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E05D 5/10 *(2006.01)*

(54) **Adjustable snap operating hinge for doors and wing assemblies, preferably made of a tempered glass material**

Einstellbares Schnappscharnier für Türen und Flügel, vorzugsweise aus gehärtetem Glas

Charnière à déclic réglable pour portes et volets, notamment en verre trempé

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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates to a metal snap adjustable hinge to be used for closing and opening wings associated with either simple or double doors preferably including frameless tempered glass material plates, wherein the wings are held at a closing or opening position thereof by a snap driving mechanism of the hinge and comprising one or more operating springs.

[0002] A lot of snap operating metal hinge assemblies in particular for use in shower cabs or boxes, for allowing a frameless shower wing plate to hold a closing or opening condition by a simple inner mechanism driven by one or more driving springs applying, through an intermediate roller or ball, a driving force to the hinge body at preselected positions thereof, the hinge body including recesses therewithin said roller or ball are forced by the springs to provide a snap mode of operation, are already known and used.

[0003] By applying a comparatively small manual pressing or pulling force, the wing may be opened or closed by the user to a desired locking position thereof.

[0004] The above fittings are made with a lot of different configurations and are substantially operatively similar; however, they cannot be easily fitted to their support structure as they are assembled.

[0005] In fact, a precise setting of the hinge locking point/points, as said hinge assembly is designed and made (usually at -90°/0°/+90°), does not allow the above prior fittings to accurately fit the tolerances of their supporting structures, usually constituted by masonry walls either plaster coated or not, which do not have perfectly orthogonal and flat surfaces.

[0006] Thus, it would advantageous to provide a snap operating hinge assembly which may be easily adjusted along the wing rotary axis thereby allowing, even with a not perfectly orthogonal supporting structure, to hold the wing at a set closed position on a preset threshold line therefor.

[0007] To solve the above problems, prior approaches have been already disclosed, for example, in prior patent references, such as EP 0792990 A, WO 2004/038145 A1, US 6,766,561 B1 EP 1630333 A1, WO 2009/015550 A1, DE 20314065 U1, DE 19800813 A1, most of which are based on a same idea of making the hinge body portion as an independent element, and forming therein the snap operating mechanism recesses or seats, to allow said element to rotate about a vertical rotary axis to perform an angular adjustment of the wing.

[0008] Prior rotary systems for rotatively driving the recessed elements may be generally defined as "cam" systems which in all the above patent references, constitute the hinge assembly basic operating member.

[0009] On the other hand, all the above mentioned prior approaches allow the cam system to turn only through few turning degrees, thereby greatly limiting a proper adjustment of the wing.

[0010] This drawback is particularly evident in US 6766561 B1, but it can be seen also in WO 2009/015550 A1, DE 20314065 U1, DE 19800813 A1, as the locking screw of the adjustment cam being arranged on the cam itself cannot be driven by a suitable driving tool over a certain cam turning degree.

[0011] In particular, the document EP 0792990 A does not allow to make a "glass/glass" type of operating hinge, that is a hinge assembly to be affixed, instead of an attachment masonry wall or frame, to a glass plate.

[0012] In a further prior patent document, EP 0599255 A1,a cam system having a larger rotary range is disclosed.

[0013] However, this prior cam system is affected by yet other drawbacks, since the locking of the adjustment cam at its detent position is achieved by a pressing ball urged by a pressing dowel element, which has a low operating efficiency thereby a very high clamping torque must be applied to properly clamp a screw on the dowel.

[0014] In the above mentioned document, EP 1630333 A1, which discloses the preamble of Applicant's main claim, a great and effective adjustment of the cam is possible, an adjustment element (axle) integral with the cam is locked by elastic deformation of a hinge body suitably shaped for this purpose. But this is affected by two distinct drawbacks, since it does not allow to make the above "glass/glass" type of operating hinge or a hinge of the type without a base to be affixed to, and the flatness of the clamping flange is lost because of the deformation of the flange itself during the adjustment.

SUMMARY OF THE INVENTION

[0015] Thus, the aim of the present invention is to provide such a hinge fitting which is very simple construction wise and inexpensive, includes few operating pieces, while allowing frameless door wings to be efficiently opened, closed and locked at set locking positions, in particular suitable for door wings of a tempered glass material and which, moreover, allows the wing detent position along the rotary axis thereof to be easily, repeatedly and efficiently adjusted.

[0016] According to one aspect of the present invention, the above aim, as well as yet other objects, which will become more apparent hereinafter, have been achieved by a hinge assembly according to Claim 1.

[0017] The inventive adjustable hinge assembly provides the following advantages:

- a possibility of adjusting through a very broad adjusting range the detent positions thereby solving all problems caused by an installation on uneven surfaces.
- It allows to provide a very accurate detent or stop position angular adjustment, in a substantially continuous and precise manner.
- Owing to the broad contact surface of the adjustment

axis and housing therefor in said main body, it is possible to easily and safely lock said axis by detent dowels.

- It allows to perform a number of further adjustment operations, also at different time points, without damaging the component elements of the locking safety system.
- It may be made in a very inexpensive manner, owing to the small number of the hinge assembly pieces.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The invention will become more apparent hereinafter from the following exemplary but not limitative disclosure of some embodiments thereof, with reference to the accompanying drawings, where:

Figure 1 is an exploded perspective view showing all the hinge components, with the exception of a cam-adjustment axis assembly, of a snap adjustable hinge for wings preferably made of a tempered glass material with a fixing base, of a so-called "offset wing" wall or frame fixing type.

Figure 2 is a further exploded perspective view showing the cam - adjustment axis - "offset wing" - base assemblies, and provided to better understand the component piece assembling operation.

Figure 3 is a vertical cross-sectional view showing the components of the snap hinge assembly and showing, in particular, in a not cross-sectioned condition, the adjustment or adjusting axis of a cylindric-hexagonal embodiment with the snap roller and axis therefor.

Figure 4 is a horizontal cross-sectional view showing the components of the snap and adjusting mechanisms of the snap operating hinge assembly, in which the adjustment cam has been shown in a non cross-sectioned condition, and including a hexagonal axial hole according to a further modified embodiment.

Figure 5 shows a side elevation view of the inner side of the hinge assembly and in particular the two adjustment axis clamping dowel elements.

Figure 6 is a front view showing the hinge assembly for clamping to a wall or frame with a "central wing".

Figure 7 shows a top plan view of that same hinge assembly.

Figure 8 shows a side elevation view of a modified embodiment of a hinge assembly for connection on glass plates arranged on the same plane as that of the wing, the so called 180° glass/glass position.

Figure 9 is a horizontal cross-sectional view showing a tempered glass wing including snap operating adjustable hinge assemblies having a clamping base for clamping them to a wall or frame and not aligned with a threshold, since the support, before adjusting, is not arranged at an orthogonal position. In fact, the hinge, because of its "snap" type of operation allows the wing to assume the so-called 0° position, thereby, if it is not arranged perfectly perpendicular to the clamping surface with respect to the threshold line, then the wing will not be properly aligned.

Figure 10 is a horizontal cross-sectional view showing that same wing after having adjusted the hinge assembly and having properly aligned it with respect to the threshold.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0019] The main body 1 constitutes the basic element of the inventive hinge assembly and comprises a clamping or fixing flange or base, and being made of a metal material and so perforated and contoured as to provide a suitable housing for the adjustment hollow axis 2, the threaded locking dowels 4 for said axis and the cam 3.

[0020] Figure 2 shows details of the assembling of the above pieces which constitute the core of the adjusting system: in fact, the axial hole of the main body 1 is bored with two different diameters thereby it is precisely coupled to the adjustment axis 2.

[0021] The adjustment axis 2 has three different cross-sections: a round one with two different diameters at the end portions thereof and a hexagonal one at the center thereof. The round cross-section end portions are so designed as to freely rotate in dedicated recesses or seats formed in the main body 1, whereas the hexagonal cross-sectional part is mated to the grooved cam 3, thereby making the three pieces rigid with one another.

[0022] The assembling sequence of the above parts is a very simple one, that is: locating the cam 3 in its main body 1 housing, engaging the adjustment axis 2 in its seat or recess on 1 while simultaneously coupling the cam 3.

[0023] The cam 3 comprises a polygonal axial hole so formed as to be precisely fitted to the central cross-section of the adjustment axis 2 and including three contoured recesses operating for housing the roller 13 and allowing the wing to be stopped at set stopping or detent positions, typically a closing and an opening positions at 90° in the two directions respectively.

[0024] The locking dowel elements 4 are threadably engaged in dedicated threaded holes formed at a set position on a side of the main body 1. Said dowel elements, upon screwing on, urging the hollow adjustment axis 2 into its seat of the main body 1 thereby preventing it from turning. Thus, said adjustment axis 2 and consequently the cam 2 coupled thereto, may be rotated to any desired position to allow the dowel elements 4 to be released, which rotary movement, however, will be then fully prevented with the dowel elements 4 in a clamped condition.

[0025] The pivot pin 5 allows the hinge assembly to turn, that is pivotably supports the two hinge assembly bodies, the main body 1 including its adjusting elements and clamp plate jaws 7 and 8 for clamping the glass wing

and the spring mechanism therefor, to allow the wing to be pivotably driven.

[0026] Said pin 5 is engaged in housing recesses 5b and passes through the adjustment axis 2 in the main body 1 by anti-friction plastic material bush assemblies 6, separating the pin 5 from the adjustment axis hole 2, thereby preventing metal materials from contacting with one another while facilitating the rotary movement.

[0027] The guide bearing clamping plate 7 has three functions: that of clamping the glass wing to the plate 8 by clamping screws 9, thereby clamping said plate to the wing through an interposition of contoured plastics material gaskets 10, providing a seat for housing the pin 5 and a further seat for allowing a sliding movement of the snap operating mechanism including the springs 12, guide 11, roller 13 and axis 14 therefor.

[0028] The plate 8 jaw is fixedly coupled by the coupling screws 9 to the plate jaw 7, thereby clamping the hinge assembly on the glass wing, while holding the snap mechanism forming parts.

[0029] Thus, said screws 9 firmly connect the two plate jaws 7 and 8 to pressure clamp the glass wing therebetween, with the contoured plastics material gasket 10 preventing any contact of the glass wing and metal surfaces of the two clamping plate jaws 7 and 8.

[0030] The roller holder or bearing guide 11, which is preferably made of an anti-friction material, is housed in a seat of the plate jaw 7, thereby allowing a sliding movement under the action of the springs 12 arranged in the plate jaw 7.

[0031] The guide 11 comprises, at an end portion thereof, a housing for engaging the roller 13 and axis 14 to linearly drive the springs 12 on the roller axis 14, thereby said coil springs 12 will operatively press the roller 13 on the cam 3 contour, to provide the so-called "snap" mode of operation with the roller 13 mating with one of the recesses formed on the cam 3.

[0032] Such a snap mode of operation will allow to arrange at set stable positions the glass wing, typically at +90°/0°/-90° positions.

[0033] Moreover, the axis 14 allows the roller 13 to freely turn, thereby providing a smooth operation without undesired frictions of the snap mechanism.

[0034] From the above disclosure it should be apparent that the adjustable snap operating hinge assembly according to the present invention, achieves all the above mentioned aim and objects.

Claims

1. A snap adjustable hinge assembly for frameless windows or doors, preferably made of a tempered glass sheet, of a type including two clamping plates (7 and 8) made rigid with one another and clamping the window or door wing by clamping screws (9), pivotably arranged on a pivot pin (5) of a hinge assembly main body (1) by plastics material bush elements (6), said plates having an axis (14) supporting a roller (13) which is resiliently urged by springs (12) operating through a guide (11) against a cam (3) coupled to a hollow adjusting axle (2) rotatively engaged in a seat formed in said main body (1), said adjusting axle (2) being adapted to be forcibly engaged in an axle seat formed in said main body (1), thereby preventing said body from turning; said adjusting axle (2) being forcibly engaged in said main body seat by one or more pressing locking elements (4); said main body (1) comprising one or more threaded holes, each of said threaded holes being adapted to receive a respective locking element (4), each locking element being a threaded dowel element (4); said hinge assembly being **characterized in that** said threaded holes are open into said main body seat and said dowel elements (4) interfere with said adjusting axle (2) thereby preventing said adjusting axle (2) from turning, wherein said adjusting axle (2) has an adjusting axle central portion having a cross section adapted for coupling with said cam (3) so as to be made integral therewith and wherein the cam (3) comprises a polygonal axial hole so formed as to be precisely fitted to the central cross-section of the adjusting axle (2).

2. A snap adjustable hinge assembly according to claim 1, **characterized in that** said pivot pin (5) pivotably supporting thereon said hinge assembly is arranged in the cavity of said hollow adjusting axle (2).

3. A snap adjustable hinge assembly according to claim 1, **characterized in that** said locking elements (4) have each a head portion so shaped as to allow said locking elements to be easily driven by a manual driving tool such as a screwdriver, or a recessed head driving wrench.

4. A snap adjustable hinge assembly according to claim 1, **characterized in that** said roller (13) is so arranged as to always contact said cam (3), said cam including a calibrated recess thereby, as the rotary axle of said cam is coupled to be rotatively driven, said cam will cause said door wing to be arranged at any operator selected positions.

5. A snap adjustable hinge assembly according to claim 4, **characterized in that** said cam (3) comprises a central slot and two further slots for allowing said door wing to be driven to +90° and -90° operating positions.

Patentansprüche

1. Einstellbare Schnapp-Scharnierbaugruppe für rahmenlose Fenster oder Türen, vorzugsweise hergestellt aus einer Hartglastafel, von einer Art welche zwei Klemmplatten (7 und 8) aufweist, die fest mit-

einander verbunden werden und den Fenster- oder Türflügel durch Klemmschrauben (9) einklemmen, drehbar angeordnet an einem Drehzapfen (5) eines Grundkörpers (1) der Scharnierbaugruppe durch Buchsenelemente (6) aus Kunststoffmaterial, wobei die Platten eine Achse (14) aufweisen, welche eine Rolle (13) halten, die elastisch mittels Federn (12), welche durch eine Führung (11) wirken, gegen einen Nocken (3) gedrückt werden, der an eine hohle Einstellachse (2) gekoppelt ist, die drehbar in einen Sitz, der im Grundkörper (1) ausgebildet ist, eingesetzt ist, wobei die Einstellachse (2) derart gestaltet ist, dass sie unter Kraftaufwendung in einen Achssitz, der im Grundkörper (1) ausgebildet ist, eingesetzt wird, wodurch der Körper daran gehindert wird, sich zu verdrehen; wobei die Einstellachse (2) unter Kraftaufwendung durch ein oder mehrere Druckverriegelungselemente (4) in den Grundkörpersitz eingesetzt ist; der Grundkörper (1) umfassend eine oder mehrere Gewindebohrungen, wobei jede der Gewindebohrungen derart gestaltet ist, dass sie ein jeweiliges Verriegelungselement (4) aufnimmt, wobei jedes der Verriegelungselemente ein Gewindedübelelement (4) ist; wobei die Scharnierbaugruppe **dadurch gekennzeichnet, dass** die Gewindebohrungen in den Grundkörpersitz hinein offen sind und die Dübelelemente (4) in die Einstellachse (2) eingreifen, wodurch sie die Einstellachse (2) daran hindern, sich zu verdrehen, wobei die Einstellachse (2) einen mittigen Einstellachsenabschnitt aufweist, der einen Querschnitt aufweist, der derart gestaltet ist, dass er mit dem Nocken (3) gekoppelt werden kann, sodass er fest mit diesem verbunden ist, und wobei der Nocken (3) eine vieleckige Axialbohrung umfasst, die derart ausgebildet ist, dass sie präzise auf den mittigen Querschnitt der Einstellachse (2) passt.

2. Einstellbare Schnapp-Scharnierbaugruppe nach Anspruch 1, **dadurch gekennzeichnet, dass** der Drehzapfen (5), welcher die Scharnierbaugruppe hält, im Hohlraum der hohlen Einstellachse (2) angeordnet ist.

3. Einstellbare Schnapp-Scharnierbaugruppe nach Anspruch 1, **dadurch gekennzeichnet, dass** die Verriegelungselemente (4) jeweils einen Kopfabschnitt aufweisen, der derart geformt ist, dass es möglich ist, die Verriegelungselemente mühelos mit einem Handschraubwerkzeug, zum Beispiel einem Schraubenzieher oder einem Inbusschraubenschlüssel, einzudrehen.

4. Einstellbare Schnapp-Scharnierbaugruppe nach Anspruch 1, **dadurch gekennzeichnet, dass** die Rolle (13) derart angeordnet ist, dass sie immer in Kontakt mit dem Nocken (3) steht, wobei der Nocken eine kalibrierte Vertiefung aufweist, wodurch, da die Drehachse des Nockens so gekoppelt ist, dass sie drehbar angetrieben wird, der Nocken bewirkt, dass der Türflügel in jeglicher vom Bediener gewählten Position angeordnet werden kann.

5. Einstellbare Schnapp-Scharnierbaugruppe nach Anspruch 4, **dadurch gekennzeichnet, dass** der Nocken (3) einen mittigen Schlitz und zwei weitere Schlitze aufweist, um zu ermöglichen, dass der Türflügel in Arbeitspositionen von +90° und -90° geführt wird.

Revendications

1. Charnière à déclic réglable pour fenêtres ou portes sans encadrement, notamment en verre trempé, d'un type comprenant deux plaques de serrage (7 et 8) connectés l'une avec l'autre tandis que le serrage de la fenêtre ou de la porte se fait par des vis de serrage (9) agencées pivotantes sur un axe de pivot (5) d'un corps principal de charnière (1) par des éléments de manchon en matériau plastique (6), lesdites plaques ayant un axe (14) supportant un rouleau (13) qui est forcé de manière résiliente par des ressorts (12) fonctionnant à travers un guide (11) contre une came (3) couplée à un axe d'ajustement creux (2) engagé en rotation dans un siège formé dans ledit corps principal (1), ledit axe d'ajustement (2) étant adapté pour être engagé en force dans un siège d'axe formé à l'intérieur dudit corps principal (1), empêchant ainsi ledit corps de tourner ; ledit axe d'ajustement (2) étant engagé en force dans ledit siège de corps par un ou plusieurs élément de verrouillage par compression (4) ; ledit corps principal (1) comprenant un ou plusieurs trou(s) fileté(s), chacun desdits trous filetés étant adapté pour recevoir un élément de verrouillage respectif (4), chaque élément de verrouillage étant un élément de goujon fileté (4) ; ladite charnière étant **caractérisée en ce que** lesdits trous filetés sont ouverts dans ledit siège de corps principal et lesdits éléments de goujon (4) interfèrent avec ledit axe d'ajustement (2), empêchant ainsi ledit axe d'ajustement (2) de tourner, dans lequel ledit axe d'ajustement (2) présente une partie centrale d'axe d'ajustement ayant une section transversale adaptée pour le couplage avec ladite came (3) de façon à faire partie intégrante de celle-ci et dans lequel la came (3) comprend un trou axial polygonal formé de façon à être logé précisément sur la section transversale centrale de l'axe d'ajustement (2).

2. Charnière à déclic réglable selon la revendication 1, **caractérisée en ce que** ledit axe de pivot (5) supportant en pivotement dessus ladite charnière est agencé dans la cavité dudit axe d'ajustement creux (2) .

3. Charnière à déclic réglable selon la revendication 1, **caractérisée en ce que** lesdits éléments de verrouillage (4) ont chacun une partie de tête formée de manière à permettre auxdits éléments de verrouillage d'être facilement entraînés par un outil d'entraînement manuel comme un tourne-vis, ou une clé d'entraînement à tête creuse.

4. Charnière à déclic réglable selon la revendication 1, **caractérisée en ce que** ledit rouleau (13) est agencé de façon à être toujours en contact avec ladite came (3), ladite came comprenant un creux calibré sur celle-ci, lorsque l'axe de rotation de ladite came est couplé pour être entraîné en rotation, ladite came va faire que ledit battant de porte soit agencé à n'importe quelles positions sélectionnées par un opérateur.

5. Charnière à déclic réglable selon la revendication 4, **caractérisée en ce que** ladite came (3) comprend une fente centrale et deux fentes supplémentaires pour permettre audit battant de porte d'être entraîné à des positions de fonctionnement de +90° et -90°.

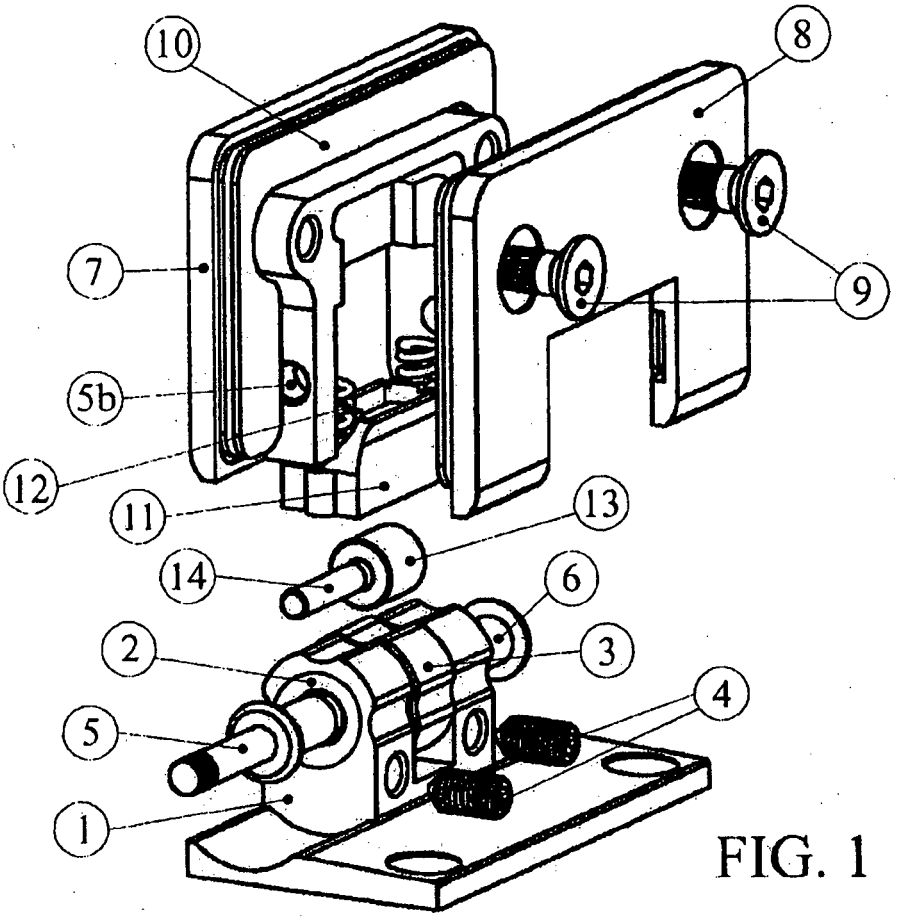

FIG. 1

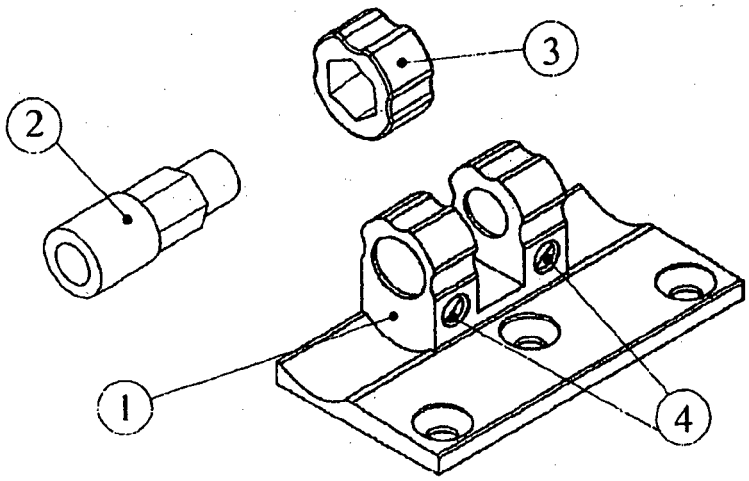

FIG. 2

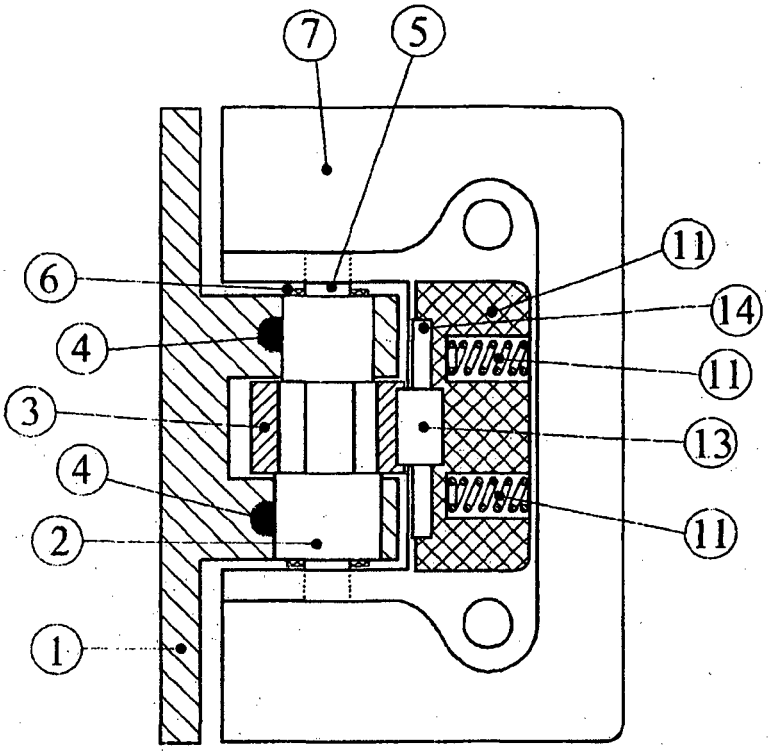

FIG. 3

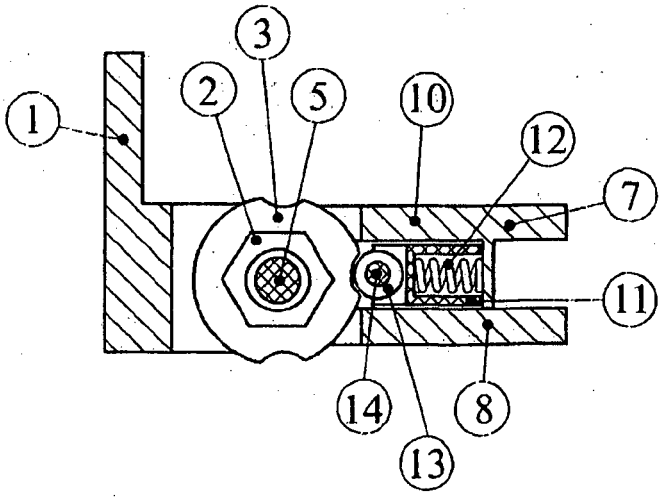

FIG. 4

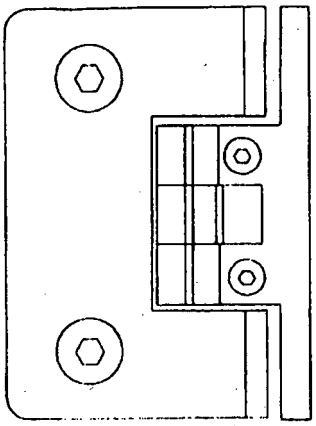

FIG. 5

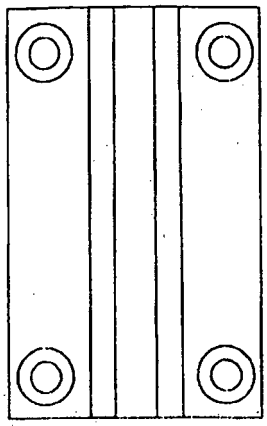

FIG. 6

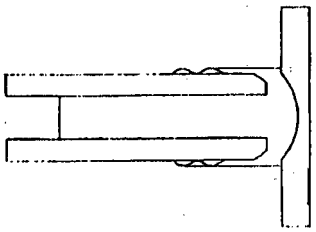

FIG. 7

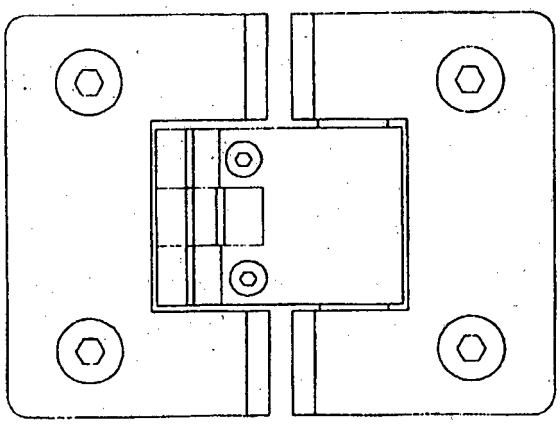

FIG. 8

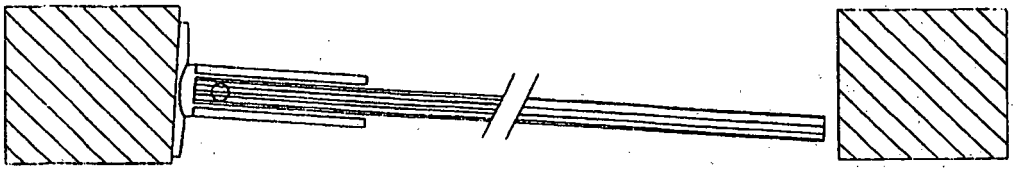

FIG. 9

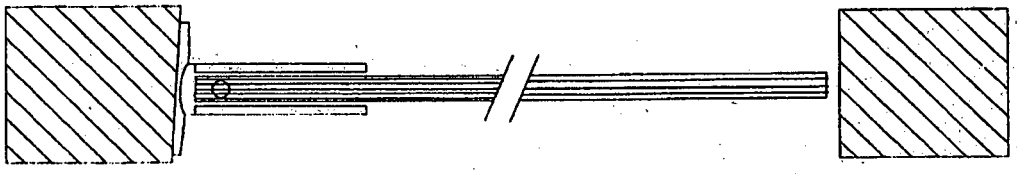

FIG. 10

REFERENCES CITED IN THE DESCRIPTION

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