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(54) **Refrigerator with a scissor-action folding support associated with a shelf**

(57) A refrigerator comprising at least one shelf (1) to which is associated a bottle support (5) for objects such as a bottle and/or an additional shelf, particularly an additional removable shelf, said support comprising a movable and foldable structure having at least one pair of elongated portions (7) preferably provided with undulated portions, said elongated portions (7) capable of being arranged in a first working position beneath the shelf (1) so as to accommodate at least one object, in particular a bottle (6) and/or an additional shelf, said elongated portions (7) being capable of assuming at least one second

working position or folded position near said shelf (1), said elongated portions (7) being secured at their opposing ends (9, 10) to pairs of arms (11, 12) hinged to a corresponding support (14) integral with the shelf (1). The arms (11, 12) of each pair of arms are arranged so as to cross over each other and form, with said undulated portions (7), a movable scissor-action structure.

A support for at least a bottle and/or for at least an additional shelf that can be applied to a shelf, in particular an upper located shelf of a refrigerator, is also claimed.

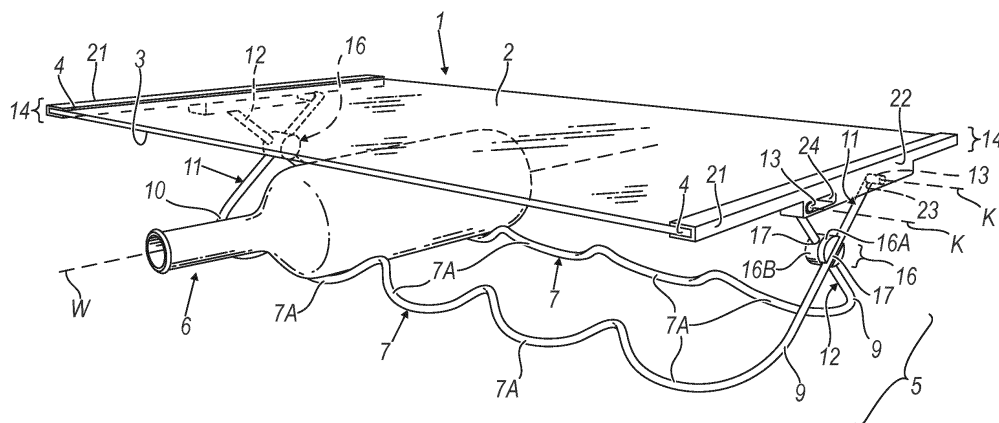


Fig. 1

Description

[0001] This patent relates to a refrigerator according to the pre-characterising clause of the main claim.

[0002] Refrigerators with foldable structures for further shelves or for bottles, secured to a shelf of the domestic appliance have been known for some time. Usually, a typical example of these structures comprises at least one pair of elongated portions, preferably comprising undulated portions, located beneath the shelf and associated, at their opposing ends, to arms hinged to a corresponding support secured on each side of the shelf. By means of the hinged movement of these arms in relation to said supports, the angled portions are arranged in a first work position beneath the shelf and at a distance from it, said portions being parallel to each other and spaced apart so as to be able to support beneath said shelf one or more objects such as at least a bottle and/or at least an additional (further) shelf.

[0003] By an opposing movement of said arms, they are rotated towards the shelf so as to bring the elongated portions level with and beneath it, thus making them assume a second working position or folded position.

[0004] These solutions, although simple in their design, have the drawback that all of the weight of the objects, such as bottles and/or an additional (further) shelf with the further objects on it disposed, is supported by the folding structure bears on the hinges of the supporting arms of the undulated portions, hinges which, over time, can become damaged and no longer ensure an optimum and safe support of the objects beneath the (first) shelf. Furthermore, since in general the pairs of elongated portions and respective supporting arms are independent of each other, a user must act on both elongated portions and ensure that both are correctly positioned beneath the shelf and at a distance from it before placing an object, in particular, a bottle and/or an additional (further) shelf upon them. If, in error, one of these portions is not correctly positioned, for example in a way not parallel to the first, the object placed on them, especially a bottle, could fall onto the refrigerator shelf below with obvious drawbacks.

[0005] The aim of the present invention is to offer a refrigerator with a support structure for objects, in particular for further underneath shelves and/or bottles, that is improved compared with the known structures.

[0006] In particular, the aim of the invention is to offer a refrigerator with a structure of the above-mentioned type which is more robust and long-lasting than the corresponding known structures.

[0007] Another aim is to offer a refrigerator with a structure of the said type that can simplify the arrangement of an object beneath a shelf of the refrigerator, particularly a further shelf and/or a bottle, bottle and ensure that the positioning of the object is not precarious, thus preventing it from accidentally falling.

[0008] Yet another aim of the invention is to offer a support structure for one or more bottles and/or for at

least one additional shelf, that can be associated with a shelf and in particular with a refrigerator shelf, which is simple to apply to existing shelves, for example glass ones, which does not require a special "ad hoc" structure of the shelf, which may be removed, is long-lasting and provides a correct support for each supported object, in particular for at least one bottle and/or for at least a further shelf.

[0009] These and other aims, which will be obvious to person skilled in the art, are achieved by a refrigerator and support structure for bottles and/or one or more further shelves according to the accompanying claims.

[0010] For a better understanding of the present invention, the following drawings are attached purely by way of a non-limiting example, in which:

Figure 1 is a perspective view from one side of a refrigerator shelf to which is associated a bottle support structure made according to the invention; and Figure 2 is a perspective view similar to that of Figure 1, but from the opposite side.

[0011] With reference to the above-mentioned Figures, they show a refrigerator shelf 1 (preferably of glass) having a top side 2, a bottom side 3 and opposing side edges 4. On the bottom side 3 and fixed to the above-mentioned opposing sides 4 is a movable support 5 for bottles 6 (only one shown in the Figures) capable of forming a shelf to support the latter.

[0012] The support 5 comprises a pair of elongated portions or elements (formed from a shaped metal rod) 7 having a series of recesses or spaces 7A into which bottles are placed so as to lie parallel to the shelf 1 along their longitudinal axis W (allowing the support 5 to form a "shelf" for the bottles). Each undulated portion 7 has opposing ends 9 and 10 associated with corresponding support arms 11 and 12. These arms are hinged at one of their free ends 13 to a corresponding bearing organ 14 associated with the side edges 4 of the shelf 1. This organ, acting as a frame for the shelf, can be fixed thereto or arranged to connect to the shelf, but so that it can be separated therefrom.

[0013] The arms are arranged so as to cross over each other and form a scissor-action structure. This term refers to the fact that in each pair of arms 11 and 12, present at each side edge 4 of the shelf 1 or associated at corresponding or counterpart ends of the portions 7 lying beneath said edge 4 of the shelf, these arms are connected together by means of an interconnecting body 16 that enables their reciprocal movement through a rotation about said body, while remaining connected to their respective bearing organ 14 which, preferably, is one and the same for both arms.

[0014] The interconnecting body is preferably a cylindrical body formed by two disc-shaped portions 16A, 16B hinged to one another. Each portion 16A, 16B comprises a slot 17 in which is arranged a corresponding arm 11, 12 so that the relative rotation of the above-mentioned

portions allows the arms to move the portions 7 away from or towards the shelf 1. All behaves as a movable scissor-action structure that lifts the portions 6 towards or away from the shelf. In this way, the movable support 5 can be extended or moved away from the shelf so as to assume a first working position in which it is possible to insert the bottles 6 therein, or compactly folded close to said shelf so as to assume a second working position or folded position, freeing up space beneath the shelf 1.

[0015] In a first embodiment, the arms 11 and 12 are fixed to the respective portions 16A and 16B of the interconnecting body and the ends 13 of the above-mentioned arms are associated in a sliding manner to the corresponding organ 14.

[0016] In a different embodiment, one of the ends 13 of these arms 11, 12 is hinged to the corresponding organ 14, the other is associated in a sliding manner. At the same time, at least one of these arms 11, 12 of each pair of arms is inserted in a sliding manner into the respective groove 17 of its corresponding portion 16A, 16B of the interconnecting body 16, the other arm possibly being fixed to the other corresponding portion.

[0017] In both of these solutions, however, the arms 11, 12 of each pair of arms do not move independently in relation to each other since they are always secured to the body 16. This "non independence" of the arms from the point of view of their movement gives greater stability to the structure of the movable support 5.

[0018] Each pair of arms 11 and 12 placed at a lateral edge 4 of the shelf is, as stated, associated with a single support, the organ 14. The latter comprises a first C-section portion 21 fitted onto the respective edge of the shelf so as to secure itself to it. To this first (extended) portion is associated a second underlying portion 22 (possibly recessed in relation to the edge of the shelf) to which the arms 11 and 12 are hinged. If the shelf 1 rests on "pins" inserted into the walls of the refrigerator, the portions 21 and 22 can be aligned with each other (so as to form a single body-namely the organ 14 - associated with the edges of the shelf). If, by contrast, the shelf 1 is configured to be inserted onto "guides" present along said walls of the refrigerator, the second portion 22 must be recessed in relation to the first so as to allow the shelf to be "slid" into the guide.

[0019] If only one arm (for example 11) of each pair of arms 11, 12 is hinged to the organ 14, this second portion comprises a first seat 23 into which is inserted, simply by rotating, one folded end 13 of the first arm (11 in the figures); the second portion 22 also comprises a second seat 24, made as an elongated hole, in which rotates and slides the second end 13, also folded, of the other second arm (12 in the figures) of the above-mentioned pair of arms. The ends 13 are folded so that one of their longitudinal axes K is parallel to the shelf 1.

[0020] Note that the seat 24 has at least one projection or internal notch 26 that forms at least one end zone capable of stably accommodating the end 13 of the arm 12 when the structure 5 is in the folded position near the

shelf.

[0021] In this position this end 13 remains locked precisely due to the presence of this projection or notch 26. Reaching this end position and the consequent locking of the arm 12 defines the reaching of the second working position by the support 5 and the stability of the position reached. In practice, this projection or notch delimits the width of the seat 24 (or its height) and thus defines an end position where the arm 12 rests stably after the insertion therein of its end 13.

[0022] Let us now assume using the support 5 and wishing to bring it from the first extended working position shown in the figures to its second folded working position.

[0023] To achieve this, after having removed the bottle 6, it is sufficient to act on at least one arm 12 whose end 13 is inserted in the seat 24 with an elongated hole. This arm is in fact pushed towards the shelf thus making its end 13 slide within the above-mentioned seat until it reaches the notch 26. By forcing the arm 12 towards the shelf, its end overcomes said notch and is located stably in the seat 24 keeping the structure closed or folded.

[0024] Note that when the support is in the position shown in Figures 1 and 2, its weight, but above all that of the bottle, holds this support in the extended position.

[0025] During the movement of the support towards the shelf 1, the arms 11 and 12 move in relation to each other by sliding within the slots 17 of portions 16A and 16B of each body 16, portions that rotate in relation to each other. Due to the fact that these bodies 16 and the structures 14 are made of a material with a low friction coefficient, for example nylon or suchlike, the movement of the arms 11 and 12 with respect to them occurs simply and substantially without excessive effort.

[0026] Thanks to the invention, the weight of the bottles is not supported totally by the hinges formed by the seats 23 and 24 of the bearing organs 14, but is also supported by the bodies 16. This gives the support 5 a longer life.

[0027] Furthermore, as described, the movement of the above-mentioned support to pass from the first to the second working position and vice versa can be achieved also by acting on only one of the arms that have the undulated portions on which the bottles are placed.

Even though in the above description it have been described supports for bottles, according to the present invention the same structure can be used to support an additional (further) shelf. Preferably this additional shelf is removable from said support and is preferably carried by the elongated portions of the movable structure. More preferably, the elongated portions are shaped to stably retain said further shelf in said first working position of the movable structure. Preferably, in the first position the additional shelf is parallel to the (first) above shelf, to which the movable and foldable support is associated. Preferred embodiments of the invention have been described in the above. Yet others are possible in the light of the description and are deemed to fall within the scope of the following claims.

Claims

1. Refrigerator comprising at least one shelf (1) to which is associated a support (5) for objects such as a bottle and/or an additional shelf preferably located below said shelf (1), said additional shelf being preferably an additional removable shelf, said support comprising a movable and foldable structure having at least one pair of elongated portions (7) preferably provided with undulated portions, said elongated portions (7) capable of being arranged in a first working configuration beneath the shelf (1) so as to accommodate at least one object, in particular a bottle (6) and/or an additional shelf, said elongated portions (7) being capable of assuming at least one second working configuration or folded position near said shelf (1), said elongated portions (7) being secured at their opposing ends (9, 10) to pairs of arms (11, 12) hinged to a corresponding support (14) of the shelf (1), **characterised in that** the arms (11, 12) of each pair of arms are arranged so as to cross over each other and form, with said undulated portions (7) and with the relative supports (14), a movable scissor-action structure.
2. Refrigerator according to claim 1, **characterised in that** the arms (11, 12) of each pair of arms are secured to one another.
3. Refrigerator according to claim 2, **characterised in that** it comprises an interconnecting body (16) of said arms (11, 12), said body comprising disc-shaped portions (16A, 16B) hinged to one another, each of which is integral with one of said arms, each disc-shaped portion (16A, 16B) having a slot (17) in which is placed the corresponding arm (11, 12).
4. Refrigerator according to claim 3, **characterised in that** at least one arm (11, 12) is inserted in a sliding manner into the corresponding groove (17).
5. Refrigerator according to claim 1, **characterised in that** the arms (11, 12) of each pair of arms are arranged at a side edge (4) of the shelf and are hinged to one and the same support (14) common to both.
6. Refrigerator according to claim 5, **characterised in that** said support (14) has a first portion (21) integral with the edge (4) of the shelf (1) and a second portion (22) having seats (23, 24) for folded ends (13) of the above-mentioned arms (11, 12).
7. Refrigerator according to claim 6, **characterised in that** a first seat (23) accommodates the end (13) of a first arm (11), the second seat (24) being formed by an elongated hole and enabling the rotation and translation therein of the end of the second arm (12) of said pair of arms.
8. Refrigerator according to claim 7, **characterised in that** the first seat (23) alternatively contains the end (13) of the first arm (11) so as to enable it only to rotate or is made as the second seat (24) so as to enable the rotation and translation therein of said end (13) of said first arm (11).
9. Refrigerator according to claim 7, **characterised in that** said second seat (24) has an internal projection (26) delimiting an end zone of said seat in which the end (13) of the arm is accommodated stably when the support (5) is in its second working position or folded position.
10. Refrigerator according to the claim 3 and 5, **characterised in that** the interconnecting bodies (16) and the supports (14) of the arms (11, 12) of the support (5) of the bottles (6) are made of a material with a low friction coefficient.
11. Support for at least a bottle and/or for at least an additional shelf capable of being associated with a shelf, preferably an upper located shelf, in particular a shelf (1) of a refrigerator, said support comprising at least one pair of elongated portions (7) preferably comprising undulated portions, said elongated portions (7) associated at their ends (9, 10) with arms (11, 12) hinged to supports (14) capable of being connected to the above-mentioned shelf so as to enable the movement of the support and its positioning in a first working position capable of supporting at least an object, in particular a bottle and/or an additional shelf, in which the elongated portions (7) are distanced from the shelf and in a second working position in which said elongated portions (7) are folded towards the shelf, **characterised in that** pairs of arms (11, 12) associated with counterpart ends of the elongated portions (7) cross over each other and are secured to one another at said intersection and form, with said undulated portions (7) and said supports (14) a movable scissor-action structure.
12. Bottle support according to claim 11, **characterised in that**, for each pair of arms (11, 12), an interconnecting body (16) is provided, comprising disc-shaped portions (16A, 16B) hinged to one another and associated with a corresponding arm.

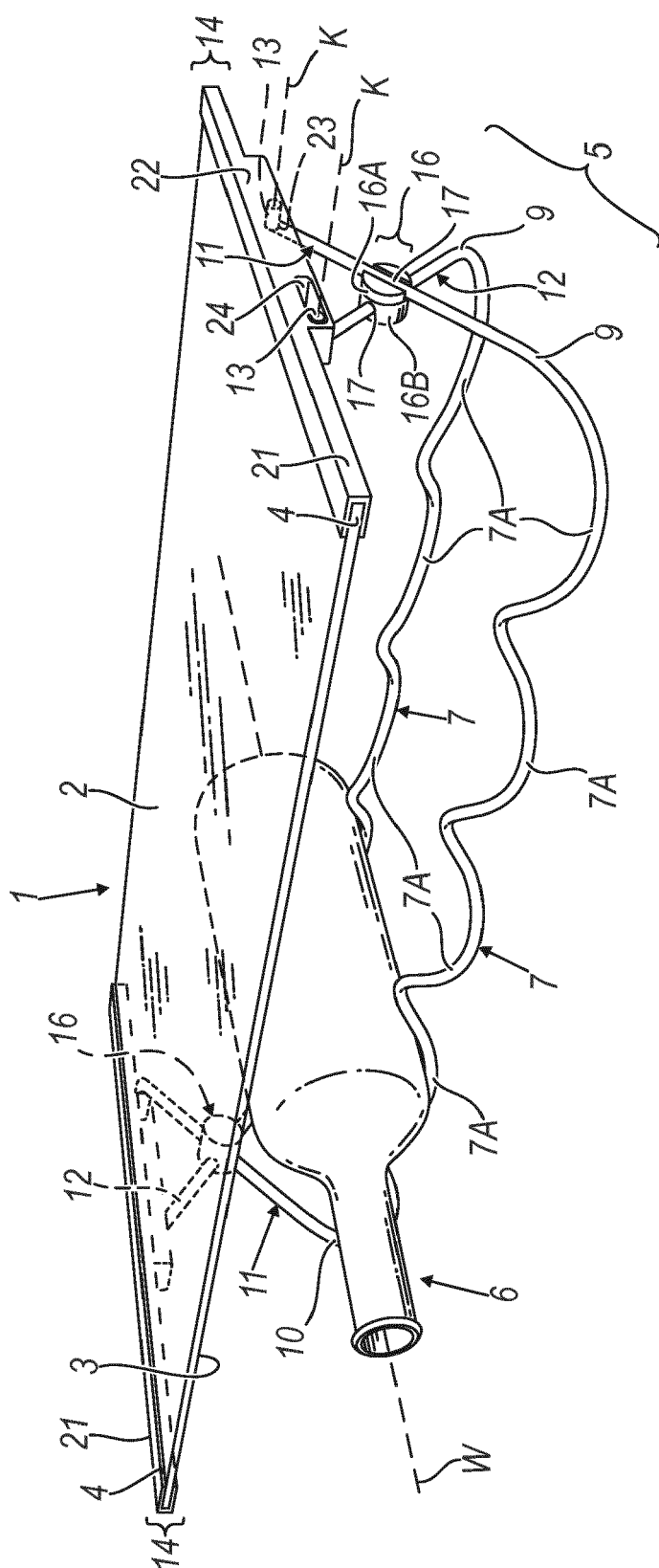


Fig. 1

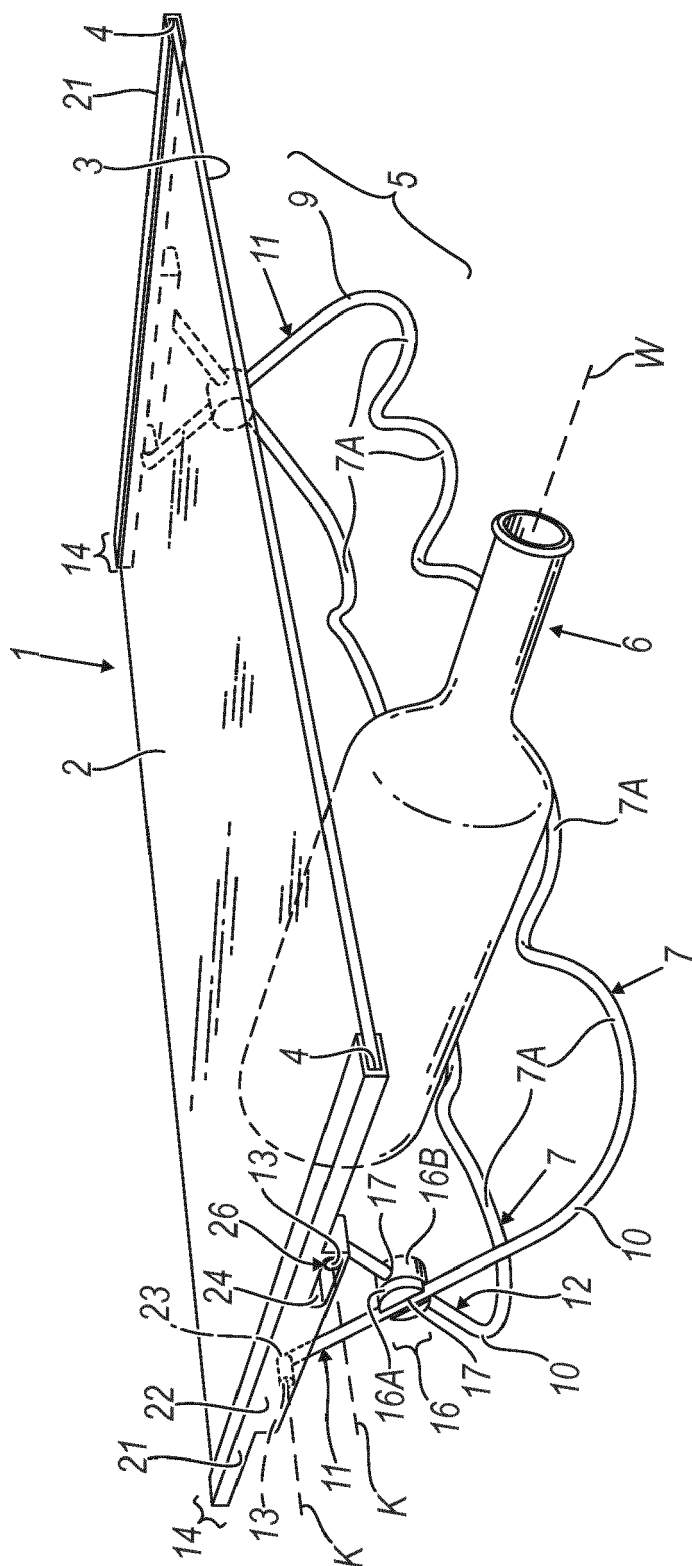


Fig. 2



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EP 14 19 1947

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The present search report has been drawn up for all claims			
Place of search		Date of completion of the search	Examiner
The Hague		13 April 2015	Bidet, Sébastien
CATEGORY OF CITED DOCUMENTS		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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This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
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