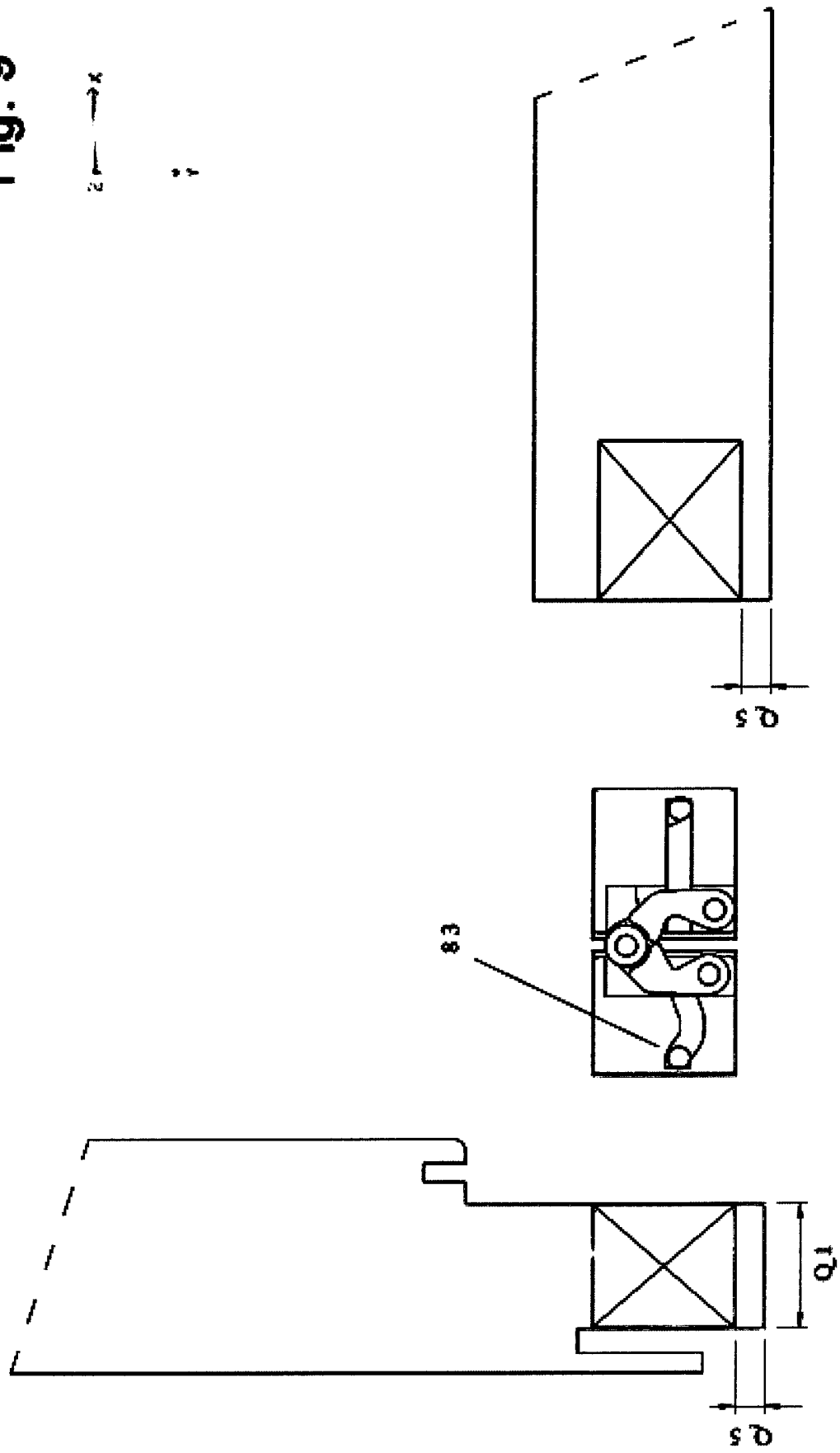




Fig. 9



**REFERENCES CITED IN THE DESCRIPTION**

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