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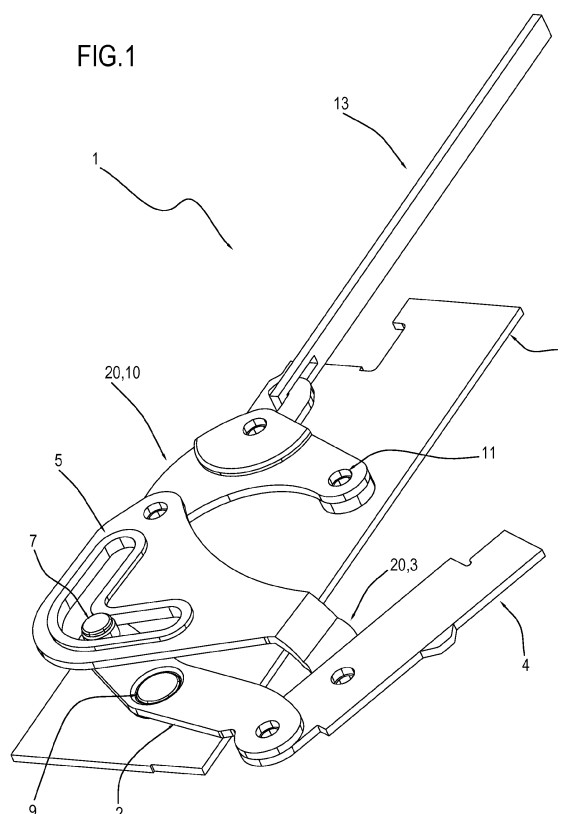
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(54) **A hinge for a door of a domestic appliance**

(57) A hinge for a door of a domestic appliance comprises at least a first member (4) and a second member (8), one of either the first member (4) or the second member (8) being fixable, in use, to the door so that the door can be opened or closed by tilting relative to the frame of the domestic appliance, and the other of either the first member (4) or the second member (8) being fixable, in use, to the frame of the domestic appliance, the hinge (1) comprising: an articulated arm (20), which is connected to the first member (4) and to the second member (8); a lever (2), which is connected to the first member (4) and to the second member (8); guide means (6,7) connecting the lever (2) to the articulated arm (20) and configured to allow relative movement of the articulated arm (20) and of the lever (2) during the movement of the first member (4) relative to the second member (8).



Description

[0001] This invention relates to a hinge for the doors of domestic appliances such as refrigerators, dishwashers, ovens and the like.

[0002] Known in the prior art are hinges used on the doors of domestic appliances and comprising a plurality of levers configured to define a four-bar linkage designed to allow the door to be opened to provide access to the space or compartment inside the domestic appliance (the one which is closable by the selfsame door).

[0003] A need strongly felt by manufacturers of domestic appliances is to be able to make certain types of domestic appliances such as, for example, fitted dishwashers or other fitted appliances, where the door can be opened/closed according to a desired and predetermined sequence of movements.

[0004] For example, in the case of a dishwasher, manufacturers strongly feel the need to have a hinge which allows the door to move from the closed to the open position by a movement which comprises a first step where the door is lifted and moved away from the body of the appliance, followed by a step where the door is lowered again.

[0005] It should be noted that this sequence of movements makes it possible to avoid damage to the sealing gasket at the bottom of the door (thanks to the first movement by which the door is lifted and moved outwards) thereby guaranteeing its sealing action along the bottom of the door.

[0006] This invention has for an aim to satisfy the above mentioned need by providing a hinge for a door of a domestic appliance, such as a dishwasher, an oven or a refrigerator, which allows the door to be moved according to desired sequence of movements in a particularly simple manner.

[0007] According to the invention, this aim is achieved by a hinge for a door of a domestic appliance comprising the technical features described in one or more of the appended claims.

[0008] The technical features of the invention, with reference to the above aims, are clearly described in the claims below and its advantages are more apparent from the detailed description which follows, with reference to the accompanying drawings which illustrate a preferred non-limiting example embodiment of the invention and in which:

- Figure 1 is a perspective view of the hinge according to this invention;
- Figures 2 to 5 are respective side views showing the hinge of Figure 1 in a closed configuration, a first partly open configuration, a second partly open configuration and a fully open configuration, respectively.

[0009] With reference to the accompanying drawings, the numeral 1 denotes a hinge according to the invention.

[0010] The hinge 1 according to the invention is designed to be applied to a door which forms part of a domestic appliance and which can be opened and closed by tilting relative to a frame of the domestic appliance.

[0011] The hinge 1 according to the invention comprises a first member 4 and a second member 8.

[0012] One of either the first member 4 or the second member 8 is fixed, in use, to the door so that the door can be opened or closed by tilting relative to the frame of the domestic appliance; the other of either the first member 4 or the second member 8 is fixable, in use, to the frame of the domestic appliance.

[0013] As may be observed in the accompanying drawings, the first member 4 is adapted to be fixed to the door and the second member 8 is adapted to be fixed to the frame of the domestic appliance.

[0014] The hinge 1 further comprises an articulated arm 20 which is connected to the first member 4 and to the second member 8.

[0015] The hinge 1 also comprises a lever 2 which is connected to the first member 4 and to the second member 8.

[0016] According to the invention, the hinge 1 further comprises guide means (6,7) connecting the lever 2 to the articulated arm 20.

[0017] The guide means (6,7) connecting the lever 2 to the articulated arm 20 are configured to allow relative movement of the articulated arm 20 and of the lever 2, according to a defined law of motion, during the movement of the first member 4 relative to the second member 8 (that is to say, in use, during the movement of the door relative to the frame of the domestic appliance).

[0018] It should be noted that the law of motion concerned is that of the first member 4 relative to the second member 8: this law of motion is determined by the configuration of the guide means (6,7) connecting the lever 2.

[0019] In the embodiment illustrated, the guide means (6,7) connecting the lever 2 to the articulated arm 20 comprise a cam 6 and a follower 7.

[0020] It should be noted that the cam 6 is associated with one of either the lever 2 or the articulated arm 20 and the follower 7 is associated with the other of either the lever 2 or the articulated arm 20.

[0021] More specifically, in the example illustrated, the cam 6 is associated with the articulated arm 20 and the follower 7 is associated with the lever 2. Preferably, the cam 6 is in the form of a slot.

[0022] With reference to the example illustrated, the cam 6 is formed on a portion of the articulated arm 20.

[0023] The follower 7 is preferably in the form of a pin which is slidably coupled to the slot.

[0024] With reference to the example illustrated, the follower 7 is associated with the lever 2.

[0025] In the example illustrated, the lever 2 is a rocker lever. In effect, it should be noted that it is rotatably connected (pivoted) to the second member 8 at an intermediate portion.

[0026] With reference to the articulated arm 20, it

should be noted that the articulated arm 20 comprises a first portion 10, which is rotatably connected (pivoted) to one of either the first member 4 or the second member 8, and a second portion 3, which is connected to the other of either the first member 4 or the second member 8 and which is coupled to the lever 2.

[0027] It should be noted that the two portions 10 and 3 of the articulated arm 20 are rotatably connected to each other.

[0028] With reference to the example illustrated, it should be noticed that the first portion 10 is connected (pivoted) to the second member 8, whereas the second portion 3 is connected (pivoted) to the first member 4.

[0029] It should be noticed that the articulated arm 20 and the lever 2 comprise one or more plates, that is to say, parts whose ratio of surface area to thickness is particularly high.

[0030] Similarly, the first member 4 and the second member 8 also preferably comprise one or more plates.

[0031] It should also be noted, with reference to the embodiment illustrated and by way of example, that the articulated arm 20 is preferably rotatably coupled (hinged) to the first member 4.

[0032] On the other hand, with reference to the embodiment illustrated and by way of example, the lever 2 is preferably rotatably coupled (pivoted) to the first member 4.

[0033] The hinge 1 also comprises elastic means 12 which are operatively coupled to the articulated arm 20 (preferably to the first portion 10 thereof) so as to apply, in use, a retaining action on the door during the movement of the door from a closed position PC to an open position PA.

[0034] Preferably, the elastic means 12 comprise a spring 12.

[0035] It should also be noted that the hinge 1 comprises a rod 13 which is operatively coupled to one end of the spring 12.

[0036] More specifically, the spring 12 is operatively coupled, at its first end, to the second member 8 and, at its second end, to the rod 13.

[0037] The rod 13 is slidably coupled to the second member 8 to move along a direction of sliding Y.

[0038] It should be noted that the movement of the rod 13 along the direction of sliding Y causes the spring 12 to be compressed. In effect, the spring 12 is compressed between the second member 8 and the rod 13.

[0039] In the advantageous embodiment illustrated in the accompanying drawings, the lever 2 and the articulated arm 20 are respectively coupled on opposite sides of the first member 4.

[0040] This improves the balance of the first member 4 (and hence of the door) during its movement, so as to be able to obtain a particularly robust and reliable hinge, where unwanted oscillations of the first member 4 are substantially avoided.

[0041] Below is a description of how the hinge 1 works, made with reference to the specific embodiment illustrat-

ed and from which the advantageous features of the hinge may be inferred.

[0042] In use, the first member 4 is fixed to the door of the domestic appliance.

[0043] In use, the second member 8 is fixed to the frame of the domestic appliance.

[0044] Figure 2 shows a configuration where the door of the domestic appliance is in the closed position PC.

[0045] Figures 3 and 4, on the other hand, illustrate respective positions where the door is partly open.

[0046] It should be noticed that in passing from the closed position PC to the partly open position of Figure 3, the first member 4 performs a movement upwards (with reference to Figure 3) combined with a movement outwards and away from the second member 8.

[0047] In other words, the movement of the first member 4 between the closed position PC and the open position PA is, advantageously, such that the door of the domestic appliance remains clear of the frame of the domestic appliance by a combined movement up and away from the compartment of the domestic appliance.

[0048] This makes it possible to avoid accidental damage to the gasket which applies its sealing action between the compartment and the door of the domestic appliance.

[0049] In effect, this type of movement prevents scraping between parts of the door and the compartment, thus preventing wear and damage.

[0050] During opening, that is to say, in passing from the closed position PC to the open position PA, the pin 7 is moved along the path defined by the guide 6.

[0051] Preferably, the guide 6 forms a path defined by two stretches (T1, T2) which are joined to each other.

[0052] Preferably, the main directions of extension of the two stretches (T1, T2) make an angle of less than 90°.

[0053] Moreover, it should also be noted that during opening, that is to say, in passing from the closed position PC to the open position PA, the first portion 10 of the articulated arm 20 is urged to rotate about its centre of rotation 11 in the direction of rotation W.

[0054] The first portion 10 of the articulated arm 20 is urged to rotate by the second portion 3 of the articulated arm 20.

[0055] Rotation of the first portion 10 about the centre of rotation 11 causes the rod 13 to be moved.

[0056] Movement of the rod 13, vertically downwards, causes compression of the spring 12 which is designed to apply a force which tends to pull the door towards the closed position PC.

[0057] It should also be noted that movement of the first member 4 from the closed position PC to the open position PA causes the lever 2 to rotate about its centre of rotation 9 (that is, about the point relative to which the lever 2 is pivoted to the second member 8).

[0058] Figure 4 shows a further intermediate position, where the door is partly open, whilst Figure 5 illustrates a fully open position PA of the door.

[0059] It should be noted that in the position of Figure 5 (fully open), the first member 4 is disposed with its lower

end close to the second member 8: advantageously, that means the gasket (fitted in the door and/or in the compartment of the domestic appliance) can apply an effective sealing action between the door and the compartment.

[0060] In Figure 5, corresponding to the fully open position of the door, it should be noticed that the pin 7 has reached the end of its path, defined by the guide 6.

[0061] It should also be noted that in passing from the closed position PC to the open position PA, the pin 7 has been made to move along the entire path defined by the guide 6.

[0062] With regard to the advantages of the invention, attention is drawn to the following.

[0063] The hinge 1 of the invention advantageously allows the door of a domestic appliance to be moved relative to the frame of the domestic appliance according to a trajectory determined by the manufacturer based on the shape of the path defined by the guide.

[0064] It should be noted that in the particular embodiment illustrated, the first member 4 is moved relative to the second member 8 according to a sequence of movements which includes: a) a first combined movement of the first member 4 relative to the second member 8 upwards and outwards, and b) a second movement by which the lower end of the first member 4 is drawn near to the second member 8.

[0065] Advantageously, this sequence of movements avoids damaging the sealing gasket between the door and the compartment, thereby preventing liquids or other substances from dripping out when the door is opened.

[0066] It should also be noted that the hinge of the invention is a particularly simple and inexpensive hinge which can be made easily to obtain a plurality of desired movements of the door relative to the frame.

[0067] The invention described above is susceptible of industrial application. It can be adapted and modified in several ways without thereby departing from the scope of the inventive concept. Moreover, all the details of the invention may be substituted for technically equivalent elements.

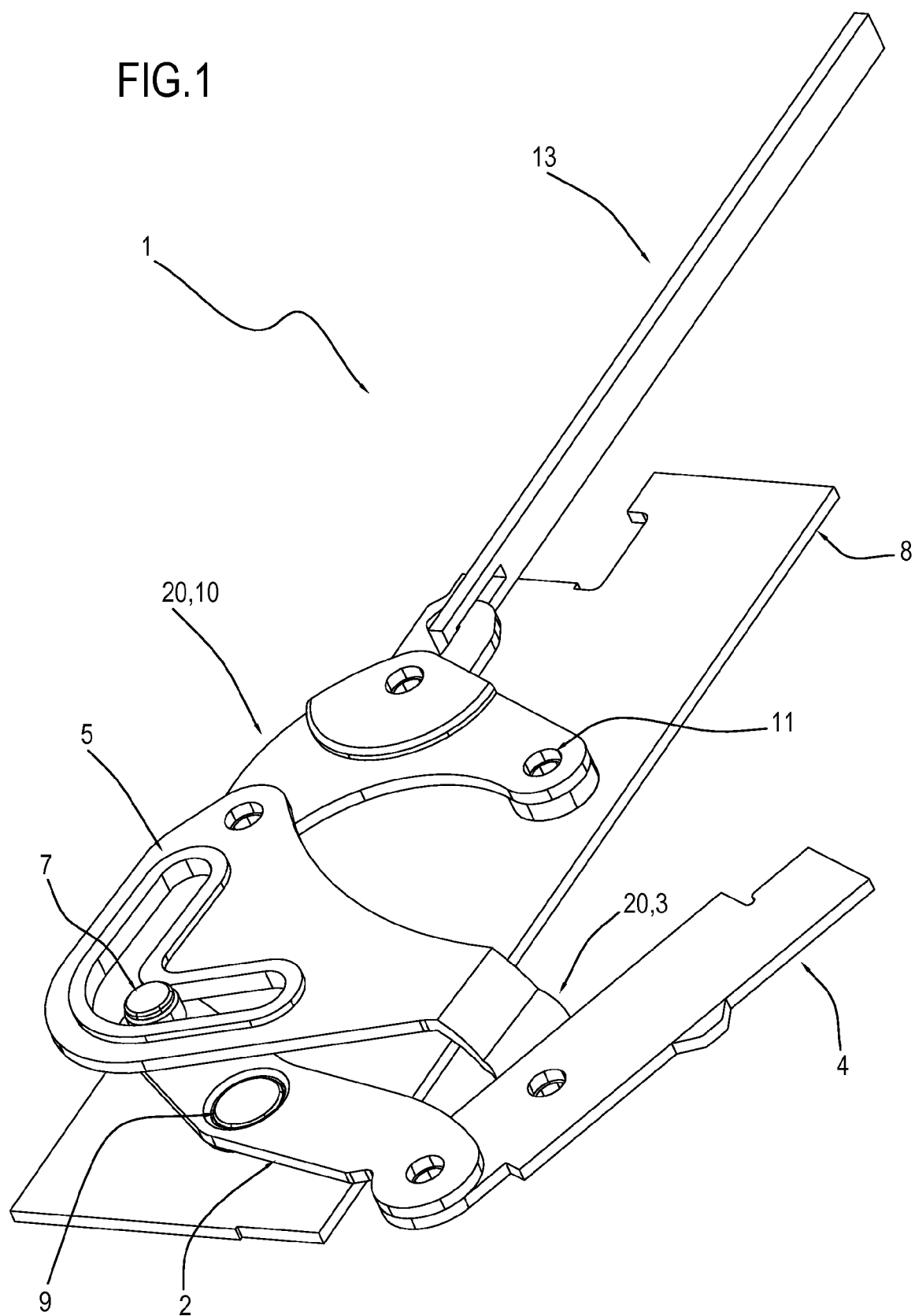
Claims

1. A hinge for a door of a domestic appliance, comprising at least a first member (4) and a second member (8), one of either the first member (4) or the second member (8) being fixable, in use, to the frame of the domestic appliance, and the other of either the first member (4) or the second member (8) being fixable, in use, to the door so that the door can be opened or closed by tilting relative to the frame of the domestic appliance, the hinge (1) being **characterized in that** it comprises: an articulated arm (20), which is connected to the first member (4) and to the second member (8), the articulated arm (20) comprising a first portion (10), which is rotatably connected to

one of either the first member (4) or the second member (8), and a second portion (3) which is connected to the other of either the first member (4) or the second member (8) and which is coupled to the lever (2); a rocker lever (2) connected to the first member (4) and to the second member (8), the rocker lever being pivoted, at an intermediate portion of it, to one of either the first or the second member; guide means (6,7) connecting the lever (2) to the articulated arm (20) to allow the articulated arm (20) and the lever (2) to move relative to one another according to a defined law of motion during the movement of the first member (4) relative to the second member (8), the guide means (6, 7) comprising a cam (6) and a follower (7), the cam (6) being associated with a portion of the articulated arm (20), and the follower (7) being in the form of a pin fixed to the rocker lever (2).

2. The hinge according to claim 1, wherein the cam (6) is in the form of a slot.
3. The hinge according to claim 2, wherein the pin constituting the follower (7) is slidably coupled to the slot.
4. The hinge according to any of the preceding claims, comprising elastic means (12) which are operatively coupled to the articulated arm (20) so as to apply, in use, a retaining action on the door during the movement of the door at least from a closed position (PC) to an open position (PA).
5. The hinge according to claim 4, wherein the first portion (10) of the articulated arm (20) is operatively coupled to the elastic means (12).

FIG.1



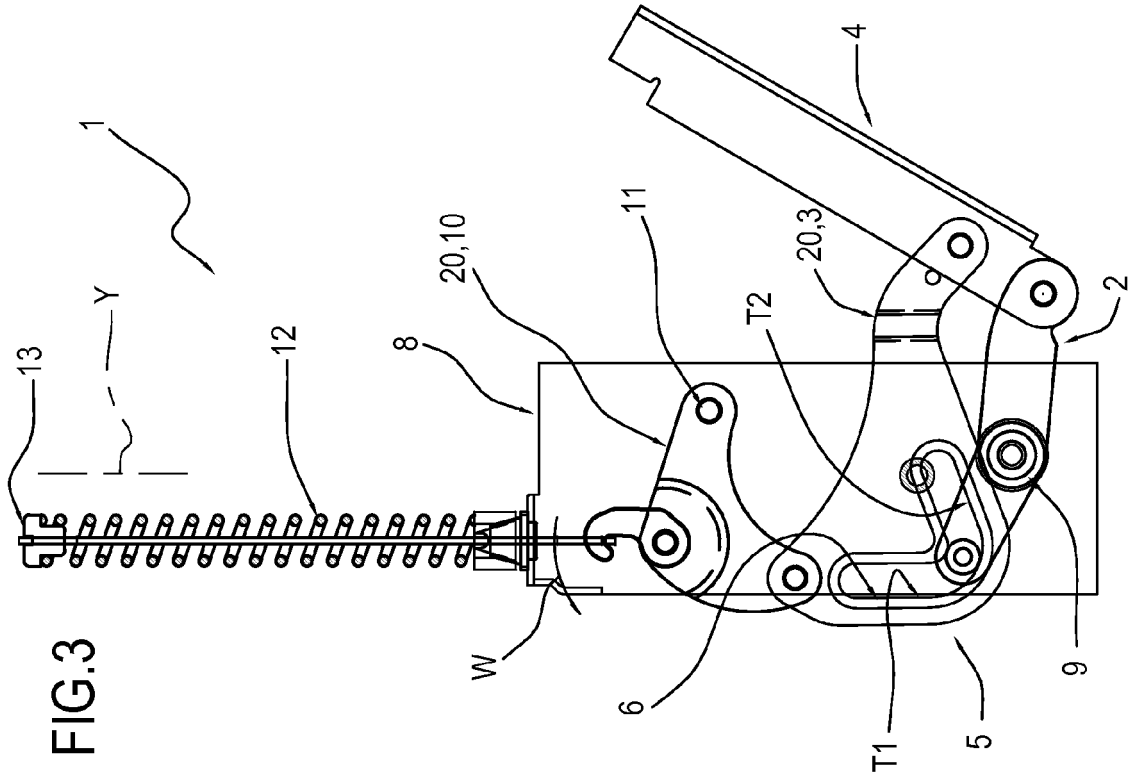
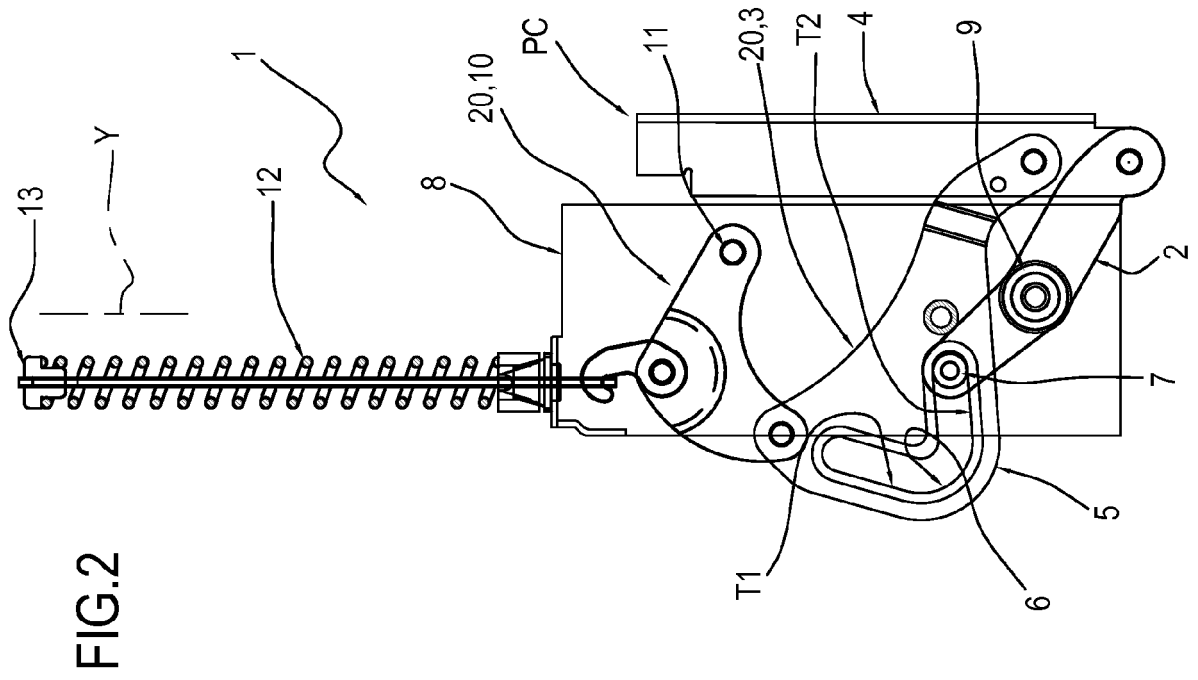


FIG.4

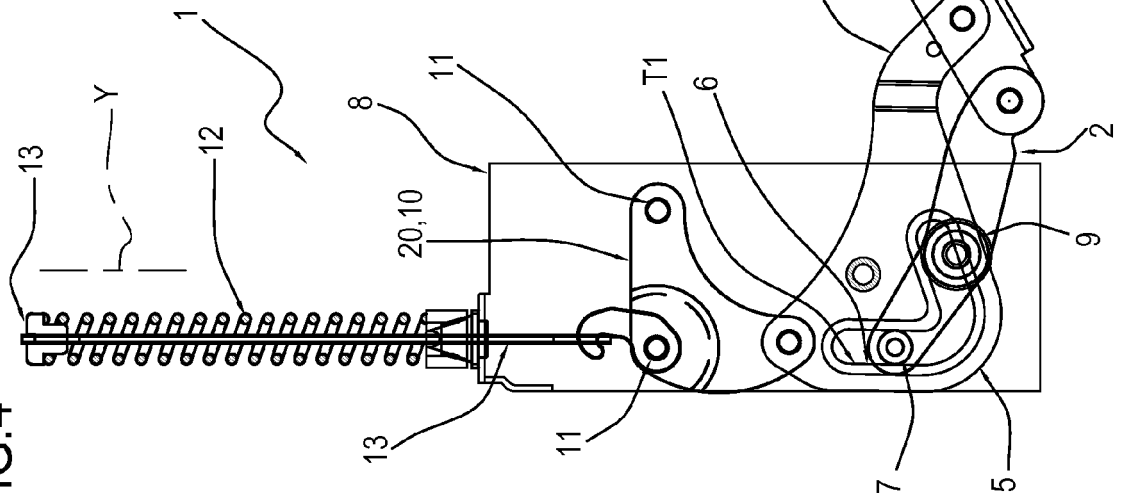
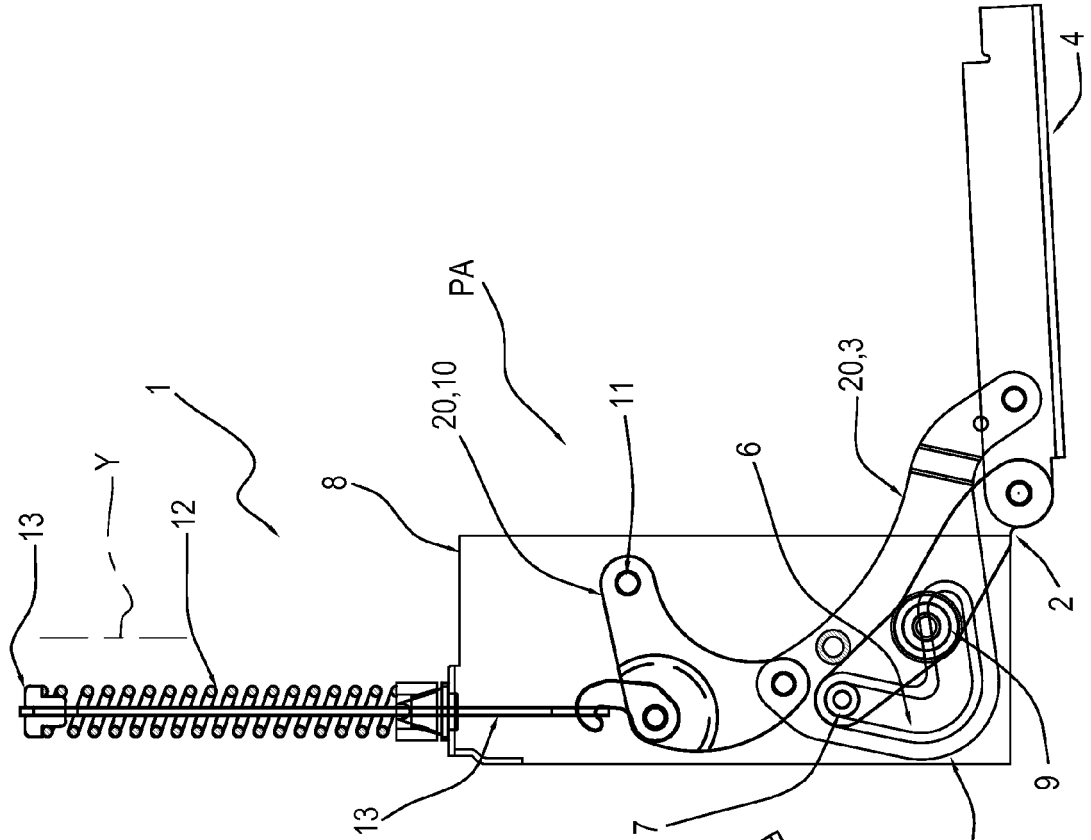


FIG.5





EUROPEAN SEARCH REPORT

Application Number
EP 13 18 5658

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	FR 2 320 473 A1 (PHILIPS NV [NL]) 4 March 1977 (1977-03-04) * page 2, line 6 - line 30 * * figures 1-2 * -----	1-5	INV. E05F1/10 E05F1/12 E05D3/06 E05D3/18
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The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 13 December 2013	Examiner Prieto, Daniel
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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EP 13 18 5658

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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