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(54) **Hinge with locking pivot**

Scharnier mit verriegelndem Scharnierzapfen

Charnière à axe de pivot verrouillant

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EP-A- 0 637 669 **FR-A- 2 555 236**

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Description

[0001] This invention relates to a hinge according to the preamble of claim 1.

[0002] In particular, this invention finds application in the context of two-panel opening structures such as grilles, screens, windows and the like.

[0003] Opening structures provided with a panel which is fixed to a supporting frame and at least a second panel attached thereto in an articulated manner by hinges are known. The use of locking pins of the bayonet type to lock and unlock the first panel in the closed position is known.

[0004] These locking pins have to be operated by the user manually before opening the panel or after it has been closed. This obviously brings about appreciable disadvantages because of both the difficulty encountered by the user in gaining access to the upper locking pin, and the fact that the locking pin can suffer damage or, in the limit, breakage, when it projects from its seat in the event of the second panel being closed inadvertently.

[0005] A solution to this problem has been suggested in Italian patent IT 1 302 175.

[0006] In accordance with the known state of the art indicated above, a hinge for double panels opening structures comprises a female member and a male member provided respectively with a fork and an extension inserted into the fork and provided with holes lined up to receive a pivot constituting the axis of the hinge. The extension of the male member has a helical groove in which a pin integral with the pivot is engaged, the pivot rotating together with the female member but being free to move axially with respect to the female member. In this way the locking pivot is operated automatically as a result of rotation of the second panel.

[0007] A solution of the abovementioned type was however already known from French patent application FR 2 555 236 which describes a device for automatically controlling the locking and unlocking of two adjacent panels which are mutually articulated. In particular, the device comprises a system of cams to impart an axial movement upon the hinge pivot in response to the mutual rotation of the two panels. As it comes out from the description (page 3, lines 32-40) the cam system can be replaced by a pin which is integral with the pivot and which is caused to move in a helical slot formed in one of the two parts constituting the hinge.

[0008] Therefore, it has been found that the arrangements in the known art, although resolving the abovementioned problem, have particular disadvantages from the point of view of safety. In particular, the safety of the hinge described in Italian patent IT 1 302 175 and French patent application FR 2 555 236 is compromised when the pin which is integral with the hinge is broken or removed from the pivot. This operation of tampering with the hinge is made easier by the external accessibility of the head of the pin, which head projects laterally from the locking pivot for insertion into the helical groove. This has an unacceptable effect on the requirements which hinges of this type must satisfy in terms of reliability and safety standards.

[0009] It is clear from the above that the need for a hinge with an automatically locking pivot which ensures a high level of safety is very much felt.

[0010] The object of this invention is to provide a hinge which has structural and functional characteristics such as to satisfy the abovementioned requirements and which is at the same time able to overcome the disadvantages mentioned with reference to the known art.

[0011] This object is accomplished through a hinge according to claim 1.

[0012] Other advantages and characteristics of the present invention will become clear from the following detailed description which is given with reference to the appended drawings which are provided purely by way of non-limiting example and in which:

- Figure 1 shows a diagrammatical perspective view of a hinge according to the invention in a first operating configuration,
- Figure 2 shows a diagrammatical perspective view of the hinge in Figure 1 in a second operating configuration,
- Figure 3 shows a view of the male element of the hinge in Figure 1,
- Figure 4 shows a view of the male element in Figure 3 in partial cross-section along the section line IV-IV in Figure 3,
- Figure 5 shows a frontal view of the male element in Figure 3,
- Figure 6 shows a view of the female element of the hinge in Figure 1,
- Figure 7 shows a view of the female element in Figure 6 in partial cross-section along the section line VII-VII in Figure 6,
- Figure 8 shows a view of the female element in Figure 6,
- Figures 9 and 10 show different views of the locking pivot of the hinge in Figure 1,
- Figure 11 shows a perspective view in partial cross-section of the hinge in Figure 1 in a third operating configuration, and
- Figure 12 shows a perspective view of the hinge in Figures 9 and 10.

[0013] With reference to the aforesaid figures, 1 generically indicates a hinge according to the invention.

[0014] The hinge 1 comprises a first part 2 and a second part 3 which are coupled together in rotation about a hinge pivot 4 defining the axis X-X of hinge 1.

[0015] Preferably, the first part 2 of hinge 1 is a female element and the second part 3 of hinge 1 is a male element. Alternatively, the first part 2 and the second part 3 of the hinge 1 may take the form of a plurality of projections and recesses in the form of a comb so as to form a plurality of male-female couplings.

[0016] In the example illustrated in the appended figures, female element 2 has a fork shape and has a body 5 connected to a first panel (not shown in the figures) from which an upper arm 6 and a lower arm 7 extend. Upper arm 6 and lower arm 7 form the tines of the fork and extend in a predominantly direction Y-Y transverse to the axis X-X of hinge 1.

[0017] The male element 3 has a body 8 connecting to a second panel (not shown in the figures) and a male portion 9 extending in a direction K-K transverse to the axis X-X of hinge 1. The male portion 9 is inserted between the upper arm 6 and the lower arm 7 of the female member 2.

[0018] The male portion 9 has a through hole 10 extending along the axis X-X and in line with corresponding holes 11a, 11b made in the female member 2, in lower arm 6 and upper arm 7 respectively. Holes 10, 11a and 11b which are in line with the axis X-X allow the pivot 4, forming the hinge connection between the male element 3 and the female element 2, to be inserted.

[0019] Advantageously, the pivot 4 rotates together with the female element 2 and is movable axially along the axis X-X of the hinge 1 with respect to the female portion 2 and the male portion 3. For this purpose the pivot 4 preferably has a recess 12 extending axially which is engaged by a pin 13 which is integral with one of arms 6, 7 of female element 2, in the example upper arm 7. Advantageously, the pin 13 is inserted into a through hole 14 provided in the transverse direction Y-Y in which upper arm 7 extends.

[0020] The axial recess 12 extends over a portion of the pivot 4 such as to allow the pivot 4 to move axially between a first position in which the hinge 1 is in the open configuration (Figure 1) and a second position in which the hinge 1 is in the closed configuration (Figure 2). When the hinge 1 is in the closed configuration (Figure 2), the axis Y-Y in which upper arm 6 and lower arm 7 of female element 2 extend is in line with the axis K-K in which male portion 9 of male element 3 extends.

[0021] Advantageously, the pivot 4 has a locking portion projecting from the first part 2 and from the second part 3 to engage a locking seat provided in a fixed structure so as to allow the hinge 1 to be locked with respect to the fixed structure.

[0022] Advantageously, when the hinge 1 is in the closed configuration, the locking portion of the pivot 4 is received in a locking seat (not shown in the figures) provided in the fixed structure, for example a hole made in a fixed frame, so as to allow the hinge 1 to be locked with respect to the frame.

[0023] The hinge 1 according to the invention may be used to lock the bottom or the top part of a panel. In the first case the locking seat must be provided in the lower part of the frame so as to receive the lower portion 4b of the pivot 4 when the hinge is in the closed position. In the second case, the locking seat will be provided in the upper part of the frame to receive the upper portion 4a of the pivot 4.

[0024] The hinge 1 comprises engaging means to bring about the movement of the pivot 4 along the axis X-X of hinge 1 as a consequence of mutual rotation of the female member 2 and the male member 3 about the axis X-X.

[0025] The engaging means comprise a pin 15 which is integral with the male member 3 and which is inserted into a through opening 16 made transversely in the pivot 4. In order to bring about movement of the pivot 4 along the axis X-X of the hinge 1 as a consequence of the mutual rotation of male member 3 and female member 2, the through opening 16 extends for an axial portion P of pivot 4 following a helical path.

[0026] The pin 15 is inserted into a through hole 17 made in the male portion 9 so as to extend as far as the axial hole 10 and to end in a seat 18 suitable for receiving an end portion 15b of the pin 15.

[0027] Advantageously, the through hole 17 is made in the head end 9a of the male portion 9 and extends in the transverse direction K-K in which male portion 9 extends.

[0028] In operation, following mutual rotation of the female element 2 and the male element 3 about the axis X-X, the pin 13 which is engaged in axial recess 12 brings about a corresponding rotation of the pivot 4. Because the pin 15 is integral with the male element 3, the pin 15 moves within helical through opening 16 made in the pivot 4, thus bringing about axial movement of the pivot 4 with respect to the male element 3 and the female element 2 of the hinge 1. Depending upon the conformation of helical through opening 16, whether left handed or right handed, the relative rotation of the male element 3 and the female element 2 brings about axial movement of the pivot 4 in either direction, that is upwards or downwards. In this way the hinge 1 according to the invention can be adapted for use for locking a panel at the top and at the bottom.

[0029] Advantageously, one of the fork arms 6, 7 of the female element 2 is provided with a protective wing 20 which prevents access to the pivot 4 when the hinge 1 is in the closed configuration. In the example illustrated in the figures, in which the locking seat for the pivot 4 will be located at the bottom of the hinge 1, the protective wing 20 must be provided on lower arm 6.

[0030] The procedure when fitting the hinge 1 may be as described below. First of all the pivot 4 is inserted in holes 10, 11a and 11b so as to couple the male element 3 and the female element 2 in rotation about the pivot 4. Subsequently the pin 13 is inserted into the through hole 14 to engage the axial recess 12 of the pivot 4 and link the pivot 4 in rotation with the female element 2 allowing it to move axially. At this point the pin 15 can be inserted into the male element 3 through an opening 17a made in the male portion 9. Finally, the opening 17a may be closed up by welding or other equivalent means.

[0031] In this way inaccessibility of the head end 15a of the pin 15, which is completely housed within the through hole 17, is ensured, at the same time giving to

the hinge 1 a high degree of safety against external tampering. In this respect it may be noted that the embodiment illustrated in the appended figures is extremely advantageous. In particular, the arrangement of the pin 15 with respect to the direction of extension of the male portion 9 allows the head end 15a of the pin 15 to be wholly inaccessible from the exterior when the hinge 1 is in the closed configuration (Figure 1).

[0032] Alternatively, the through hole 17 may be made transversely to the direction Y-Y in which the male portion 9 extends, the opening 17a being provided in one of the walls 9b and 9c of male portion 9. Advantageously, the opening 17a is located opposite that where protective wing 20 is provided.

[0033] From what has been described above it will be appreciated that the hinge according to the invention resolves the abovementioned problem with reference to the known art, making it possible to construct a hinge with a locking pivot which can be activated automatically and which has superior safety characteristics in comparison with hinges in the known art.

[0034] Furthermore, the presence of a pin inserted into a through opening makes it possible to construct a hinge in which the arrangement of the masses is symmetrical with respect to the axis of the hinge.

[0035] Naturally, the principle of the invention remaining the same, the forms of embodiment and details of construction may be varied widely with respect to those described and illustrated, which have been given purely by way of example, without thereby departing from the scope of the invention.

Claims

1. Hinge (1) comprising:

- a first part (2) and a second part (3) coupled together in rotation about a hinge pivot (4) defining the axis (X-X) of the hinge (1), said hinge pivot (4) rotating together with said first part (2) and moving axially along the said hinge axis (X-X) with respect to said first (2) and second (3) part, and
- engaging means to bring about said axial movement of said hinge pivot (4) along said hinge axis (X-X) as a consequence of mutual rotation of said first (2) and second (3) parts of the hinge (1) about said axis (X-X),

characterised in that
said engaging means comprise a pin (15) which is integral with said second part (3) and is inserted in a through opening (16) made transversely in said hinge pivot (4), said opening (16) extending for an axial portion of said hinge pivot (4) along a helical path.

2. Hinge (1) according to claim 1, in which said pivot (4) has a locking portion (4a) projecting from said first (2) and second (3) parts to engage a locking seat provided in a fixed structure so as to allow locking of said hinge (1) with respect to said fixed structure.

3. Hinge (1) according to claim 1 or 2, in which said first part (2) is a fork shaped female element having an upper arm (6) and a lower arm (7) extending in a predominant direction (Y-Y) transverse to said hinge axis (X-X), and said second part (3) is a male element comprising a male portion (9) extending in a direction (K-K) transverse to said hinge axis (X-X), said arms (6, 7) and said male portion (9) having respective holes (10, 11a and 11b) aligned along said axis (X-X) to house said pivot (4), **characterised in that** said pin (15) is inserted into a through hole (17) made in said male portion (9) in such a way as to extend as far as the axial hole (10) of said male portion (9) and to end in a seat (18) capable of receiving an end portion (15b) of said pin (15).

4. Hinge (1) according to claim 3, in which said through hole (17) is provided in the head end (9a) of said male portion (9) and extends in said transverse direction (K-K) of said male portion (9).

Patentansprüche

1. Scharnier (1), bestehend aus:

- einem ersten Bauteil (2) und einem zweiten Bauteil (3), die über einen Scharnierzapfen (4), der die Achse (X-X) des Scharniers bestimmt, verdrehbar miteinander verbunden sind, wobei der Scharnierzapfen (4) sich zusammen mit dem ersten Bauteil (2) dreht und sich bezüglich des ersten (2) Bauteils und des zweiten (3) Bauteils axial entlang der Scharnierachse (X-X) bewegt,
  und
- Eingriffsmittel um die axiale Bewegung des Scharnierzapfens (4) entlang der Scharnierachse (X-X) bedingt durch die gegenseitige Drehung des ersten (2) Bauteils und des zweiten (3) Bauteils des Scharniers (1) über die Achse (X-X) zu bewirken,

dadurch gekennzeichnet, dass
die Eingriffsmittel einen Stift (15) aufweisen, welcher mit dem zweiten Bauteil (3) einstückig ist und durch eine Durchgangsöffnung (16), die schräg im Scharnierzapfen (4) ausgebildet ist, eingesetzt ist, wobei sich die Durchgangsöffnung (16) einem spiralförmigem Pfad entlang für einen axialen Teil des Scahrnierzapfens (4) erstreckt.

2. Scharnier nach Anspruch 1, worin der Zapfen (4) einen Verriegelungsteil (4a) hat, der aus den ersten (2) und zweiten (3) Bauteilen herausragt um eine Verriegelungsaufnahme zu erfassen die in einem feststehenden Gebilde vorgesehen ist , so das das Scharnier (1) im Bezug zu dem feststehenden Gebilde verriegelt werden kann.

3. Scharnier nach Anspruch 1 oder 2, worin das erste Bauteil (2) ein gabelförmiges, weibliches Element ist, das einen Unterarm (6) und einen Oberarm (7) hat die sich in einer vorherrschenden Bewegung (Y-Y) querlaufend zur Scharnierachse (X-X) erstrecken und worin das zweite Bauteil (3) ein männliches Element ist, das einen männlichen Teil(9) umfasst der sich in einer Bewegung (K-K) querlaufend zur Scharnierachse (X-X) erstreckt; worin dieArme (6, 7) und das männliche Teil (9) jeweilig Löcher (10, 11a und 11b) haben, die entlang der Achse (X-X) ausgerichtet sind, um den Zapfen (4) aufzunehmen; **dadurch gekennzeichnt, dass** der Stift (15) durch ein Loch (17) im männlichen Teil (9) so eingeführt wird, das er sich wie das axiale Loch (10) des männlichen Teils (9) erstreckt und in einer Aufnahme (18) endet die dazu fähig ist das Endteil (15b) des Stiftes (15) aufzunehmen.

4. Scharnier nach Anspruch 3, in welchem das Durchgangsloch (17) im Kopfende (9a) des männlichen Teils (9) ist und in querlaufender Richtung (K-K) des männlichen Teils (9) erstreckt.

Revendications

1. CHARNIÈRE (1) comportant:

   - une première partie (2) et une seconde partie (3) couplées ensemble tournant autour d'un gond (4) définissant l'axe (X-X) de la charnière (1), le gond (4) susdit tournant autour de la première partie (2) susdite et bougeant axialement le long de l'axe muni de charnière (X-X) susdit par rapport aux première (2) et seconde (3) parties susdites et
   - des moyens d'enclenchement pour générer le mouvement axial susdit du gond (4) susdit le long de l'axe de la charnière (X-X) susdit en conséquence de la rotation réciproque des première (2) et seconde (3) parties susdites de la charnière (1) autour de l'axe (X-X) susdit, **caractérisée en ce que** les moyens d'enclenchement susdits comportent une cheville (15) qui fait partie intégrante de la seconde partie (3) susdite et qui est introduite dans un orifice de passage (16) pratiqué transversalement dans le gond (4) susdit, l'orifice (16) susdit s'étendant pour une portion axiale du gond (4) le long d'une trajectoire hélicoïdale.

2. CHARNIÈRE (1) selon la revendication 1, où le gond (4) susdit a une portion de verrouillage (4a) saillant des première (2) et seconde (3) parties susdites pour enclencher un siège de verrouillage réalisé dans une structure fixe de façon à permettre le verrouillage de la charnière (1) susdite par rapport à la structure fixe susdite.

3. CHARNIÈRE (1) selon la revendication 1 ou 2, où la première partie (2) susdite est un élément femelle en forme de fourchette ayant un bras supérieur (6) et un bras inférieur (7) s'étendant dans une direction prédominante (Y-Y) transversalement à l'axe de la charnière (X-X) susdit, et que la seconde partie (3) susdite est un élément mâle comportant une portion mâle (9) s'étendant dans un sens transversal (K-K) par rapport à l'axe de la charnière (X-X) susdit, les bras (6,7) susdits et la portion mâle (9) susdite ayant leurs trous respectifs (10, 11a et 11b) alignés le long de l'axe (X-X) susdit pour loger le gond (4) susdit, **caractérisée en ce que** la cheville (15) susdite est introduite dans un orifice de passage (17) pratiqué dans la portion mâle (9) susdite de façon à s'étendre le long du trou axial (10) de la portion mâle (9) susdite et à terminer dans un siège (18) en état de recevoir une portion d'extrémité (15b) de la cheville (15) susdite.

4. CHARNIÈRE (1) selon la revendication 3, où l'orifice de passage (17) susdit est pratiqué dans l'extrémité frontale (9a) de la portion mâle (9) susdite et qu'il s'étend dans le sens transversal (K-K) susdit de la portion mâle (9) susdite.

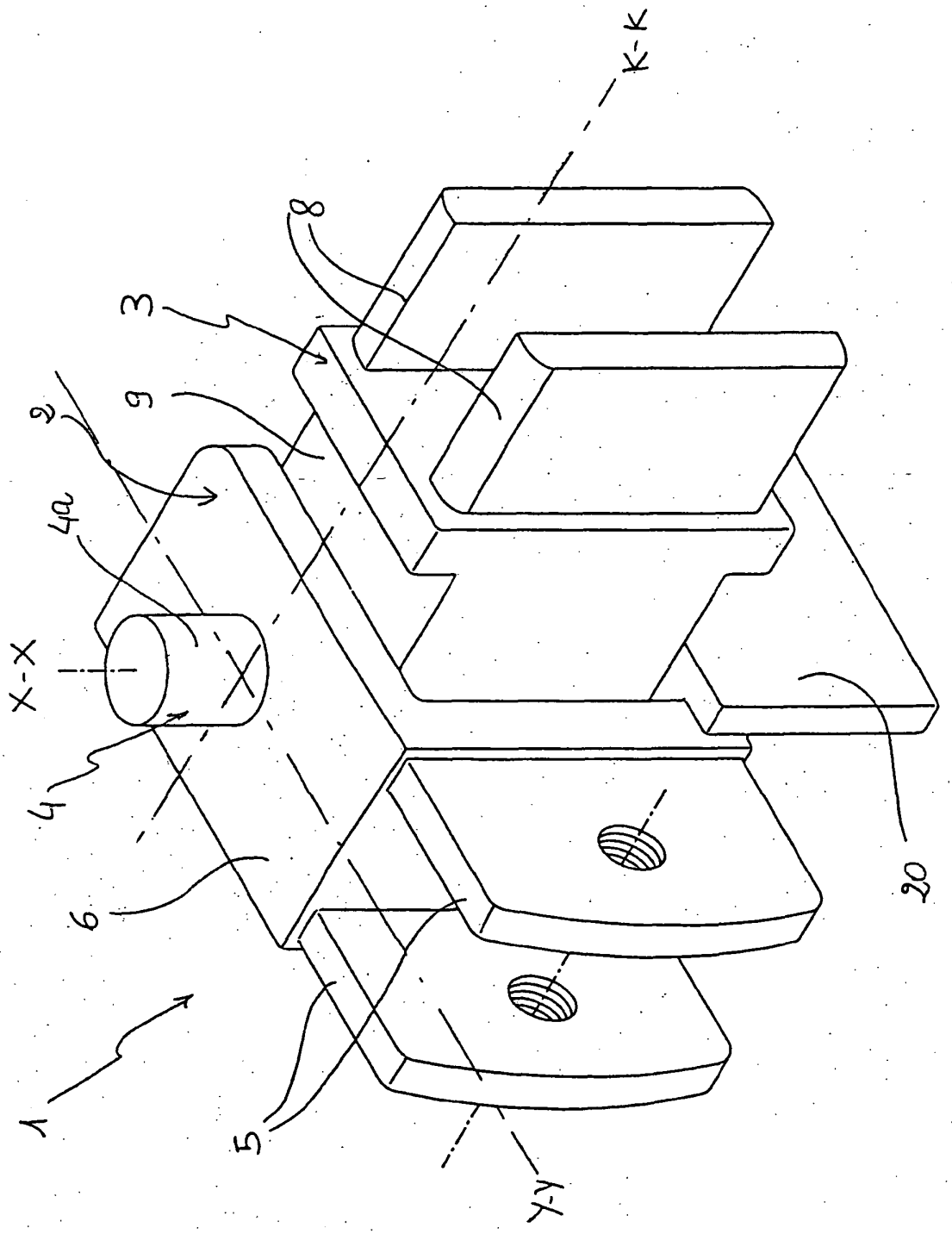


FIG. 1

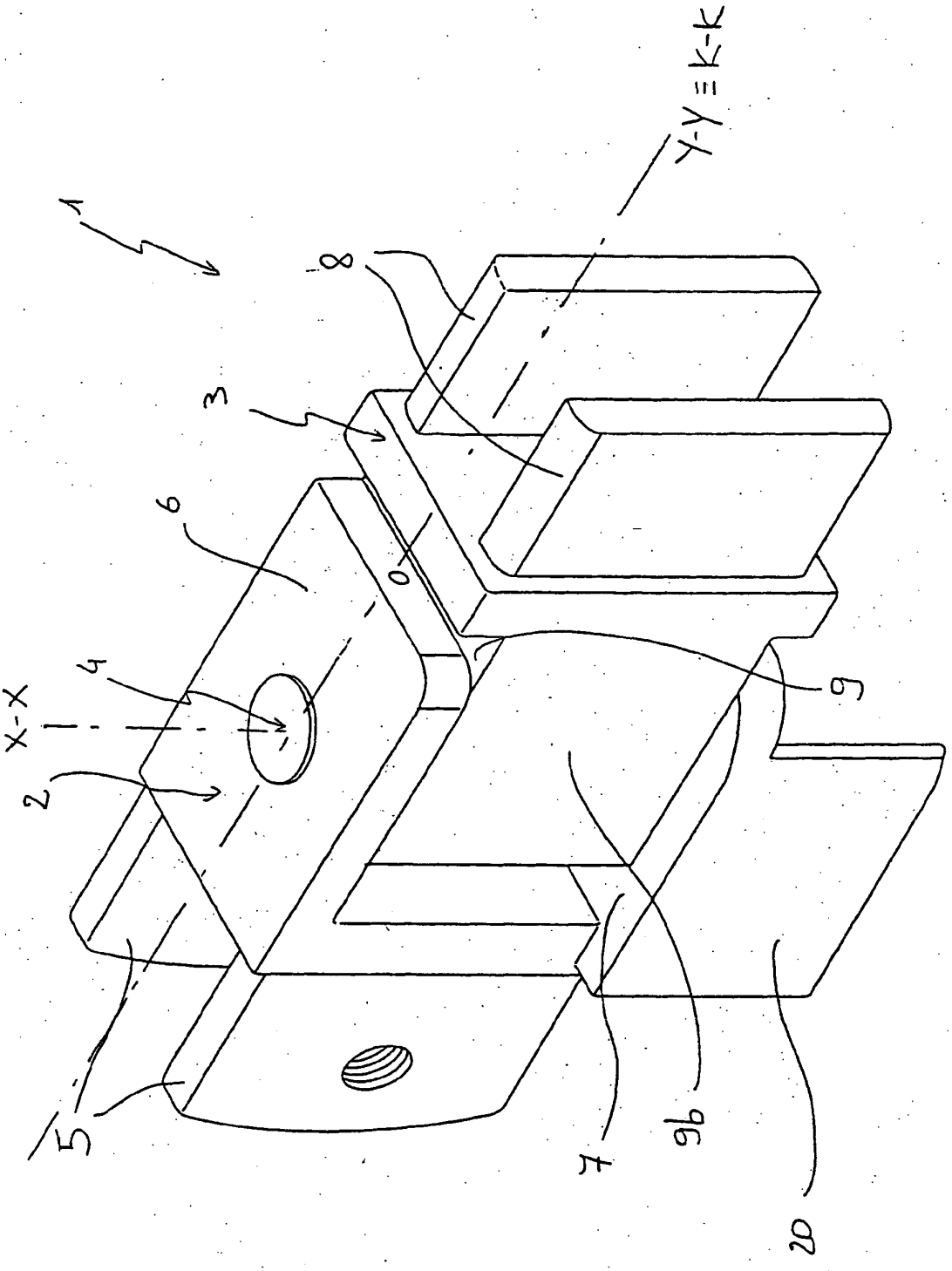


FIG.2

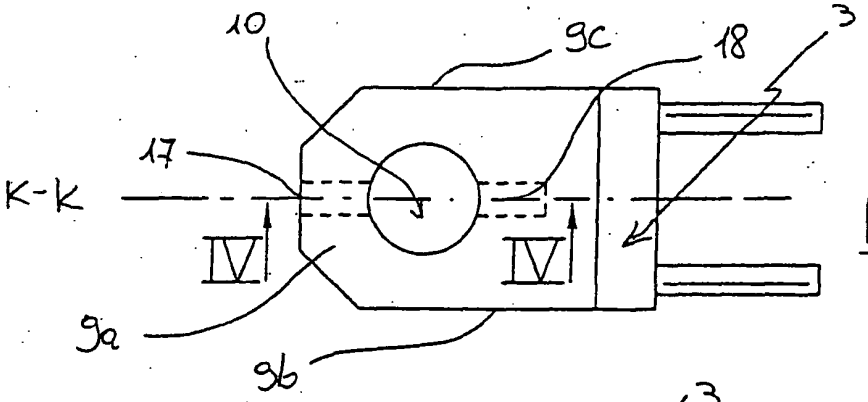


FIG.3

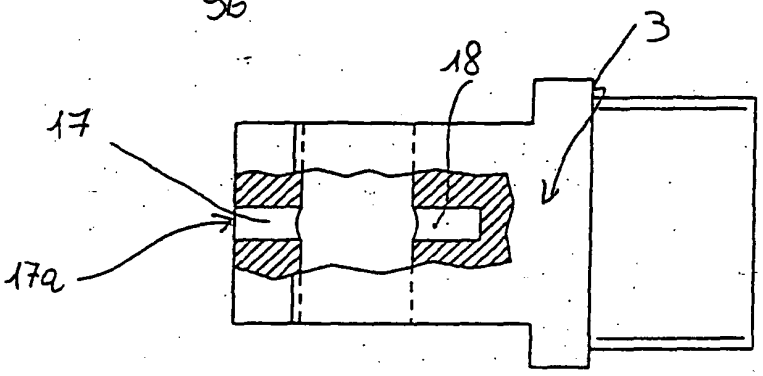


FIG.4

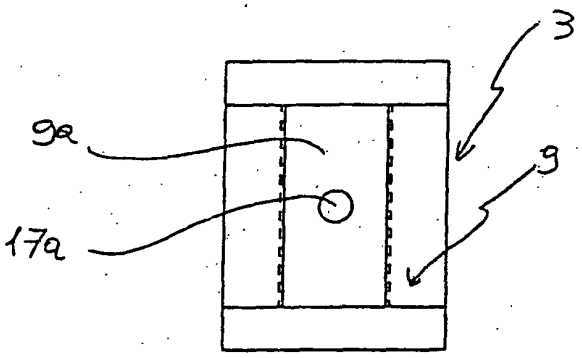


FIG.5

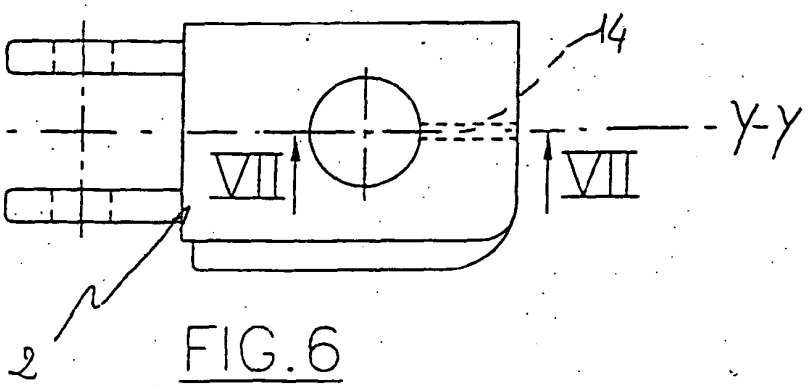


FIG.6

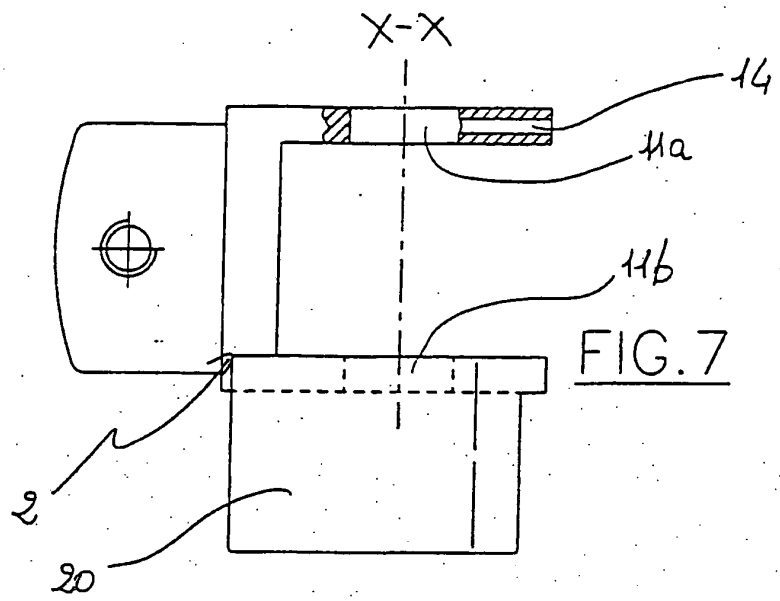


FIG.7

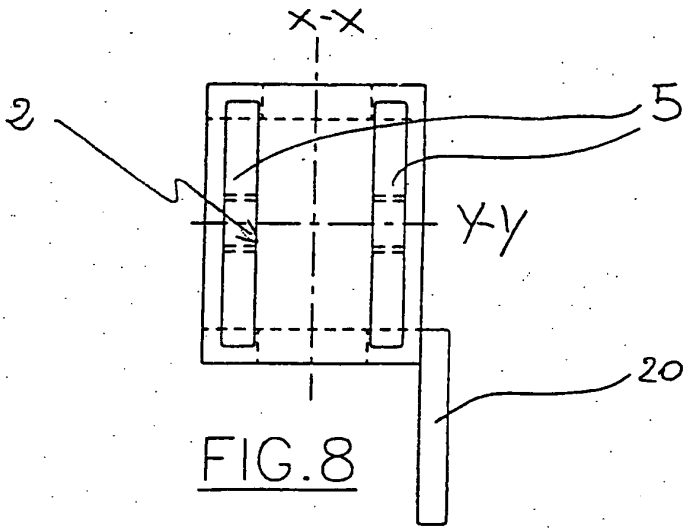


FIG.8

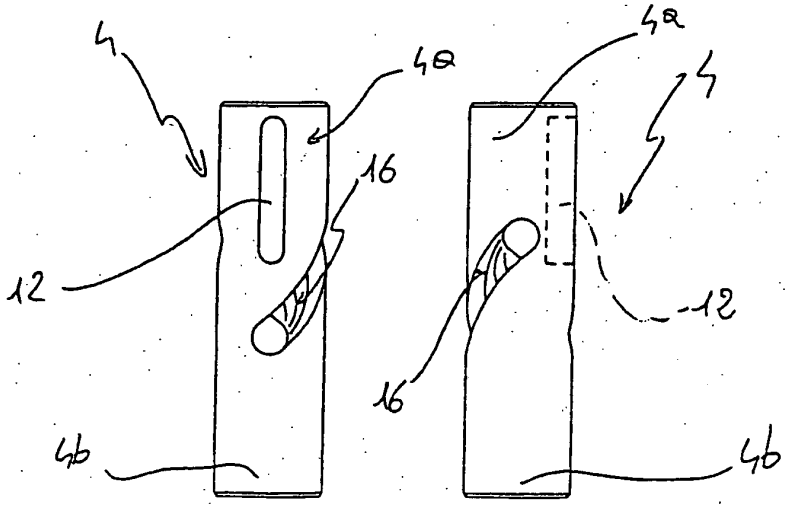


FIG.9 FIG.10

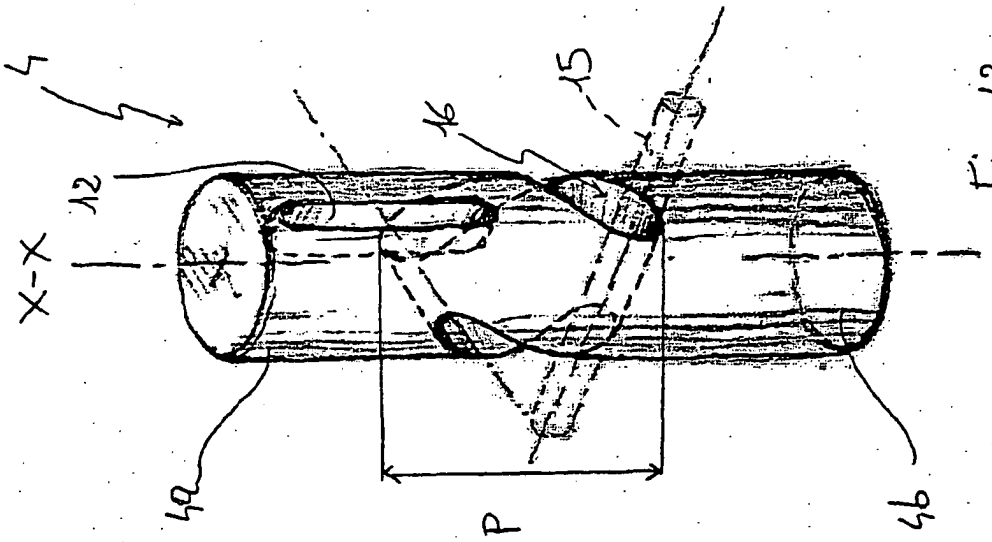


Fig.12

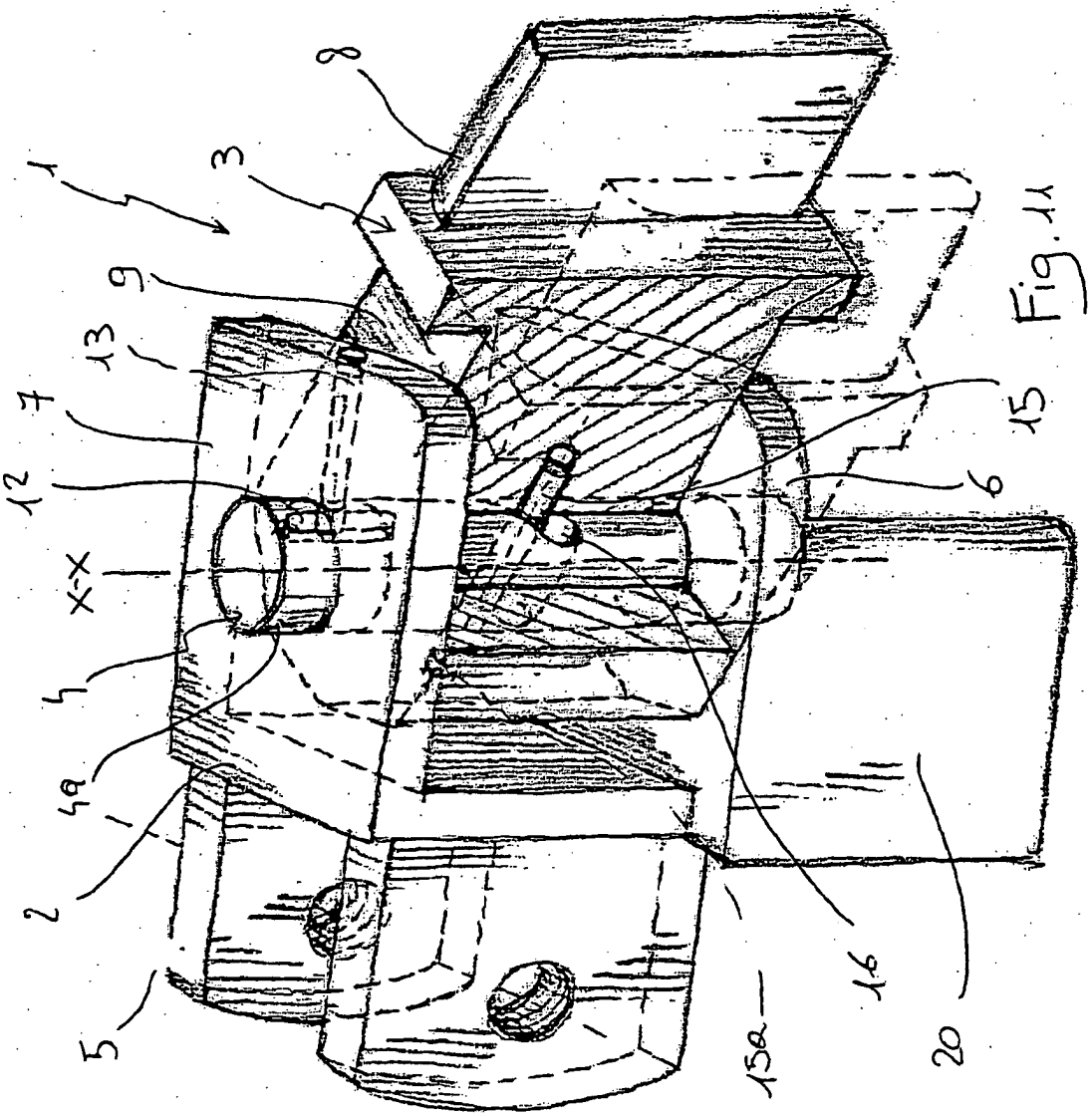


Fig.11

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- IT 1302175 **[0005] [0008]**
- FR 2555236 **[0007] [0008]**