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Cengio (IT). BRUN, Giancarlo [IT/IT]; Via Nazario Sauro, 19, I-36010 Thiene (IT).

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(74) Agent: PROVVISIONATO, Paolo; Provvisionato & Co. S.r.l., Piazza di Porta Mascarella, 7, I-40126 Bologna (IT).

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(71) Applicant (for all designated States except US): TECNOLOGIA S.A.S. DI VALENTINO BRAZZALE & C. [IT/IT]; Via Trenti, 37, I-36010 Cogollo del Cengio (IT).

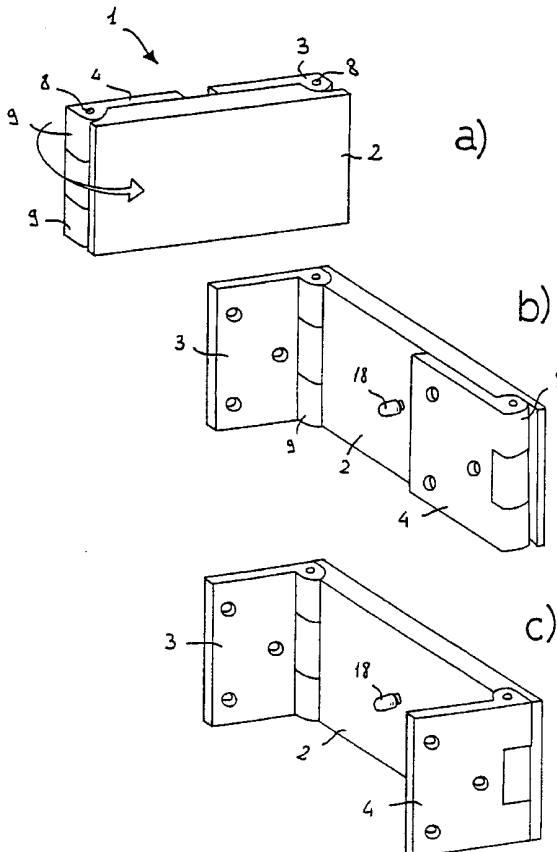
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(72) Inventors; and

(75) Inventors/Applicants (for US only): APOLLONI, Giambattista [IT/IT]; Via Trenti, 35, I-36010 Cogollo del

[Continued on next page]

(54) Title: ARTICULATED WIDE-ANGLE HINGE FOR DOORS AND THE LIKE



(57) Abstract: An articulation hinge having a wide opening radius for doors and the like comprises two hinge members (3, 4, 21) which, in use, are to be connected, respectively, to a structure and to a door which is movable relative to the structure. At least one connecting member (2, 20) comprising sequential locking means (11, 12, 13, 14, 32) for bringing about articulation of the hinge members (3, 4, 21) in succession is articulated between the hinge members (3, 4, 21).



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ARTICULATED WIDE-ANGLE HINGE FOR DOORS AND THE LIKE

The present invention relates to the field of hinges, with particular reference to a hinge of an opening system for doors and the like which comprises a movable member and a fixed member which are articulated to one another.

In general, various types of articulation hinge are known which comprise two hinge members which, in use, are to be connected, respectively, to a structure and to a door which is movable relative to the structure.

The object of the present invention is to produce an innovative hinge for doors or the like which has an increased opening radius while having small dimensions and which maintains features of compactness.

A further object of the present invention is to provide a device which is simple, economical to produce and to put into operation and which is reliable over time.

In order to achieve the objects indicated above, the invention relates to an articulation hinge of the type indicated in the preamble of the present description, characterised in that at least one connecting member comprising sequential locking means for bringing about articulation of the hinge members in succession is articulated between the hinge members.

The invention relates also to a method of articulating doors and the like, characterised in that it comprises the stages of:

- a) providing at least one hinge having a wide opening radius according to the present invention, in which a first of the hinge members is locked in its articulation relative to the at least one connecting member;
- b) imparting a rotation to the at least one connecting member relative to a second of the hinge members, the rotation unlocking the articulation of the first hinge member relative to the connecting member; and
- c) imparting a rotation to the first hinge member relative to the at least one connecting member, the rotation locking the articulation of the second hinge member relative to the connecting member.

One advantage of the present invention resides in the possibility of producing an articulation having a wide opening radius above all for doors having a large lateral thickness.

According to one particular embodiment of the invention, the connecting member also comprises selective locking means for maintaining the hinge in a predetermined opening position, with the advantage of preventing accidental closure of the door.

A further advantage of the present invention resides in the possibility of producing the connecting member using different materials and in accordance with different forms which can be adapted to a large number of conditions of use.

Further features and advantages will become clear from the following detailed description of a preferred embodiment, with reference to the appended drawings which are given purely by way of non-limiting example and in which:

- Figures 1a, 1b and 1c are perspective views of the opening stages of a preferred embodiment of a hinge produced in accordance with the present invention,
- Figure 2 is a side view of a hinge having a wide opening radius according to the present invention,
- Figure 3 is a side view of the base of the hinge of Figure 2,
- Figure 4 is a side view of the hinge members of the hinge of Figure 2,
- Figure 5 is a side view of the hinge illustrated in Figure 1,
- Figure 6 is a plan view of the hinge of Figure 5,
- Figure 7 is a side view of another embodiment of a hinge having a wide opening radius,
- Figure 8 is a side view of a further embodiment of a hinge according to the present invention,
- Figure 9 is a sectional view of the means for articulating the hinge of Figure 8, and
- Figure 10 is a top view of the hinge of Figure 8.

Referring now to the drawings, a hinge 1 for doors, casements and the like comprises a base 2 to which are articulated a fixed wing 3 and a movable wing 4 which, in use, are to be connected, respectively, to a structure and to a door which is movable relative to the structure.

In particular, the base 2, which, for example, although this is not to constitute a limitation, is substantially rectangular, comprises at each of its lateral ends two semicircular recesses 5 between which is formed a passage 7 suitable for the insertion of a pin 8 for the articulation, respectively, of the fixed wing 3 and the movable wing 4. The two substantially quadrangular wings 3, 4 each comprise, in the vicinity of one of their lateral ends, two curved appendages 9 which, in use, are to abut the two recesses 5 and in which are formed two holes 10 for the insertion of the pins 8 in order to articulate the wings 3, 4 to the base 2.

Formed inside the base 2 are two ducts 11 which extend over the entire length of the base 2 until they open out facing the side portions at the location of the recesses 5, and inside which are slidably inserted two cylindrical pegs 12 which are longer than the ducts 11, so that they project from one or other of the side walls of the base 2 in the vicinity of the recesses 5. The respective extensions 9 of the wings 3, 4 each comprise, at the location of the recesses 5, two hollow portions 13, 14 suitable for accommodating one end of a peg 12.

In use, in a closed position of the hinge 1 in which the two wings 3, 4 rest on the inner wall of the base 2, the hollow portions 14 of the movable wing 4 face towards the outlets of the ducts 11 and are engaged by one end of the pegs 12. On the other hand, the hollow portions 13 of the fixed wing 3 are arranged at right-angles to the pegs 12, so that a solid portion of the appendage 9 faces the outlets of the ducts 11. In that configuration it is impossible to rotate

the movable wing 4 because such a movement would force its appendage 9 to push the pegs 12 in the ducts 11 towards the outlets facing the fixed wing 3, while the pegs 12 are already abutting the solid portion of the appendage 9 of the fixed wing 3 and are thus prevented from sliding. On the other hand, it is possible to rotate the base 2 relative to the fixed wing 3, bringing the appendages 9 into abutment with the recesses 5, bringing the hollow portions 13 to the location of the outlets of the ducts 11, and bringing the hinge into an opening position of approximately 90°.

From this opening position, it is possible to open the hinge 1 further by also rotating the movable wing 4 relative to the base 2 so that the appendages 9 force the pegs 12 to slide along the ducts 11 until they engage the hollow portions 13.

In the position of maximum opening of the hinge 1, a solid portion of the appendage 9 of the movable wing 4 faces the outlets of the ducts 11, making it impossible to close the fixed wing 3 according to the same principle as that described above.

With this configuration, it is possible to open and close the hinge 1 by articulating the wings 3, 4 only in a sequential manner starting with the fixed wing 3, so that complete efficiency of the device is ensured.

According to a further particular embodiment of the present invention illustrated in Figure 5, the base 2, which has been described above, comprises a further channel 15 inside

which a further peg 16 is slidably inserted. The movable wing 4 comprises a hollow portion 17 which is suitable for accommodating one end of the peg 16 and which faces the outlet of the channel 15 when the movable wing 4 is in an open position. The peg 16 comprises a knob 18 which extends from the inner portion of the base 2 through a slot 19 in order to permit sliding inside the channel 15.

In use, after bringing the hinge 1 into its position of maximum opening, by moving the knob 18 towards the movable wing 4, the peg 16 slides in the channel 15 in such a manner that it engages the hollow portion 17 and prevents the wing 4 from being closed. Owing to the fact that the fixed wing 3 is already locked thanks to the mechanism explained above for the first embodiment, the whole hinge is locked in its position of maximum opening.

It is, of course, possible to produce the base 2 and the wings 3, 4 of the hinge described hitherto using members having a form different from that illustrated, without thereby modifying the general operating principle of the device, and using different types of material which nevertheless enable the objects and advantages of the present invention to be achieved. The pegs 12, 16 can also be replaced by different locking means which perform the same functions.

Figure 7 shows a variant of the previous embodiments in which the outer ends of the wings 3, 4 comprise an inclined portion 34. With this configuration, during the stages of opening the hinge, the inclined portions 34 come into abutment with the recesses 5 of the base 2, each forming an

opening angle larger than 90° , so that the overall opening angle of the hinge 1 is substantially equal to 270° . The inclined portions 34 may of course be in different forms in order to achieve the desired opening angle.

A further embodiment of the present invention is illustrated in Figure 8 in which a hinge 1 comprises a connecting member 20 to which are articulated two plates 21 which, in use, are secured, respectively, to a fixed member 22 and to a movable member 23 of an opening system for doors, casements and the like.

In particular, the connecting member 20, which, for example, although this is not to constitute a limitation, is U-shaped, comprises on each of its lateral ends two "fork-shaped" appendages 24, each of which has a hole 25 suitable for the insertion of a peg 26 for articulation to the plates 21. A duct 32 which extends over the entire length of the connecting member 20 until it opens out facing the side portions at the location of the ends 24 is also formed inside the connecting member 20. A peg which is longer than the duct 32 is inserted slidably in the duct 32 so that it projects from one or other of the side portions of the connecting member 20 in the vicinity of the ends 24. The peg is produced using a material having characteristics of flexibility, given the curvilinear path which it has to follow inside the connecting member 20.

The plates 21 are also substantially in the shape of a U in which a base portion 27 rests on the inside of a hollow portion 28 formed in the respective members 22, 23, and the

lateral ends 29 are secured, for example by means of screws 30, although this is not to constitute a limitation, to the flat portion of the respective members 22, 23. The base 27 comprises a central projection 31 which is of a thickness equal to the distance between the two "fork-shaped" appendages 24 of the connecting member 20 and which has a hole suitable for receiving the peg 26 for articulation to the appendages 24.

In use, similarly to the description given above, it is possible to open and close the member 23 only in a sequential manner, starting with the rotation of the connecting member 20 relative to the plate 21 connected to the member 22. In this embodiment also, the selective opening of the individual components is achieved by sliding the flexible peg inside the connecting member 20, which locks the articulation of one or other of the plates 21.

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

CLAIMS

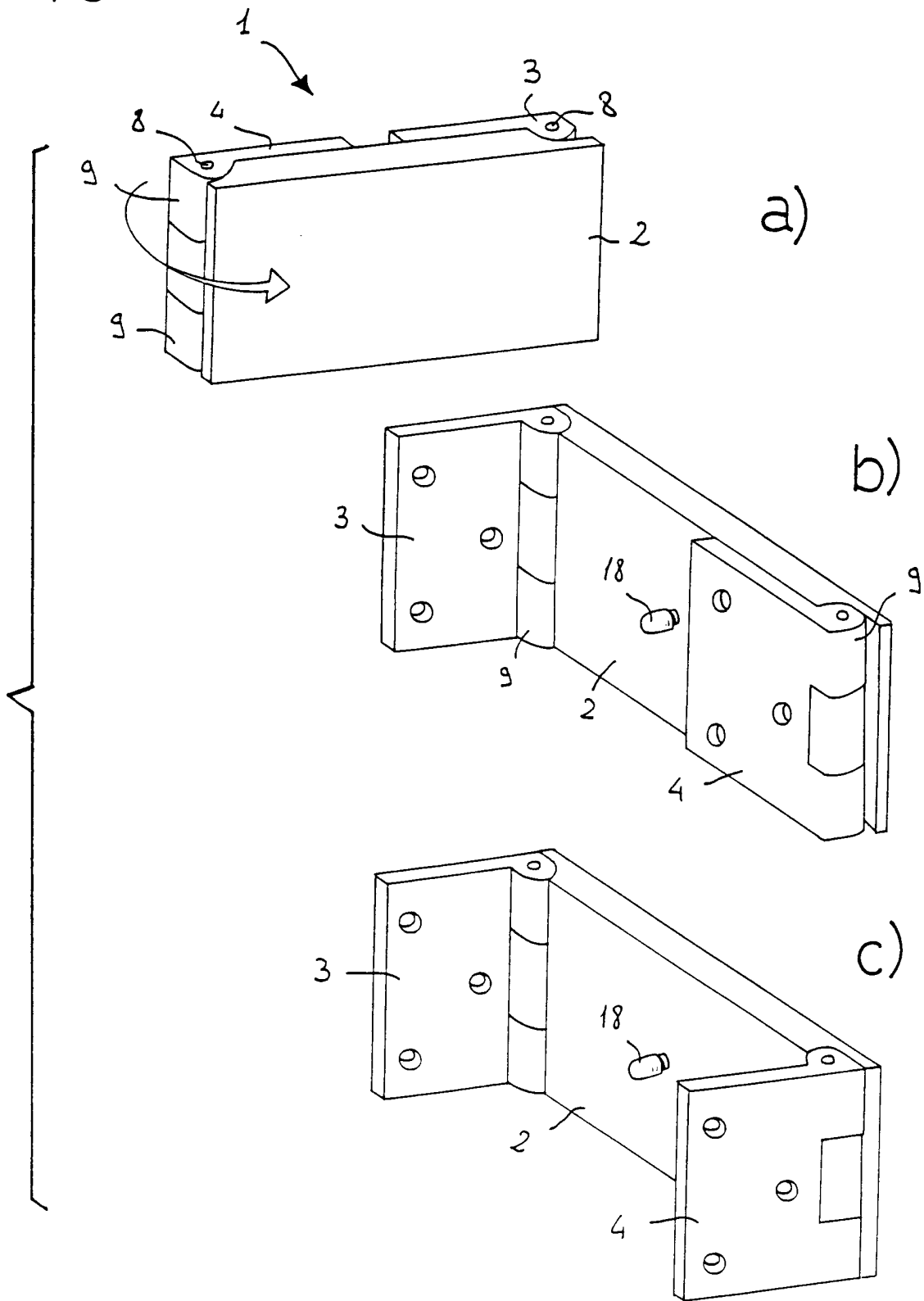
1. An articulation hinge having a wide opening radius for doors and the like, comprising two hinge members (3, 4, 21) which, in use, are to be connected, respectively, to a structure and to a door which is movable relative to the structure, characterised in that at least one connecting member (2, 20) comprising sequential locking means (11, 12, 13, 14, 32) for bringing about articulation of the hinge members (3, 4, 21) in succession is articulated between the hinge members (3, 4, 21).
2. An articulation hinge according to claim 1, characterised in that the sequential locking means comprise one or more pegs (12) which are slidable inside respective channels (11, 32) formed inside the at least one connecting member (2, 20).
3. An articulation hinge according to claim 2, characterised in that at least one recess (13, 14) is formed in each hinge member (3, 4, 21), one or other of the ends of each peg (12) engaging in the at least one recess in the respective hinge member during the sequential articulation thereof.
4. An articulation hinge according to claim 1, characterised in that the connecting member (2, 20) also comprises selective locking means (16, 17, 18) for maintaining the hinge (1) in a predetermined opening position.

5. An articulation hinge according to claim 4, characterised in that the selective locking means comprise one or more pegs (16) which are slidable inside respective channels (15) formed inside the at least one connecting member (2, 20) and which are operated by handle means (18).

6. A method of articulating doors and the like, characterised in that it comprises the stages of:

- a) providing at least one hinge (1) having a wide opening radius according to any one of the preceding claims, in which a first of the hinge members (3, 4) is locked in its articulation relative to the at least one connecting member (2, 20);
- b) imparting a rotation to the at least one connecting member (2, 20) relative to a second of the hinge members (4, 3), the rotation unlocking the articulation of the first hinge member (3, 4) relative to the connecting member (2, 20); and
- c) imparting a rotation to the first hinge member (3, 4) relative to the at least one connecting member (2, 20), the rotation locking the articulation of the second hinge member (4, 3) relative to the connecting member (2, 20).

FIG.1



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FIG. 2

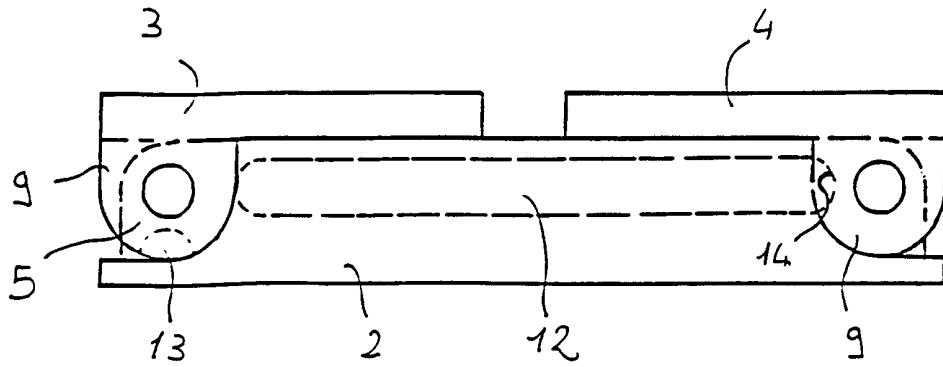


FIG. 3

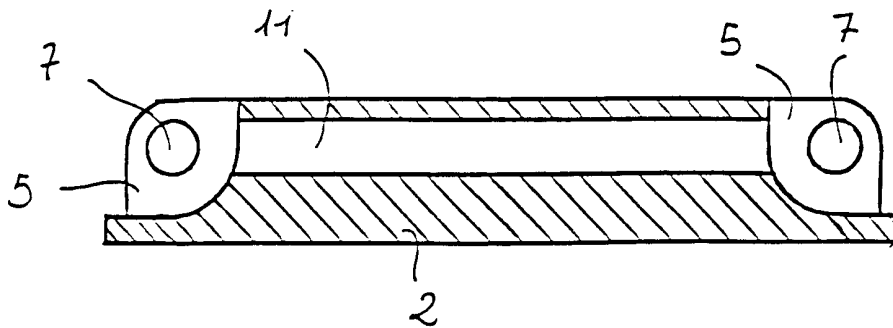
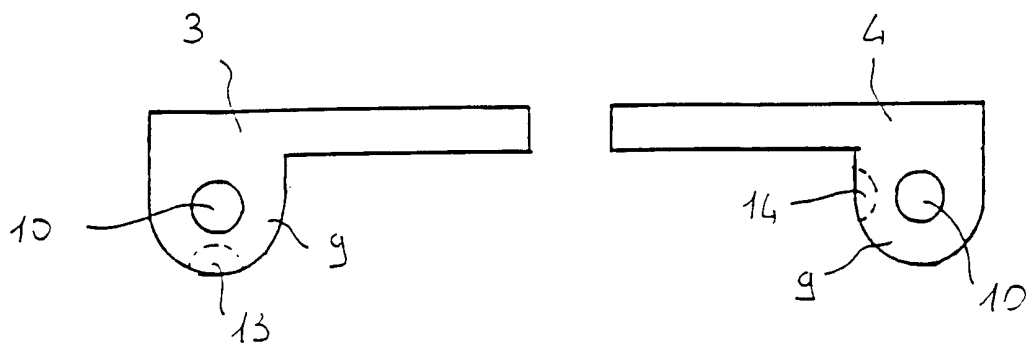


FIG. 4



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FIG. 5

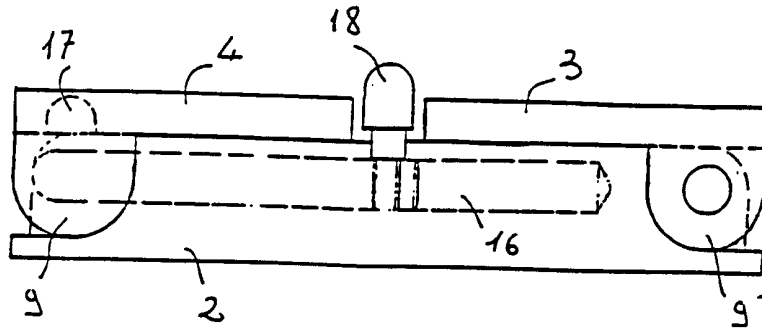


FIG. 6

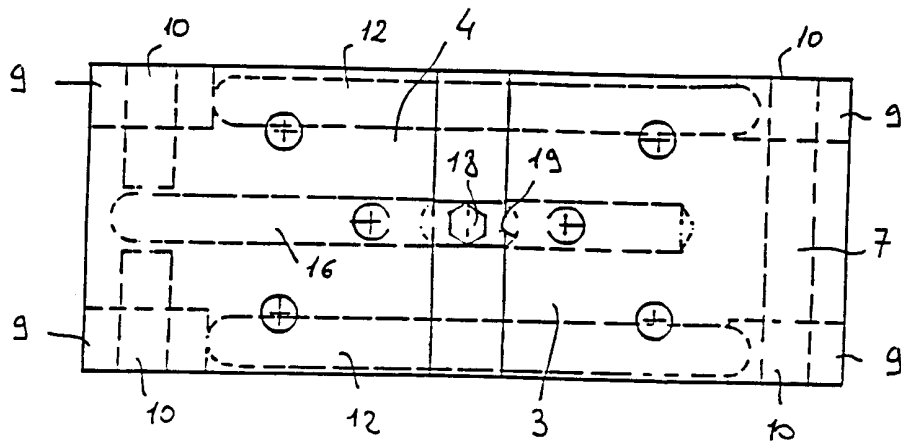


FIG. 7

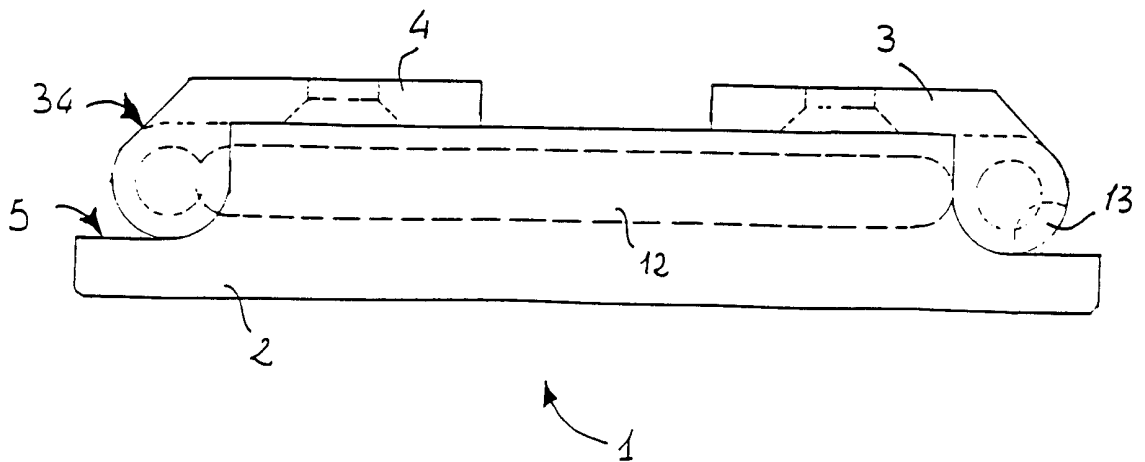


FIG.8

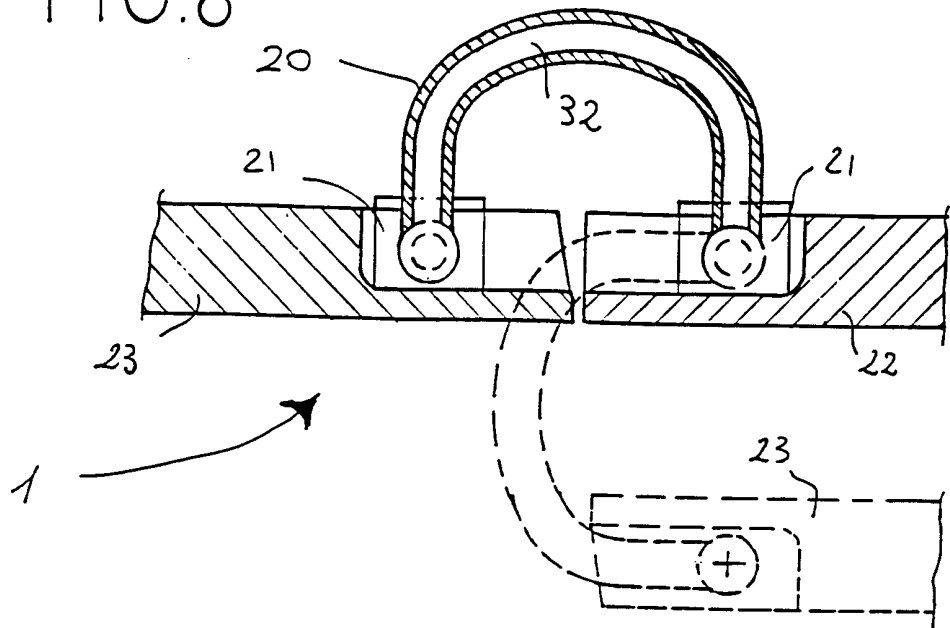


FIG.9

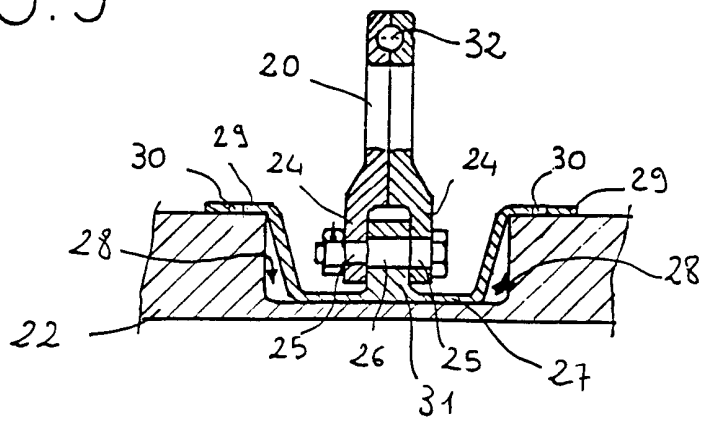
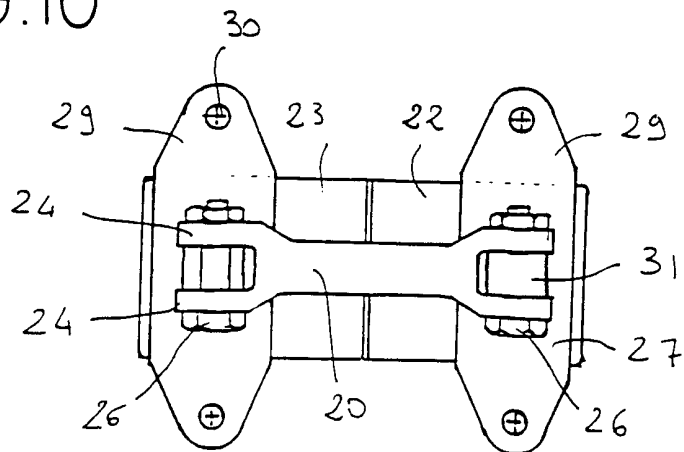


FIG.10



INTERNATIONAL SEARCH REPORT

Int. l. Application No

PCT/IT 00/00208

A. CLASSIFICATION OF SUBJECT MATTER
 IPC 7 E05D3/06 E05D11/10

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 E05D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 1 189 954 A (DAIMLER-BENZ) 29 April 1970 (1970-04-29) page 2, left-hand column; figures ---	1-3,6
X	FR 2 455 156 A (SCHARWAECHTER GMBH CO KG) 21 November 1980 (1980-11-21) page 4, line 35 -page 5, line 35; figures ---	1-3,6
X	DE 42 17 945 A (SCHARWAECHTER GMBH CO KG) 2 December 1993 (1993-12-02) column 3, line 65 -column 4, line 66; figures -----	1,4,6

Further documents are listed in the continuation of box C.

Patent family members are listed in annex.

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Date of the actual completion of the international search

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Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2
 NL - 2280 HV Rijswijk
 Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,
 Fax: (+31-70) 340-3016

Authorized officer

Van Kessel, J

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/IT 00/00208

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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