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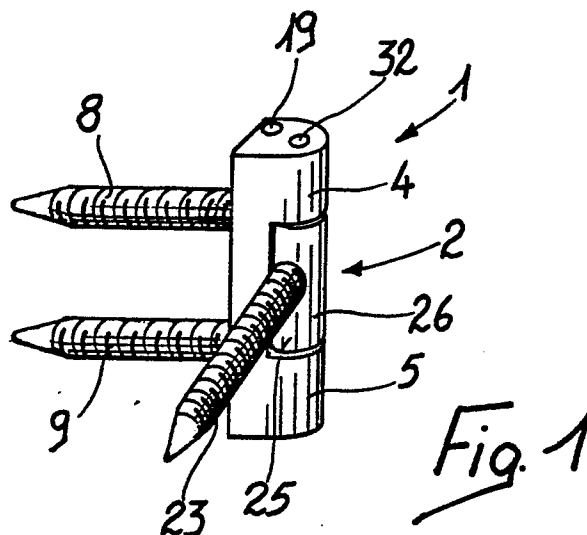
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(54) **Self-closing hinge structure for doors and the like.**

(57) The hinge structure is constituted by two members (1, 2) rotatively mutually coupled by an elastic pivot pin (32). The two members (1, 2) are also mutually associated by a rigid dowel (19) which hinders their mutual rotation. Each of the members is provided with means (8, 9, 23) for coupling to the ends to be hinged. The hinge structure may be provided with elements for the stiffening of its structure.



## SELF-CLOSING HINGE STRUCTURE FOR DOORS AND THE LIKE

The present invention relates to a self-closing hinge structure for doors and the like.

Various types of hinges for the doors of items of furniture can be currently found, among which are those formed by two cylindrical elements axially and rotatably associated by a pivot and each provided with members for respectively fixing the cylindrical elements to the door and to the item of furniture, at the side thereof to be hinged.

The closure of the door is achieved, at the side thereof opposite the hinges, by magnets associated with the inner part of the item of furniture which, upon closure of the door, make contact with ferrous elements associated therewith.

Besides being aesthetically questionable, this type of hinge also has the disadvantage that the magnetic closure is not reliable.

Other hinges currently used are those of the concealed type, mounted internally, which besides implying a considerable constructive complexity, have high production costs.

Furthermore, self-closing hinges disclosed in prior patents are characterized by large dimensions and are thus unsuitable for the specific use.

The aim of the present invention is to provide a hinge structure for doors and the like which is self-closing and has compact dimensions.

An important object of the invention is to provide a hinge structure which is capable of withstanding the stresses due to the opening and closure of the door.

Another object of the invention is to provide a hinge structure constituted by a reduced number of components and which is easy to assemble.

Still another object of the invention is to provide a hinge structure which is easy to apply to furniture in general.

Not least object of the invention is to achieve low cost with conventional plant and equipment.

This aim, as well as these and other objects which will become apparent hereinafter, are achieved by a self-closing hinge structure for doors and the like which is characterized in that it comprises two members, mutually rotatively coupled by elastic means, said members being also associated by a rigid means hindering their mutual rotation, said two members being also provided with means for coupling to the ends to be hinged.

Advantageously said hinge may be provided with elements for stiffening the structure.

Further characteristics and advantages of the invention will become apparent from the description of a preferred but not exclusive embodiment of the self-closing hinge structure, illustrated only by way of non-limitative example in the accompanying

drawings, wherein:

figure 1 is a perspective view of the hinge structure;

figure 2 is a lateral view of a monolithic female element of the hinge structure according to the invention;

figure 3 is a plan view of the element of figure 2;

figure 4 is a sectional view taken along the plane IV-IV of figure 3;

figure 5 is a sectional view taken along the plane V-V of figure 3;

figure 6 is a lateral view of a male element of the hinge structure according to the invention;

figure 7 is a plan view of the male element of figure 6;

figure 8 is a transverse sectional view of the hinge mounting assembly.

With reference to the above described figures, the self-closing hinge comprises a monolithic female element 1 advantageously made of plastic material and being rotatively coupled to a male element 2, also advantageously made of plastic material.

The female element 1 is essentially parallelepipedal in shape and defines a longitudinal surface, indicated by the reference numeral 3, having formed thereon two semicylindrical lugs, respectively 4 and 5, which extend parallel to the longitudinal axis of said element 1 and are spaced apart so as to define a seat 6 adapted for accommodating said male element 2.

From a surface 7 of the female element 1 extending opposite to said longitudinal surface 3, protrude two tabs, 8 and 9, extending perpendicular to the longitudinal axis, and mutually parallel to each other, essentially cylindrical in shape and advantageously have formed thereon annular grip notches 10.

Each of said semicylindrical lugs has formed therein a through hole 11,12 which are co-axial and arranged symmetrically with respect to the center of the longitudinal extension of said seat 6, and each have a cylindrical portion 13 adjacent to said center and by a conical portion 13a, flared towards the side opposite to said center.

The surface 3 furthermore has formed thereon a longitudinal concave recess 14 which is radiused at its outer corners to rounded borders 15 and 16.

Said female element is longitudinally traversed in an eccentric or off-center portion thereof 17 by a cylindrical hole 18, located in such a position that a dowel 19, expediently made of tempered steel, contained therein, protrudes slightly, its outer surface 20 protruding from said concave recess 14 in

the portion comprising said seat 6.

The dowel 19 also advantageously increases the rigidity of the hinge structure.

A transverse concave recess 21 adjacent to said seat 6 is provided on the female element 1 in a substantially central position at a transverse portion 22 opposite to said portion 17.

The male element 2 is elongated in shape, has such a length as to be exactly contained in said seat 6 of said female element 1. From a central portion of the male element 2 protrudes a cylindrical tab 23, extending perpendicular to the longitudinal axis of the male element 2 and having formed thereon transverse annular grip notches 24.

The cross section of said male element 2 is essentially oval and defined by the intersection of two closely set substantially circular profiles, respectively 25 and 26. The first profile 25 is shaped complementarily to said concave recess 14 and the second profile 26 advantageously corresponds to the outer profile of said semicylindrical lugs 4 and 5.

The cylindrical tab 23 is positioned such that when the element 2 is contained in said seat 6 it is substantially perpendicular to said tabs 8 and 9.

Said male element 2 is longitudinally traversed by a hole 17 having an axis coinciding with the axis of said profile 25 and with the axis of said holes 11 and 12 of said tabs 8 and 9 and having a cylindrical central portion 28 and two outwardly flared conical end portions 29 and 30.

The profile 25 has a concave recess 31 which has a shape corresponding to said outer surface 20 of said tempered steel dowel 19.

The elements 1 and 2 are rotatively coupled by an elastic pivot pin 32, advantageously made of tempered steel and being inserted in said holes 11, 12 and 27.

It is also possible to reinforce said tabs 8, 9 and 23 with internal longitudinal stiffening steel dowels, not shown in the figures for clarity purposes.

The operation of the hinge is as follows: when the coupling of the elements 1 and 2 to the pivot pin 32 has occurred and the dowel 19 has been inserted, they can mutually rotate about their common axis only if the obstacle constituted by the dowel 19, shaped complementarily to the concave recess 31, is overcome.

This is achieved by the elasticity of the pivot pin 32 and the conical portions of the holes 11, 12 and 23 which allow elastic deformation of said pivot pin 32 and temporary movement of the profile 25 away from the concave recess 14.

From what has been described it is apparent that the hinge achieves the intended aim and objects since the presence of the dowel 19 ensures the possibility of self-closure and the elasticity of

the pivot pin 32 ensures the possibility of rotation and permits an opening condition.

The hinge structure is advantageously of compact dimensions and has a rigid structure constituted by a reduced number of components.

The invention thus conceived is susceptible to numerous modifications and variations, all of which are within the scope of the inventive concept.

Moreover, all the details may be replaced with other technically equivalent elements.

In practice, the materials employed, as well as the dimensions, may be any according to the requirements.

## Claims

1. Self-closing hinge structure for doors and the like, characterized in that it comprises two members (1,2) mutually rotatively coupled by elastic means (32), said two members being also mutually associated by a rigid means (19) hindering their mutual rotation, said two members being provided with means (8, 9, 23) for coupling to the ends to be hinged.

2. Hinge structure according to claim 1, characterized in that its structure may be provided with stiffening elements constituted by steel dowels inserted internally thereto.

3. Hinge according to claims 1 and 2, characterized in that a first one (1) of said two members is essentially parallelepipedal in shape and extends on one of its longitudinal surfaces (3) with two identical semicylindrical lugs (4, 5) parallel to its longitudinal axis and mutually spaced so as to form a seat (6) for a second one (2) of said members, said first member (1) extending with two tabs (8, 9) perpendicular to its longitudinal axis, mutually parallel, essentially cylindrical in shape and provided along their entire length with annular grip notches (10).

4. Hinge according to the preceding claims, characterized in that said semicylindrical tabs (8, 9) are longitudinally provided with two holes (11, 12) with coinciding axes, symmetrical with respect to the center of said seat (6), each formed by a cylindrical portion (13) adjacent to said center and by a conical portion (13a) flared in the direction opposite to said center.

5. Hinge according to the preceding claims, characterized in that the surface (3) of said first member (1) adjacent to said seat (6) for said second member (2) is provided with a longitudinal semicylindrical concave recess (14) which connects to the outer corners with rounded borders (15, 16).

6. Hinge according to the preceding claims, characterized in that said first member (1) is longitudinally traversed in an eccentrical portion (17) thereof by a cylindrical hole (18) in such a position that a dowel (19) contained therein protrudes slightly with its outer surface (20) from said surface comprising said seat (6) for said second member (2), there being furthermore provided on said first member, in central position at a portion (22) opposite to the one (17) containing said cylindrical hole, a transverse concave recess (21) adjacent to said seat (6) for said second member (2).

7. Hinge according to the preceding claims, characterized in that said second member (2) elongated in shape has such a length as to be exactly contained in said seat (6) of said first member (1) and extends centrally with a cylindrical lug (23) perpendicular to its axis and provided along its entire length with transverse annular grip notches (24), the cross section of said member (2) being essentially oval and obtained by two closely set circular profiles (25, 26) a first one (25) whereof is shaped complementarily to said concave recess (14) of the surface of said seat provided on said first member and a second one (26) is identical to the profile of said semicylindrical lugs (4, 5).

8. Hinge according to the preceding claims, characterized in that the position of said cylindrical lug (23) at which said second member (2) extends is such that when the latter is exactly contained in said seat (6) of said first member (1) it is substantially perpendicular to said parallel tabs (8, 9) with which said first member (1) extends.

9. Hinge according to the preceding claims, characterized in that said second member (2) is longitudinally traversed by a hole (17) with axis coinciding with that of said profile (25) shaped complementarily to said concavity and with that of said holes (11, 12) provided on said tabs (8, 9), said hole being formed by a central cylindrical portion (28) and by two conical outwardly flared end portions (29, 30).

10. Hinge according to the preceding claims, characterized in that said profile (25) shaped complementarily to said concavity provided on the surface of said seat of said first member is provided with a concave recess (31) shaped complementarily to the outer surface (20) of said tempered steel dowel (19).

11. Hinge according to the preceding claims, characterized in that said first (1) and second (2) member are rotatively coupled by an elastic pivot pin (32) in tempered steel inserted in said holes (11, 12, 27) with coinciding axes.

12. Hinge according to the preceding claims, characterized in that said essentially cylindrical tabs (8, 9, 23) may be provided with internal longitudinal stiffening steel dowels.

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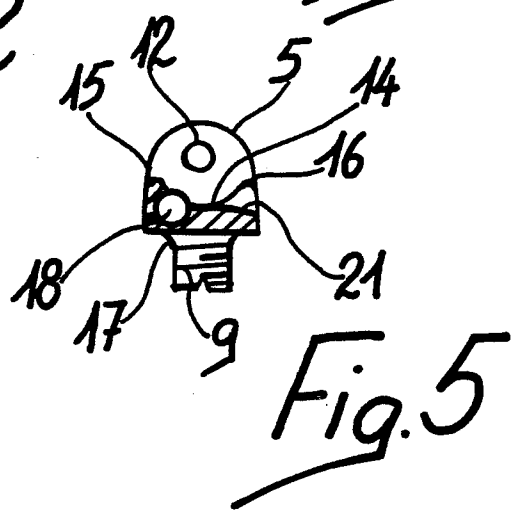
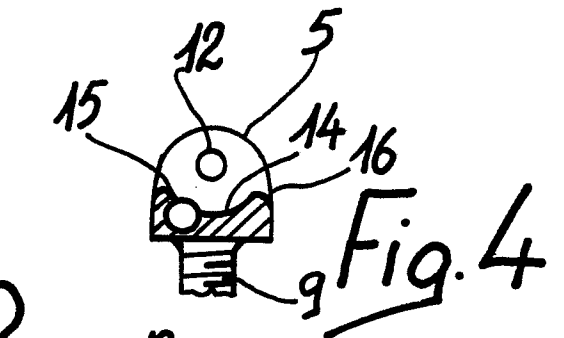
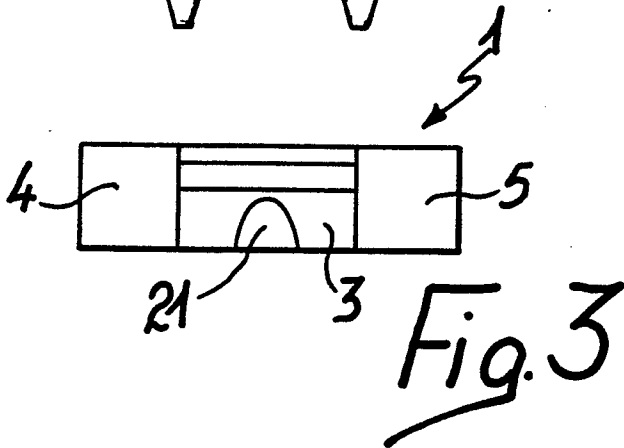
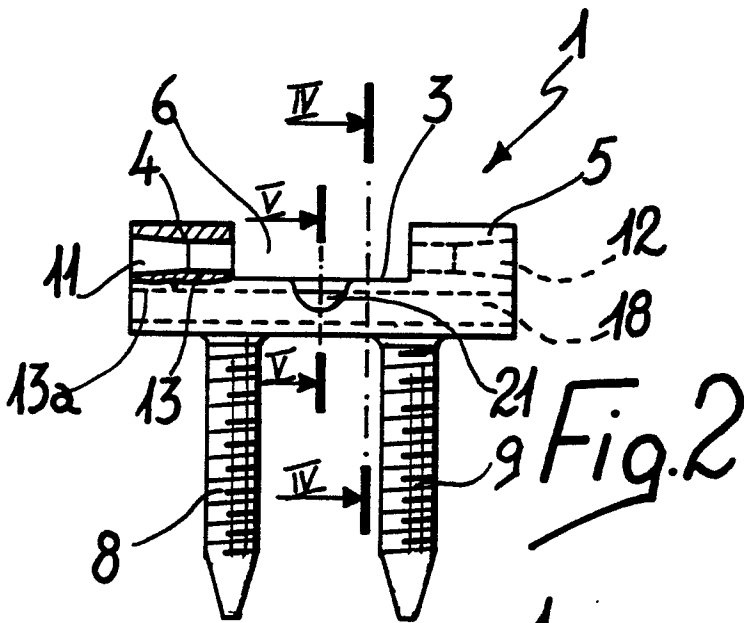
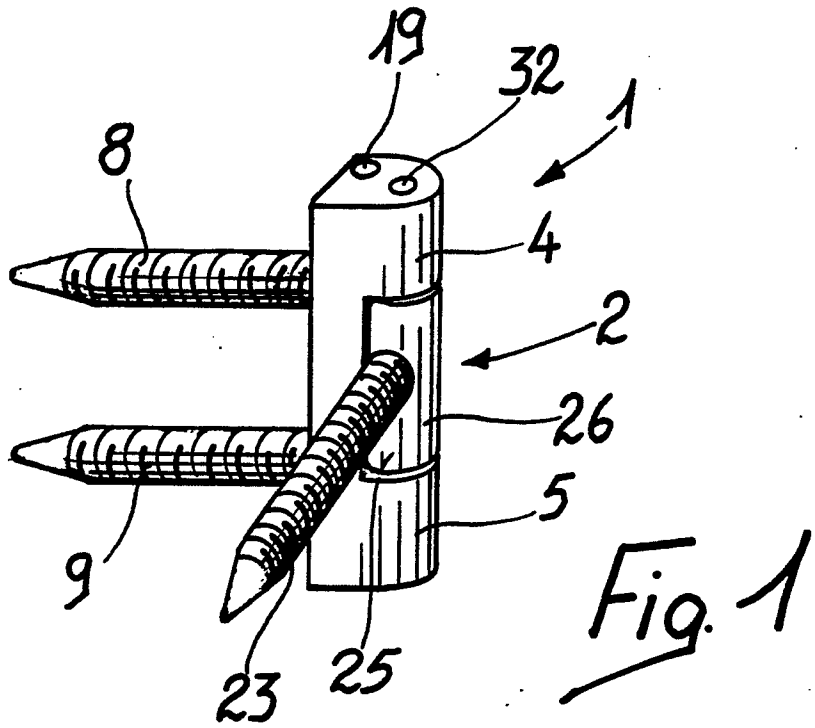
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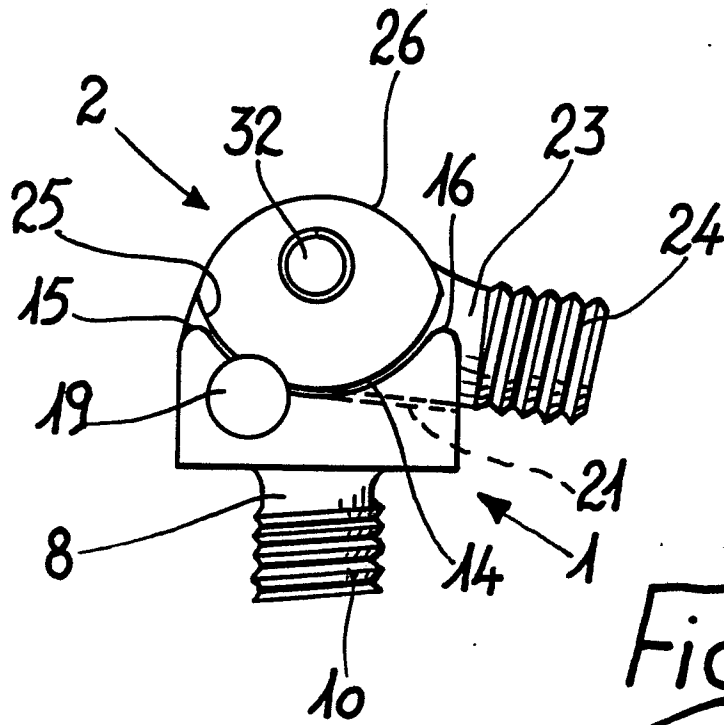
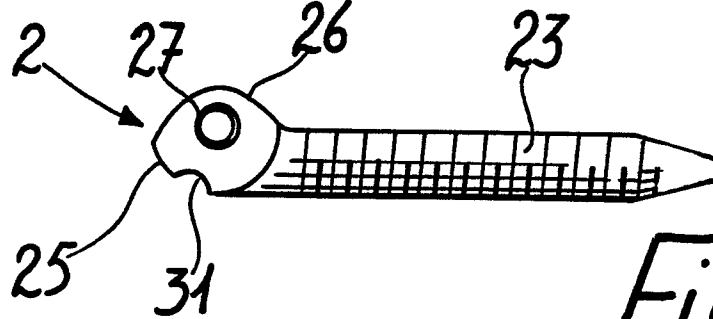
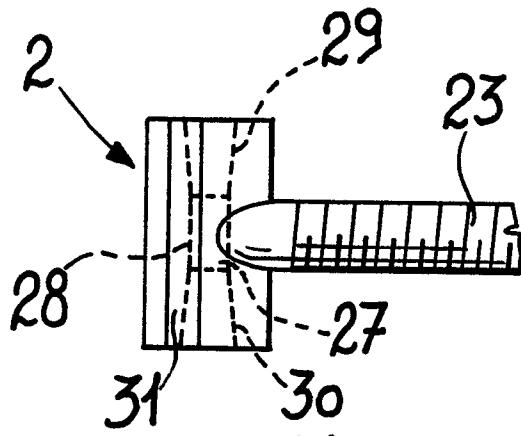
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DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
X	US-A-3 397 422 (L. YOUNGDALE) * Figures 1-10; column 1, line 68 - column 2, line 67 *	1	E 05 D 11/10
A	---	11	
A	CH-A- 450 215 (BLAIR PRODUCTS S.A.) * Figures 1-6; column 2, line 1 - column 3, line 7 *	1,4	
A	FR-A-2 089 301 (ELSTER & CO AG) * Figures 1,2; page 2, lines 19-28 *	1,6	
A	GB-A- 980 181 (J.H. DELHASE) -----		
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			E 05 D
Place of search		Date of completion of the search	Examiner
THE HAGUE		27-05-1988	SCHEIBLING, C.D.A.
CATEGORY OF CITED DOCUMENTS			
X : particularly relevant if taken alone		I : theory or principle underlying the invention	
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