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(54) **Device for adjusting the shelf height within a refrigerator preservation compartment**

Vorrichtung zur Justierung der Regalhöhe in einem Kühlschrankfach

Dispositif pour l'ajustement de la hauteur d'une étagère dans un compartiment de conservation d'un réfrigérateur

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(56) References cited:
EP-A- 1 030 142 DE-C- 3 544 446
US-A- 552 579 US-A- 2 265 542
US-A- 2 291 547 US-A- 2 604 375
US-A- 3 162 416

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Description

[0001] The present invention relates to a refrigerator having a device for adjusting the shelf height within a preservation compartment in accordance with the introduction to the main claim. DE 3544446 C discloses a refrigerator according to the preamble of claim 1.

[0002] Various devices have already been proposed for adjusting the shelf height within the refrigerator compartment. These solutions allow only "rough" adjustments, in the sense of adjustments by which the overlying shelves within the preservation compartment are moved relative to each other by large distances.

[0003] Other devices enabling substantially continuous shelf height adjustment have also been proposed. Such devices are however costly and difficult to apply to the refrigerator.

[0004] EP-A-1030142 discloses a refrigerator having short bodies fixed to the inner cladding of the refrigerator compartment and provided with slots for inserting the sides of shelves.

[0005] US-A-2604375 discloses a refrigerator having, near its front opening, a single pair of insert with sockets adapted to receive the lateral elongated extensions of the front frame member of a shelf. The rear part of the shelf presents pegs which are adapted to be inserted in pugs placed in the liner of the rear wall of the compartment.

[0006] An object of the present invention is to provide a refrigerator having a device for adjusting the shelf height within a preservation compartment which enables this height to be "finely" adjusted, while being of low cost and simple to apply to the refrigerator.

[0007] Another object is to provide a device of the stated type which the user finds easy to use.

[0008] These and further objects which will be apparent to the expert of the art are attained by a device in accordance with the accompanying claims. The present invention will be more apparent from the accompanying drawing, which is provided by way of non-limiting example and in which:

Figure 1 is a schematic exploded perspective view of the interior of a refrigerator compartment incorporating a device of the invention to which various shelves are applied;

Figure 2 is an enlarged view of the detail indicated by A in Figure 1; and

Figure 3 is a section on the line 3-3 of Figure 2.

[0009] With reference to said figures, a refrigerator preservation compartment is indicated overall by 1 and comprises a casing 2 insulated by usual foamed material 3. This compartment is defined by side walls 4 (only one visible in the figure) and an end wall 5, and is open on one side, where a usual door (not shown) is located.

[0010] Pairs of support elements 10 are disposed at the same height on the side walls 4 to support projecting

parts 11 of shelves 12 and 13 (which can be of metal, as the shelf 12, or of glass, as the shelf 13). These elements 10 comprise along the corresponding wall 4 an elongate body 15 presenting a face 16 resting against the side wall 4 of the compartment 1 and from which there project pegs 17 (only one visible in Figure 3) to cooperate by interference with seats 18 provided in the insulated casing 2 in order to centre the body 15 on said insulated casing 2; usual fixing members (for example screws or nails, not shown) positioned in holes 19 fix the body 15 to the casing 2.

[0011] Each body 15 comprises a free face 20 opposing the face 16 and facing towards the interior of the compartment 1, and opposing sides 21 and 22 substantially perpendicular to said faces 16 and 20. Along the side 21 and at least within the face 20 (and possibly also within the face 16) a plurality of dead-ended recesses 25 are provided close together at different heights along the elongate body 15. The recesses 25 present an upper side 26 and a lower side 27 (with reference to the height direction of the compartment 1); the upper side 26 is preferably inclined to the side 27; this latter terminates with a free end 30 preferably raised towards the overlying side 26. This configuration of the sides 26 and 27 of each recess 25 allows this latter to easily receive by insertion a corresponding projecting part 11 of a shelf 12 and 13; as this projecting part is securely supported in the recess, it is very difficult for the projecting part to fortuitously escape from the recess. The projecting parts 11 of a shelf 12 or 13 must evidently penetrate into recesses 25 positioned at the same height on the various elements 10.

[0012] The side 21 of each support element 10 of each pair of said elements present on the walls 4 can face the end wall 5 of said compartment; this solution is shown by full lines in Figure 1. However the side 21 of each element 10 can alternatively face the open side of the compartment, while still enabling said pairs to adequately support the shelves 12 and 13 of the compartment (this solution is shown by dashed lines in Figure 1). The device of the invention is of simple construction, is easy to mount in the refrigerator preservation compartment, enables its side walls to be easily cleaned, and is simple to use by the user. Moreover the closeness of the recesses 25 in the support elements 10 means that the user is able to finely adjust the refrigerator shelves.

[0013] Variants are possible to the described embodiment. The support elements can be integrated into the compartment casing 2 and be formed by vacuum forming together with this latter. These variants are also to be considered as falling within the present invention.

Claims

1. A refrigerator having a device for adjusting the height of shelves (12, 13) within a preservation compartment (1), this latter comprising side walls (4) and an end wall (5), on said side walls (4) there being pro-

vided supports for supporting end projecting parts (11) of the shelves on which food to be preserved is placed, and enabling said shelves (12, 13) to be positioned at different heights within said compartment (1), the supports being defined by pairs of support elements (10) each having an elongate body (15) presenting a plurality of recesses (25) arranged to contain the end projecting parts (11) of the shelves (12, 13), the recesses (25) opening into a face (20) opposite that face (16) of the support elements (10) which cooperates with a corresponding side wall (4) of the preservation compartment, **characterised in that** said recesses (25) are dead-ended recesses (25) opening into a side (21) of the elongate body (15).

2. A refrigerator as claimed in claim 1, **characterised in that** the recesses (25) pass completely through the elongate body (15) of each support element (10).
3. A refrigerator as claimed in claim 1, **characterised in that** each recess (25) opens towards the rear wall (5) of the preservation compartment.
4. A refrigerator as claimed in claim 1, **characterised in that** each recess (25) opens towards an open side of the preservation compartment.
5. A refrigerator as claimed in claim 1, **characterised in that** each recess presents an upper side (26) and a lower side (27), the upper side (26) being inclined to the lower side (27).
6. A refrigerator as claimed in claim 1, **characterised in that** the lower side (27) of each recess (25) presents a free end (30) raised towards the overlying upper side (26).
7. A refrigerator as claimed in claim 1, **characterised in that** the elongate body (15) presents fixing members (17) for fixing it to the side wall (4) of the preservation compartment.
8. A refrigerator as claimed in claim 7, **characterised in that** each fixing member is a peg (17) projecting from that face (16) of said elongate body (15) which faces said side wall (4).
9. A refrigerator as claimed in claim 1, **characterised in that** the elongate body comprises through holes (19) for receiving members for fixing said body to the side wall (4) of the preservation compartment.

Patentansprüche

1. Kühlschrank mit einer Vorrichtung zum Anpassen der Höhe von Einlegeböden (12, 13) in einem Kon-

servierungsfach (1), wobei Letzteres Seitenwände (4) und eine Endwand (5) umfasst, wobei auf den Seitenwänden (4) Träger zum Tragen von vorspringenden Endabschnitten (11) der Einlegeböden angebracht sind, auf denen zu konservierende Lebensmittel angeordnet werden, und zum Positionieren der Einlegeböden (12, 13) in verschiedenen Höhen innerhalb des Faches (1), wobei die Träger von Tragelementpaaren (10) definiert werden, die jeweils einen Langkörper (15) umfassen, der eine Vielzahl von Eintiefungen (25) aufweist, die angeordnet sind, um die vorspringenden Endabschnitte (11) der Einlegeböden (12, 13) aufzunehmen, wobei die Eintiefungen (25) in eine Fläche (20) münden, die jener Fläche (16) der Tragelemente (10) gegenüberliegt, die mit einer entsprechenden Seitenwand (4) des Konservierungsfaches zusammenwirkt, **dadurch gekennzeichnet, dass** die Eintiefungen (25) sacklochartige Eintiefungen (25) sind, die in eine Seite (21) des Langkörpers (15) münden.

2. Kühlschrank nach Anspruch 1, **dadurch gekennzeichnet, dass** die Eintiefungen (25) vollständig durch den Langkörper (15) von jedem Tragelement (10) hindurch verlaufen.
3. Kühlschrank nach Anspruch 1, **dadurch gekennzeichnet, dass** jede Eintiefung (25) zur Rückwand (5) des Konservierungsfaches hin mündet.
4. Kühlschrank nach Anspruch 1, **dadurch gekennzeichnet, dass** jede Eintiefung (25) zu einer offenen Seite des Konservierungsfaches hin mündet.
5. Kühlschrank nach Anspruch 1, **dadurch gekennzeichnet, dass** jede Eintiefung eine Oberseite (26) und eine Unterseite (27) aufweist, wobei die Oberseite (26) zur Unterseite (27) geneigt ist.
6. Kühlschrank nach Anspruch 1, **dadurch gekennzeichnet, dass** die Unterseite (27) von jeder Eintiefung (25) ein freies Ende (30) aufweist, das zur darüber liegenden Oberseite (26) emporragt.
7. Kühlschrank nach Anspruch 1, **dadurch gekennzeichnet, dass** der Langkörper (15) Befestigungselemente (17) aufweist, um ihn an der Seitenwand (4) des Konservierungsfaches zu befestigen.
8. Kühlschrank nach Anspruch 7, **dadurch gekennzeichnet, dass** jedes Befestigungselement ein Zapfen (17) ist, der von jener Fläche (16) des Langkörpers (15) vorragt, die der Seitenwand (4) gegenüberliegt.
9. Kühlschrank nach Anspruch 1, **dadurch gekennzeichnet, dass** der Langkörper Durchgangsbohrungen (19) zum Aufnehmen von Elementen für die Be-

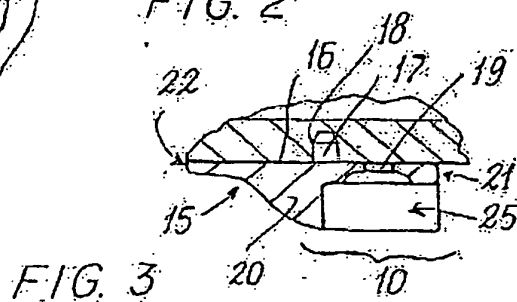
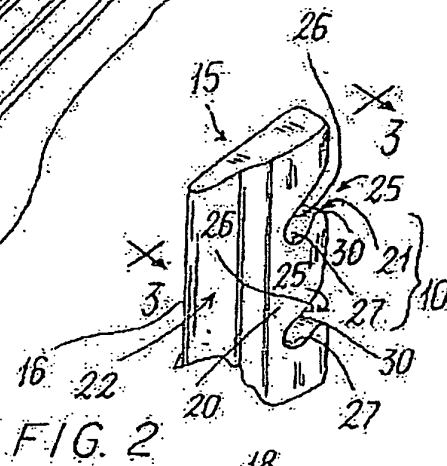
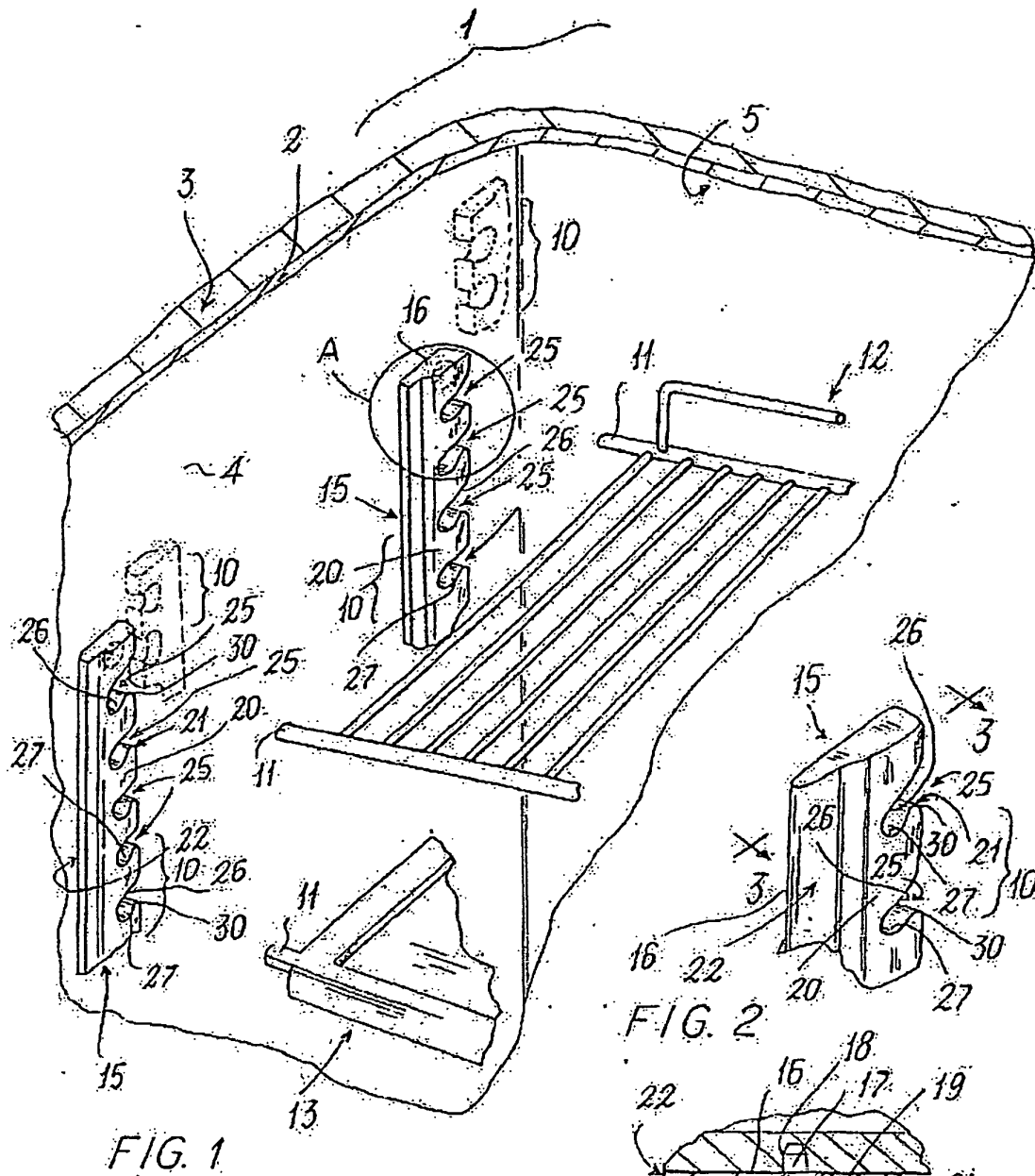
festigung des Körpers an der Seitenwand (4) des Konservierungsfaches umfasst.

Revendications

1. Réfrigérateur comportant un dispositif pour régler la hauteur d'étagères (12, 13) à l'intérieur d'un compartiment de conservation (1), ce dernier comprenant des parois latérales (4) et une paroi d'extrémité (5), des supports étant prévus sur lesdites parois latérales (4) pour supporter des parties saillantes d'extrémité (11) des étagères sur lesquelles des aliments destinés à être conservés sont placés, et permettant auxdites étagères (12, 13) d'être positionnées à des hauteurs différentes à l'intérieur dudit compartiment (1), les supports étant définis par des paires d'éléments de support (10) chacun comportant un corps oblong (15) présentant une pluralité d'évidements (25) agencés pour contenir les parties saillantes d'extrémité (11) des étagères (12, 13), les évidements (25) donnant dans une face (20) opposée à cette face (16) des éléments de support (10) qui coopère avec une paroi latérale correspondante (4) du compartiment de conservation, **caractérisé en ce que** lesdits évidements (25) sont des évidements sans issue (25) donnant sur un côté (21) du corps oblong (15). 5 10 15 20 25
2. Réfrigérateur selon la revendication 1, **caractérisé en ce que** les évidements (25) passent complètement à travers le corps oblong (15) de chaque élément de support (10). 30
3. Réfrigérateur selon la revendication 1, **caractérisé en ce que** chaque évidement (25) donne sur la paroi arrière (5) du compartiment de conservation. 35
4. Réfrigérateur selon la revendication 1, **caractérisé en ce que** chaque évidement (25) donne sur un côté ouvert du compartiment de conservation. 40
5. Réfrigérateur selon la revendication 1, **caractérisé en ce que** chaque évidement présente un côté supérieur (26) et un côté inférieur (27), le côté supérieur (26) étant incliné par rapport au côté inférieur (27). 45
6. Réfrigérateur selon la revendication 1, **caractérisé en ce que** le côté inférieur (27) de chaque évidement (25) présente une extrémité libre (30) relevée vers le côté supérieur sus-jacent (26). 50
7. Réfrigérateur selon la revendication 1, **caractérisé en ce que** le corps oblong (15) présente des éléments de fixation (17) pour le fixer sur la paroi latérale (4) du compartiment de conservation. 55
8. Réfrigérateur selon la revendication 7, **caractérisé**

en ce que chaque élément de fixation est un taquet (17) faisant saillie à partir de cette face (16) dudit corps oblong (15) qui fait face à ladite paroi latérale (4).

9. Réfrigérateur selon la revendication 1, **caractérisé en ce que** le corps oblong comprend des trous débouchants (19) pour recevoir des éléments pour fixer ledit corps à la paroi latérale (4) du compartiment de conservation.



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- DE 3544446 C [0001]
- EP 1030142 A [0004]
- US 2604375 A [0005]