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(54) **ARTICULATED DAMPED SNAP HINGE**

(57) The invention relates to a dampened snap hinge (1) for furniture, comprising a first and a second articulated quadrilateral, associated with a first and a second plate (2,3) for fixing to a wall and a door of a piece of furniture, the quadrilaterals each comprising a pair of rocker arms (5,7; 8,10) of which one extends beyond the vertex (13) of the relative quadrilateral so as to form a connecting rod (6,9) of the other quadrilateral and a pair of articulated levers (23,24) extending between the rocker arms (5,7) of the quadrilateral of the first plate (2), wherein the connecting rod (9) of the quadrilateral of the

second plate (3) comprises an extension that extends beyond a hinge point (91) with a first of the respective rockers (10)

the hinge (1) also comprising elastic means (40) for opposing the rotation of the door of the furniture, which extend between a body of one of the articulated levers (23) and an engagement abutment (42) coupled with the first plate (2)

a damper (4) coupled between the extension of said connecting rod (9) and the first rocker arm (10).

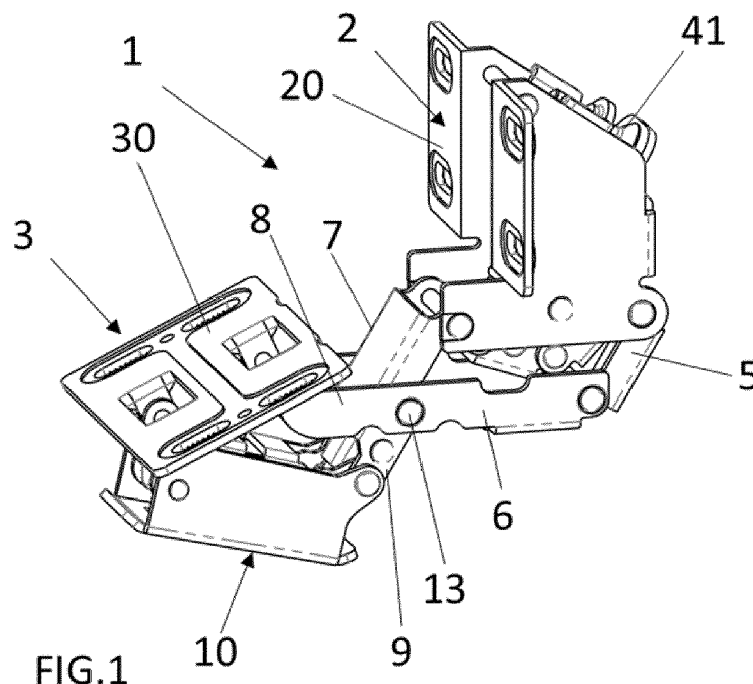


FIG.1

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Description

TECHNICAL FIELD

[0001] The present invention relates to hinges with a snap opening and closing movement, in which a pair of articulated quadrilaterals, respectively fixed to the door and to a wall of a piece of furniture, have elements in common; these hinges are preferably assembled when a door (rotatable around a horizontal axis) must be firmly kept in a raised, open condition.

[0002] A typical application of these hinges is for caravans or campers, in which a certain force must be applied for keeping the door raised and preventing it from lowering.

[0003] These hinges comprise a damper (usually with oil) destined for slowing down the movement and preventing the door from reaching the end position in a violent manner.

STATE OF THE ART

[0004] A known solution is described in European patent application EP2947246 which teaches how to produce a hinge of the above type in which the spring acts between the connecting rod and the rocker arm of one of the quadrilaterals and a damper that acts between one of the plates and the connecting rod of the other rocker arm, each of the two connecting rods being an extension of the other.

[0005] Another known solution, developed by the same Applicant, is described in EP2166285, which teaches how to produce a damped snap hinge in which the spring acts on an articulation point of two levers in turn articulated to appendices of the rocker arms of a quadrilateral according to the preamble of claim 1.

[0006] Even if functional, these solutions seem to have the limit of not being particularly suitable for high weights or dimensions of the doors, due to the position of the spring and/or damper.

[0007] A further limit that seems to emerge from these solutions is linked to a generally reduced braking angle. Furthermore, in the known hinges, the damper is practically always visible, which entails the risk that possible oil leaks may fall inside the furniture.

[0008] Due to their configuration, moreover, damped hinges essentially differ - in shape and size - from non-damped hinges, so that the assembly of a pair of hinges, one damped and the other not, on the same door, is not feasible.

OBJECTIVES AND SUMMARY OF THE INVENTION

[0009] The objective of the present invention is to overcome the limits of the known art.

[0010] A further objective of the present invention is to provide a damped snap hinge which is relatively simple to produce and with limited dimensions.

[0011] Another objective of the present invention is to provide such a hinge which can be used with doors having significant dimensions and weights.

[0012] Yet another objective of the present invention is to provide such a hinge that is able to guarantee an ample braking angle.

[0013] A further objective of the present invention is to provide such a hinge wherein the damper is assembled in a hidden position, to avoid the risk of soiling the interior of the furniture in the case of oil leaks.

[0014] Another objective of the invention is to provide a damped snap hinge which can be coupled with a non-damped hinge, sharing dimensions and/or forms with the same.

[0015] A first object of the present invention therefore relates to a hinge according to the first enclosed claim, optionally having the characteristics of the dependent claims.

[0016] The general idea at the basis of the invention is to provide a damped snap hinge for furniture, comprising a first and a second articulated quadrilateral, associated with a first and a second plate for fixing to a wall and a door of a piece of furniture, the quadrilaterals each comprising a pair of rocker arms of which one extends beyond the vertex of the relative quadrilateral so as to form a connecting rod of the other quadrilateral and a pair of articulated levers extending between the rocker arms of the quadrilateral of the first plate, wherein the connecting rod of the quadrilateral of the second plate comprises an extension that is prolonged beyond a hinge point with a first of the respective rocker arms, the hinge also comprising elastic means for opposing the rotation of the door of the piece of furniture, which extend between a body of one of the articulated levers and the first plate and a damper coupled between the extension of the connecting rod and the first rocker arm.

[0017] Optional advantageous features of the invention are contained in the enclosed claims, which should be considered as being an integral part of the present description.

BRIEF DESCRIPTION OF THE DRAWINGS

[0018] The invention is described hereunder with reference to the non-limiting examples, provided for illustrative and non-limiting purposes in the attached drawings. These drawings illustrate different aspects and embodiments of the present invention and, when appropriate, reference numbers indicating structures, components, materials and/or similar elements in different figures are indicated with similar reference numbers.

Figure 1 illustrates a perspective view of a hinge according to the invention;

Figure 2 illustrates a partial exploded perspective view of the hinge of Figure 1;

Figures 3 and 4 illustrate sections of the hinge of the previous figures in two stable run-end conditions;

Figure 5 illustrates a section of the hinge of the previous figures in an unstable passage condition between the run-end conditions.

DETAILED DESCRIPTION OF THE INVENTION

[0019] Whereas the invention can undergo various modifications and alternative constructions, some relative illustrative embodiments are shown in the drawings and are described in detail hereunder.

[0020] It should be understood, however, that there is no intention of limiting the invention to the specific embodiment illustrated, but, on the contrary, the invention intends to cover all the modifications, alternative and equivalent constructions, that fall within the scope of the invention as defined in the claims.

[0021] The use of "for example", "etc", "or" indicates non-exclusive alternatives without limitation unless otherwise specified. The use of "comprises" means "comprises, but not limited to" unless otherwise specified.

[0022] With reference to the enclosed figures 1-5, these show a non-limiting embodiment of a damped snap hinge 1 for furniture, according to the invention.

[0023] The hinge 1 comprises a first and a second articulated quadrilateral, respectively associated with a first and a second plate 2,3 for fixing to a wall and a door of a piece of furniture (not shown).

[0024] For this purpose, the plates 2, 3 are provided with engagement means with the door and the furniture, shown here as holes for screws, but equivalently replaceable or integrable with pins or the like.

[0025] In the example shown, the plate 3 is destined for being coupled with the door and comprises, for this purpose, a substantially flat engagement surface 30; the plate 2 analogously also comprises a substantially flat engagement surface 20, as can be clearly seen in figures 1 and 2.

[0026] The two engagement surfaces 20 and 30, in run-end positions of the hinge 1, have different layouts: with reference to figure 3 (door closed) and figure 4 (door open) it can be observed that in a closed position, the surfaces 20 and 30 are substantially arranged on parallel planes, whereas in an open position, the surfaces 20 and 30 are substantially arranged on perpendicular planes; in this respect, it should be noted that, completely equivalently, in some embodiments, the arrangement of the surfaces 20 and 30 especially in the run-end position corresponding to when the door is open, can vary, as it is not perpendicular, but variably angled depending on the installation requirements; the run-end position corresponding when the door is closed, on the other hand, normally always has a parallel orientation of the surfaces 20, 30.

[0027] In this respect, it should be noted that the surfaces 20, 30 can be equivalently continuous or have grooves or interruptions, as in the case illustrated.

[0028] With respect to the hinge 1, each quadrilateral, of the first or second plate 2 or 3, comprises a pair of

rocker arms 5 and 7 (for the quadrilateral of the first plate 2) or 8 and 10 (for the quadrilateral of the second plate 3).

[0029] At least one rocker arm of each quadrilateral extends beyond the vertex 13 of the relative quadrilateral and forms the connecting rod 6,9 of the other quadrilateral.

[0030] In figures 3-5, it can be noted that the rocker arms 5,7 of the first quadrilateral are each connected to a lever 23,24 in correspondence with an eccentric extension with respect to the fulcrum of the rocker arm on the plate 2.

[0031] More specifically, the eccentric extensions of the rocker arms to which the levers 23,24 are hinged, protrude from respective rocker arms 5 and 7, on their side facing the inside of the articulated quadrilateral.

[0032] According to the preferred embodiment illustrated in these figures, in correspondence with the open and closed position of the hinge, the two extensions of the rocker arms are on opposite sides with respect to the line that joins the vertices (hinge points of the rocker arms 5, 7 with the plate 2) of the first articulated quadrilateral.

[0033] As a result, the relative arrangement of the extensions is consequently offset by 180°, so that while moving solidly with a concurrent angular rotation (i.e. like that of the respective rocker arms 5, 7), they have peripheral velocities offset by 180° and therefore opposite.

[0034] The levers 23, 24 extend between the rocker arms 5, 7 and are articulated to each other by means of a central pin, so that an activation of the rocker arms 5, 7 corresponds to a movement of the levers 23, 24.

[0035] The snap mechanism of the hinge 1 comprises elastic means 40 for opposing the rotation of the door of the furniture, which extend between a body of one of the articulated levers 23 and an engagement abutment 42 coupled with the first plate 2.

[0036] The elastic means 40, in this embodiment, comprise one (or more) helical traction or traction-compression spring (s).

[0037] Under the run-end operating conditions of figures 3 and 4, the spring 40 is substantially at rest (unless it is preloaded, as better described hereunder) so that in the passage from one to the other during the opening and closing of the door, it is subjected to traction causing the snap movement of the hinge 1.

[0038] In this respect, it can be noted that in an intermediate passage position, such as that of figure 5, the spring 40 is subjected to the maximum elongation.

[0039] Furthermore, the connecting rod 9 of the quadrilateral of the second plate 3 characteristically comprises an extension which extends beyond a hinge point 91 with the rocker arm 10.

[0040] The extension of the connecting rod 9 is articulated with a damper 4 by means of the pin 92; at the other, opposite, end, the damper 4 is rotatably coupled with the first rocker arm 10.

[0041] The extension of the connecting rod 9 is substantially aligned with the body of the same, so that the hinge point 91, the vertex 13 and the pin 92 are - prefer-

ably - substantially aligned with each other.

[0042] In this way, the movement of the door can be damped, avoiding impact or excessively violent movements, resulting in an optimum hinge, considering as a whole, the kinematism, the length of the levers, the braking angle which also represents a valid alternative to commercial hinges.

[0043] The first rocker arm 10 of the second plate 3 advantageously comprises two substantially open box-shaped bodies 101,102, coupled with each other to define walls of a housing chamber for the damper 4: in this way, the damper 4 remains protected from powder and dirt. Furthermore, if the damper 4 is a hydraulic cylinder (e.g. oil or grease), in the case of a leakage between its stem and the cylinder, it is at least partially withheld in the chamber which is formed between the bodies 101,102, preventing the interior of the furniture from being soiled.

[0044] It should be noted in this respect that, when the door is in a closed condition (figure 3), the chamber which is formed is tilted towards the door and not towards the furniture, so that any possible liquid lost does not fall inside the furniture, but towards the door.

[0045] The elastic means 40 are preferably provided with a preloading device, suitable for varying the elastic response, or rather the response of the means themselves.

[0046] More specifically, in the example provided, the engagement abutment 41, 42, coupled with the first plate 2 with which the means 40 are coupled, is movable with respect to the first plate 2, so as to modify the length of the elastic means 40 to create a preloading of the same.

[0047] In the case illustrated, the movable engagement abutment 41, 42, comprises a slide 42 that can be moved with respect to the first plate 2 thanks to guides on the latter (not shown) and a screw regulation element 41 acting between the slide 42 and the first plate 2.

[0048] The screw regulation element has a head with an imprint for an actuation tool which rests against a flap of the plate, so that by rotating the element 41, this causes a linear movement of the slide 42 and, ultimately, the lengthening or shortening of the spring 40 which modifies its preloading.

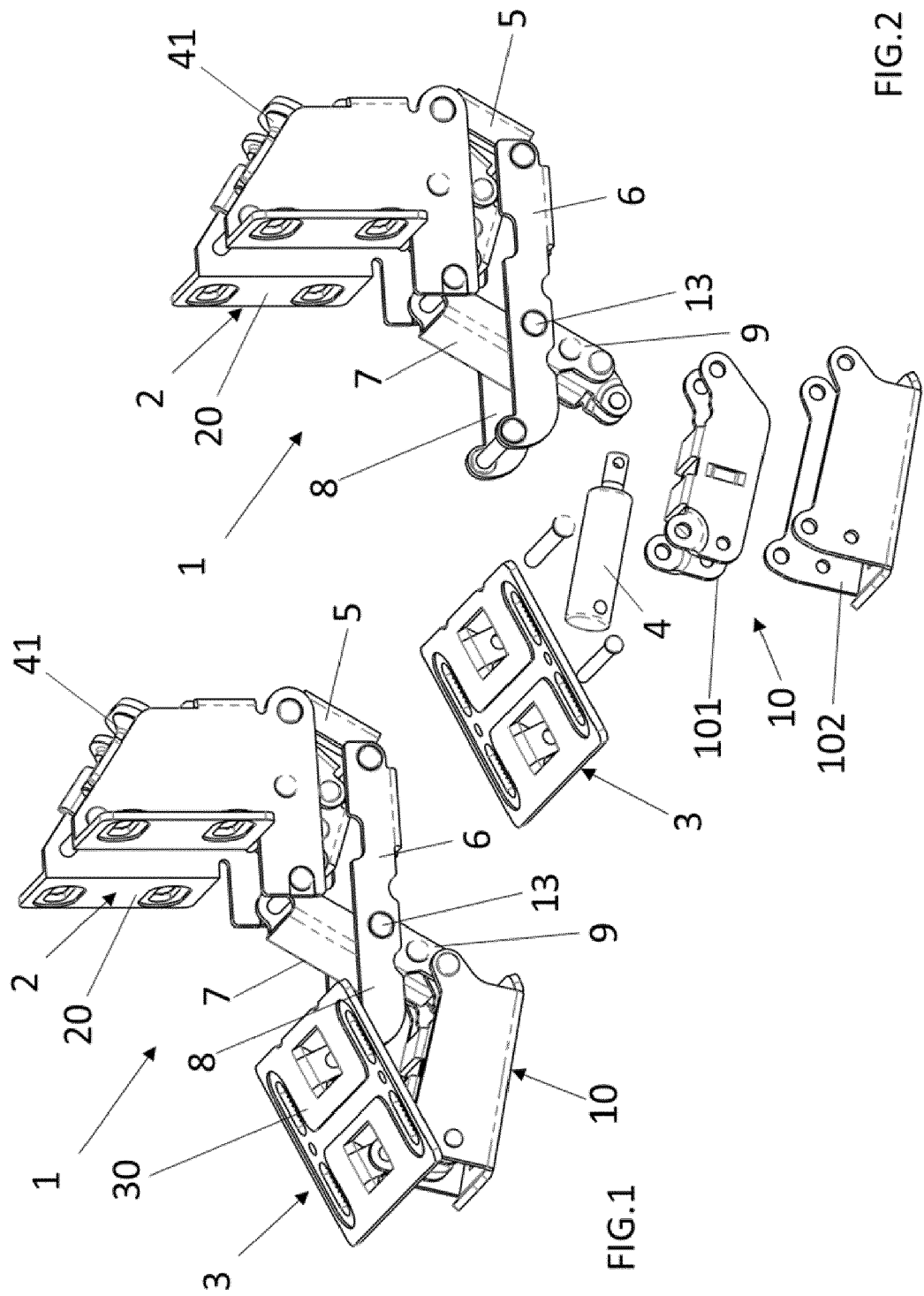
[0049] It should be noted that the cylindrical helical traction spring 4, at least under run-end conditions of the hinge 1, in particular in the run-end position corresponding to a closed door (figure 3), is tilted with respect to an engagement surface 30 of said second plate 3.

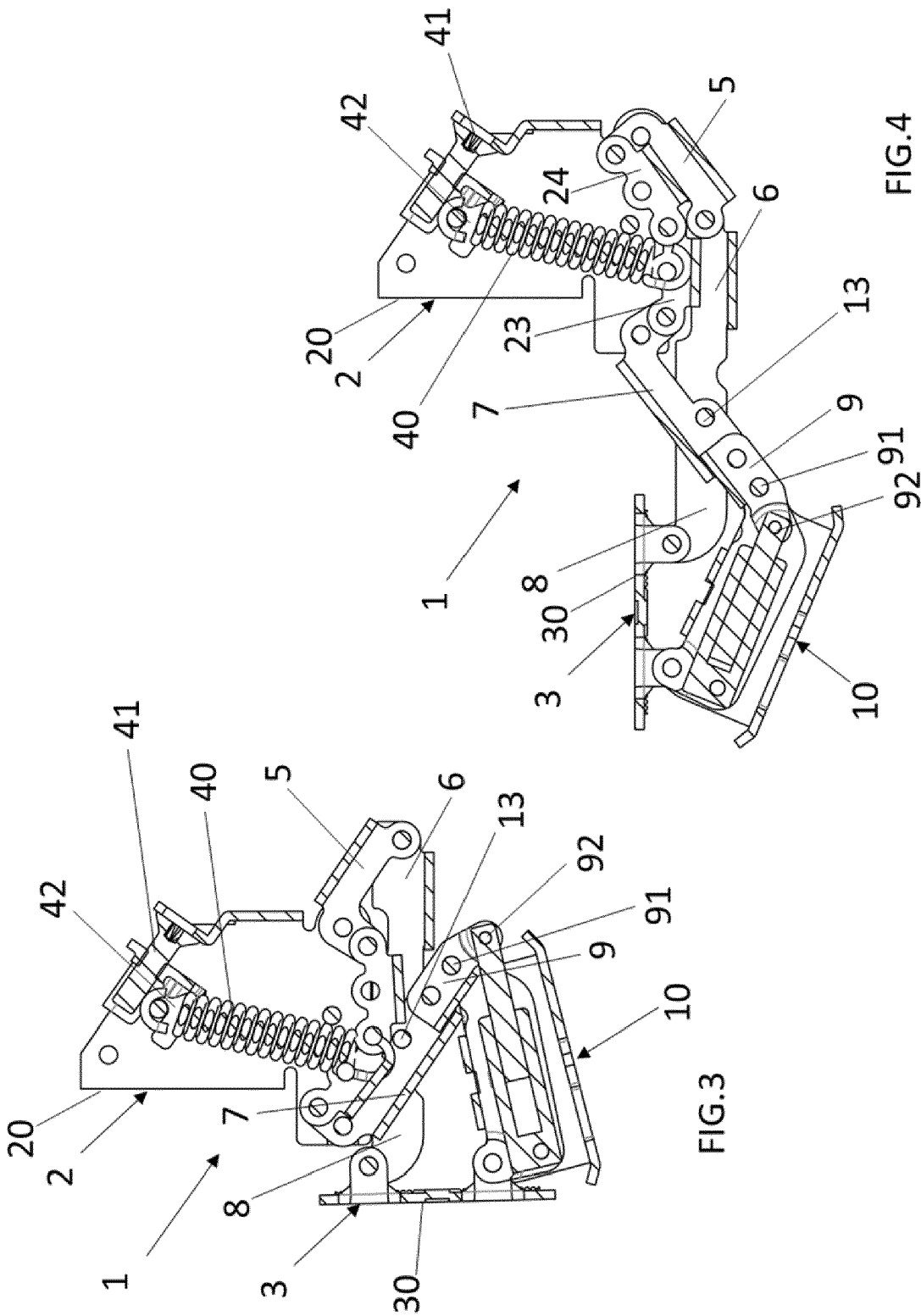
[0050] The position of the spring(s) is important with respect to the action exerted on the connecting rods 23 and 24 which act as a toggle and which, when in an open-door position, as they are almost aligned, multiply the contrast force to the weight of the door.

[0051] The objectives indicated above have therefore been achieved.

Claims

1. A damped snap hinge (1) for furniture, comprising a first and a second articulated quadrilateral, associated with a first and second plate (2,3) for fixing to a wall and a door of a piece of furniture, the quadrilaterals each comprising a pair of rocker arms (5,7; 8,10) of which one extends beyond the vertex (13) of the relative quadrilateral so as to form a connecting rod (6,9) of the other quadrilateral and a pair of articulated levers (23,24) extending between the rocker arms (5,7) of the quadrilateral of the first plate (2), wherein the hinge (1) also comprises elastic means (40) for opposing the rotation of the door of the furniture, which extend between a body of one of the articulated levers (23) and an engagement abutment (42) coupled with the first plate (2),
characterized in that
the connecting rod (9) of the quadrilateral of the second plate (3) comprises an extension that extends beyond a hinge point (91) with a first of the respective rocker arms (10)
and **in that** the hinge (1) also comprises a damper (4) coupled between the extension of said connecting rod (9) and the first rocker arm (10).
2. The hinge (1) according to the previous claim, wherein the first rocker arm (10) of the second plate (3) comprises two substantially open box-shaped bodies (101,102), coupled with each other to define walls of a housing chamber for the damper (4).
3. The hinge (1) according to claim 1 or 2, wherein the engagement abutment (41,42) coupled with the first plate (2) is movable with respect to the first plate (2), so as to modify a length of the elastic means (40) to create a preloading of the same.
4. The hinge (1) according to claim 3, wherein the movable engagement abutment (41,42) comprises a movable slide (42) with respect to the first plate (2) and a screw regulation element (41) acting between the slide (42) and said first plate (2).
5. The hinge (1) according to one or more of the previous claims, wherein the elastic means (40) comprise a cylindrical helical traction spring, which, at least under run-end conditions of the hinge (1), is tilted with respect to an engagement surface (30) of said second plate (3).





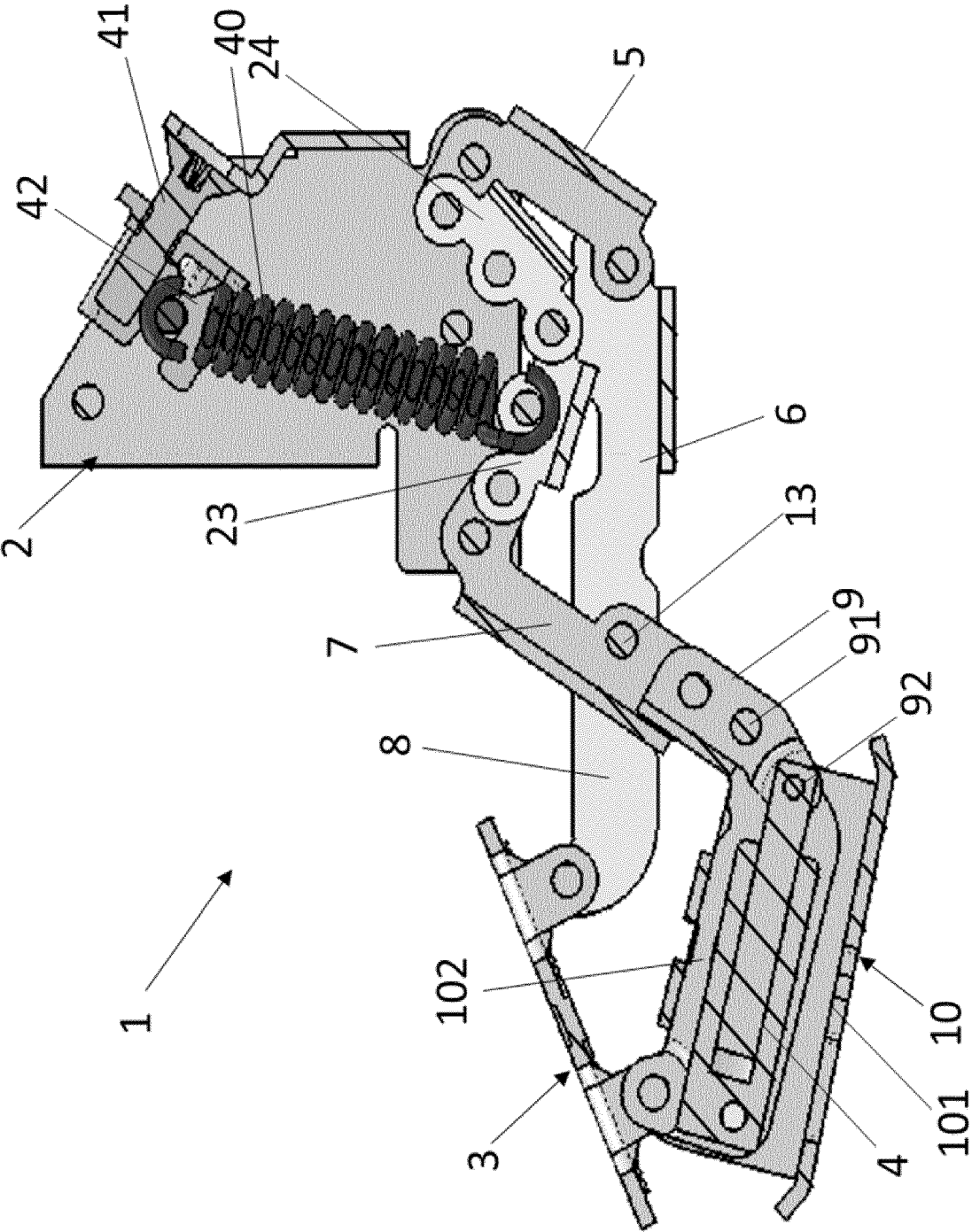


FIG.5



EUROPEAN SEARCH REPORT

Application Number
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			TECHNICAL FIELDS SEARCHED (IPC)
			E05D E05F
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 16 February 2018	Examiner Wagner, Andrea
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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**ANNEX TO THE EUROPEAN SEARCH REPORT
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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

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