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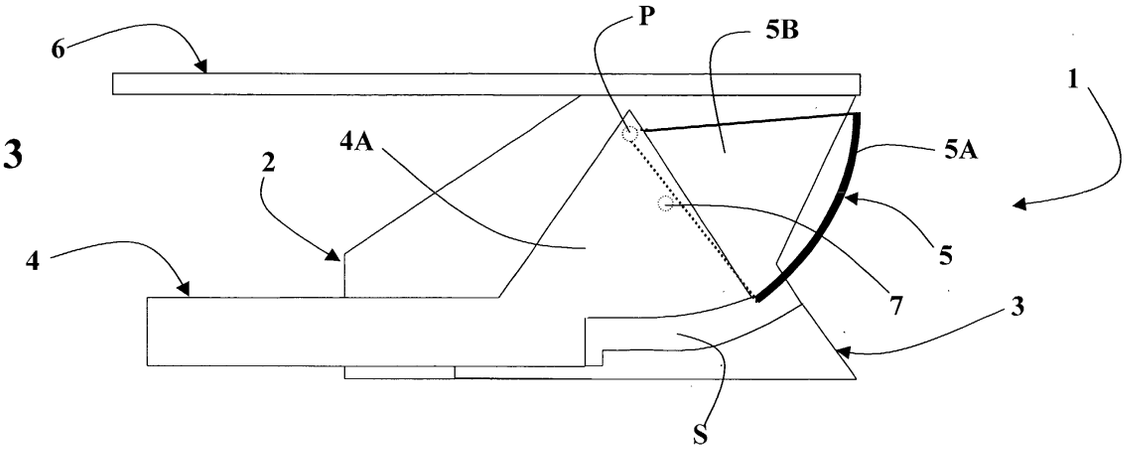
(54) Household refrigerating apparatus, with sliding container

(57) Household refrigeration apparatus, in particular a refrigerator, comprising a storing compartment, wherein a sliding container (3-4) is located, having a front cover (5) that moves angularly from a closed condition to an open condition, where actuating means (P, 7,5B) are provided for producing an angular movement of said front cover (5) following a linear movement given to said sliding container (3-4). According to the invention, said actuating means (P,7,5B) are operative to produce a change-over from the closed condition to the open condition through an angular movement of the cover (5) from top to bottom, and vice-versa.

Fig. 3



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Description

[0001] The present invention refers to a household refrigeration apparatus, in particular a refrigerator, comprising a sliding container.

[0002] As known, household refrigerators have substantially a cabinet, wherein one or more compartments are delimited for the storage and/or freezing of food.

[0003] Therefore, a household refrigerator typically comprises a compartment for the storage of fresh food, with a plurality of shelves, on which the various food can be placed. Moreover, in some instances the above compartment is also provided with one or more sliding containers, wherein food can be placed by the user; typically, these sliding containers are usually available in the lower section of the compartment for the storage of fresh food, i.e. for containing fruits and vegetables.

[0004] Some sliding containers have the form of a classic drawer, i.e. with a bottom wall and four upright walls to delimit a holding space open upwards.

[0005] Other sliding containers are substantially in the form of trays sliding within a space delimited above and underneath by shelves inside the compartment; according to these solutions, the recess containing the tray has a movable front cover, hinged in its upper area to fixed points of the structure; substantially, when a pull is exerted on a front gripping portion of the tray protruding underneath the above door, the former causes the latter to be lifted up to the top, substantially like a flap, performing an angular movement around the above fixed pins.

[0006] However, this solution does not appear to be a very practical one, since when the cover is lifted up it will detract useful space for the user, and represent a hindrance making the loading/unloading operations of the food on and from the tray ergonomically complicated.

[0007] It is the object of the present invention to solve the above drawback and provide a household refrigeration apparatus, in particular a refrigerator, which has a sliding container fitted with a movable cover providing easy comfortable use.

[0008] This and other aims to become more apparent in the following, are obtained by the present invention providing a household refrigeration apparatus, in particular a refrigerator, incorporating the features of the annexed claims, which form an integral part of the description herein.

[0009] Further aims, features and advantages of the present invention will become apparent from the following detailed description and annexed drawings, which are supplied by way of non limiting example, wherein:

- Figs. 1 and 2 show perspective views of a sliding container for a refrigerator, manufactured according to the present invention, in two different operating conditions;
- Figs. 3 and 4 show schematic sections of the operating principle of the sliding container of Figures 1 and 2, in two different operating conditions.

[0010] The refrigeration apparatus according to the invention is equipped with a cabinet having substantially a parallelepiped form and a front door, wherein at least a compartment or a space is delimited for food preservation; the above cabinet is not shown in the annexed figures, being a commonly known concept. The refrigeration apparatus also comprises all the elements commonly required for its operation, among which a refrigerating system.

[0011] In order to arrange food in the compartment, the above door is fitted with projecting brackets; substantially, the inner space of the compartment is like a shelving, i.e. having a plurality of resting shelves in the form of grids, glass shelves or other material, on which the various items can be placed.

[0012] The lower section of the storing compartment has at least a container similar to a sliding tray with a movable front cover.

[0013] In Fig. 1, the above container is indicated with 1 as a whole, and is represented in its closed condition.

[0014] In this Figure, reference 2 indicates two supporting side walls of the container, each one with a plurality of pins projecting outside, indicated with 2A; these pins are apt to be inserted in special seats or recesses delimited on the side walls of the refrigerator compartment, i.e. being apt to support the whole container structure.

[0015] Reference 3 indicates a lower supporting element, which is coupled along its side edges to the side walls 2, so as to slide linearly with respect to them; to this purpose, the side walls 2 are fitted with sliding guides, a portion of which is indicated with 2B, wherein projecting portions of the side edges of the supporting element 3, not represented in the Figures, are inserted; reference 3A indicate a handle portion, delimited on the front surface of the supporting element 3.

[0016] Reference 4 indicates a tray element solidly fastened in a common way to the supporting element 3, so it is movable with it; the side walls of the tray element 4 comprise each one a raised portion, one of them indicated with 4A in Fig. 1.

[0017] Reference 5 indicates a movable cover of the sliding device 1 as a whole. As it can be noticed in Fig. 1, the cover 5 has a front part 5A with curved section, where two side supporting wings depart from both ends in an orthogonal direction, substantially in the form of a circular sector, one of them indicated with 5B.

[0018] As it can be noticed, the wings 5B are interlaid between the sides 2 and raised side portions 4A of the tray element 4; to this purpose, it is also pointed out how the wings 5B of the cover 5 are pivoted on the raised side portions 4A of the tray element 4, in a location indicated with P.

[0019] A housing space is delimited between the tray element 4 and relevant lower supporting element 3; as

it will be seen, this housing space indicated in Figures 3 and 4 with S, has the function to receive a substantial portion of the front section of the cover 5.

[0020] Reference 6 indicates a shelf comprising a frame 6A, e.g. made from moulded plastic, which covers the edges of a glass panel 6B, or analogous transparent material. The shelf 6 delimiting the container 1 to the top, rests in its front area on the upper surfaces of the two sides 2; the rear area of the shelf 6, on the contrary, is apt to be inserted in special recesses or guides delimited on the side walls and/or bottom walls of the storing compartment of the refrigerator.

[0021] Finally, in the Figures 1 and 2 is indicated with reference 7 the location where the sides 2 are delimiting some pins on their surface facing inside the drawer device 1, which will be indicated later with the same reference number in the Figures 3 and 4, and whose functions will be clear in the following description.

[0022] In Fig. 2, the drawer device 1 is illustrated in its open condition.

[0023] As it can be noticed, in this condition the lower supporting element 3 is projected forward with respect to the front edges of the sides 2; as a result, also the tray element 4, solidly fastened to the supporting element 3, is in a position forward compared to Fig. 1.

[0024] Fig. 2 is also illustrating how the cover 5 is lowered, so as to have a substantial portion of its front section 5A inserted in a housing space existing between the bottom wall of the tray element 4 and of the supporting element 3; moreover, a substantial portion of the side wings 5A of the cover 5 is inserted in the space between the sides 2 and the raised side portions 4A of the tray element 4.

[0025] From Fig. 2 it can also be noticed how the cover 5, in its open position, does not represent a hindrance nor detract any space for access to the tray element 4, so favouring ergonomically the food load and unload operations for the user; it can also be noticed how the hinging points P of the cover 5 are at a higher height than the striker locations formed by the pins 7.

[0026] Figures 3 and 4 illustrate, very schematically, the system ensuring the movement of the cover 5 from top to bottom; as it can be noticed, these figures use the same reference numbers of Figures 1 and 2 to indicate technical equivalent element.

[0027] In Fig. 3, the sliding container 1 is in its closed condition, i.e. in the same condition illustrated in Fig. 1.

[0028] The inner edge of the wings 5A of the cover 5 is resting on the pins 7 of the sides 2; thus, the pins 7 are supporting the cover weight and maintain it in its raised position; the front part 5A of the cover 5 will thus obstruct the opening for access to the tray element 4.

[0029] In order to obtain the opening to the container 1 and go over to the operating condition of Figures 2 and 4, the user will simply have to exert a pull on the lower supporting element 3 using the special handle portion 3A.

[0030] The supporting element 3 is then able to slide forward with respect to the sides 2, also bringing with it the tray element 4 solidly fastened to it.

[0031] Obviously, this displacement also causes a translation forward of the raised portions 4A of the tray element 4, i.e. a forward displacement of the hinging points P of the cover 5, and also of the cover; as said, in fact, the cover 5 is hinged in P to the raised portions 4A of the tray element 4.

[0032] As described above, also a change of the relevant position between the hinging points P and the pins 7 projecting from the sides 2 is obtained; in particular, as it can be noticed comparing the Figures 3 and 4, the hinging points P, which are backward with respect to the pins 7 in the closed position (with reference to the moving direction of the system), will be forward with respect to the pins 7 in the open position. During this change-over, the inner edge of the wings 5A of the cover 5 can slide supported by the pins 7 until it will reach the position of the Figures 2 and 4; thus, the cover 5 is caused to lower down gradually by virtue of its own weight as the pivoting points P are gradually displaced with respect to the pins 7, and the inner edges of the wings 5A of the cover 5 are gradually sliding on the pins 7. This will obviously cause an angular movement of the cover 5, so that its front part 5A may gradually enter the congruent curved housing space S, and its side wings 5A gradually enter the space existing between the sides 2 and raised side portions 4A of the tray element 4.

[0033] The closure of the container 1 is obviously obtained by means of a reverse operation to the previous one, i.e. with a thrust to the lower supporting element 3 inside the refrigerator compartment.

[0034] Thus, a new change of the relevant position between the hinging points P and pins 7 projecting from the sides 2 is obtained; in particular, the hinging points P, which in the open position are forward with respect to the pins 7 (with reference to the moving direction of the system), in the closed position will be backward with respect to the pins 7.

[0035] During this change-over, the inner edge of the wings 5A of the cover 5 can slide supported by the pins 7, until the position of the Figures 1 and 3 is reached; thus, the cover 5 will raise up gradually by virtue of the action exerted by the pins 7, on which the inner edges of the wings 5A of the cover 5 are sliding.

[0036] This causes an angular movement of the cover 5, letting its front part 5A gradually project out of the housing space S, and its side wings 5A gradually project out of the space existing between the sides 2 and the raised side portions 4A of the tray element 4.

[0037] Accordingly, we are back to the condition illustrated in the Figures 1 and 3.

[0038] From the above description the features of the household refrigeration apparatus, in particular a refrigerator, comprising a sliding container as provided by the present invention are clear; also its advantages are clear, namely:

- the container 1 fitting the refrigeration apparatus according to the present invention has an extremely simple low cost manufacture from an industrial standpoint, since its components 2-5 can be obtained by moulding operations of thermoplastic material; the shelf 6, on the other hand, is a standard component usually fitted on refrigerators, i.e. manufactured in large series with limited costs;
- the container 1 ensures a comfortable use for the user by virtue of the peculiar movement of its front cover 5, which is angularly movable from top to bottom; moreover, in its open position it is inserted in a relevant housing and will cause no hindrance for the access operations to the inside of the container.

[0039] Obviously many changes are possible for the man skilled in the art to the machine described above by way of example, without departing from the innovative idea, and it is also clear how in common actuation of the invention the various elements described can be replaced by technical equivalent elements.

Claims

1. A household refrigeration apparatus, in particular a refrigerator, comprising a storing compartment, wherein a sliding container (3-4) is located in it, having a front cover (5) angularly movable from a closed condition to an open condition, where actuating means (P,7,5B) are provided for producing an angular movement of the front cover (5) following a linear movement to said sliding container (3-4), **characterized in that**, said actuating means (P, 7,5B) are operative to produce a change-over from said closed condition to said open condition through an angular movement of said cover (5) from top to bottom, and vice-versa.

2. A refrigeration apparatus according to claim 1, **characterized in that** said angular movement is obtained by means of the weight of said cover (5).

3. A refrigeration apparatus according to claim 1, **characterized in that** it provides at least a housing space (S), being apt to receive at least a substantial portion (5A) of said cover (5) when the latter is in said open position.

4. A refrigeration apparatus according to claim 3, **characterized in that** said housing space (S) is delimited in said container (3,4).

5. A refrigeration apparatus according to claim 1, **characterized in that** said cover (5) is hinged to said container (3,4).

6. A refrigeration apparatus according to claim 1 or 5, **characterized in that** said actuating means (P, 7,5B) comprise one or more hinging points (P) of said cover (5), which are movable with said container (3,4).

7. A refrigeration apparatus according at least to one of the previous claims, **characterized in that** said container (3,4) comprises raised side portions (4A), to which said cover (5) is hinged.

8. A refrigeration apparatus according to claim 1, **characterized in that** said actuating means (P, 7,5B) comprise one or more striker points in a fixed position (7), against which at least a surface of said cover (5) is apt to slide during said angular movement.

9. A refrigeration apparatus according at least to one of the previous claims, **characterized in that** during said linear movement of said container (3,4) a displacement of the relevant position of said hinging points (P) takes place with respect to said striker points (7).

10. A refrigeration apparatus according to the previous claim, **characterized in that** in said closed condition, said hinging points (P) are in a backward position with respect to said striker points (7), with reference to the moving direction of said container (3,4).

11. A refrigeration apparatus according to claim 9, **characterized in that** said open condition, said hinging points (P) are in a forward position with respect to said striker points (P), with reference to the moving direction of said container (3,4).

12. A refrigeration apparatus according at least to one of the previous claims, **characterized in that** during the change-over from said closed condition to said open condition said striker points (7) support the weight of said cover (5).

13. A refrigeration apparatus according to the previous claim, **characterized in that** in said closed condition, said striker means support said cover in an upraised position.

14. A refrigeration apparatus according to claim 12, **characterized in that** during said linear movement of said container (3,4), said surface of said cover (5) slides over said striker points (7), causing a progressive angular movement of said cover (5).

15. A refrigeration apparatus according at least to one of the previous claims, **characterized in that** said striker points (7) are delimited in respective side walls (2), between which said container (3,4) is slid-

ing.

16. A refrigeration apparatus according to the previous claim, **characterized in that** sliding guides are delimited (2B) between said side walls (2) and said container (3,4).

17. A refrigeration apparatus according at least to one of the previous claims, **characterized in that** said side walls (2) comprise anchoring means (2A) to the compartment.

18. A refrigeration apparatus according at least to one of the previous claims, **characterized in that** said container (3,4) comprises a tray element (4).

19. A refrigeration apparatus according to the previous claim, **characterized in that** said container (3,4) comprises a lower supporting element (3) for said tray element (4).

20. A refrigeration apparatus according to claims 3 and 19, **characterized in that** said housing space (S) is delimited between said lower supporting element (3) and said tray element (4).

21. A refrigeration apparatus according at least to one of the previous claims, **characterized in that** said substantial portion (5A) of said cover (5) has a curved section.

22. A refrigeration apparatus according at least to one of the previous claims, **characterized in that** two orthogonal wings (5B) of said cover (5) hinged in said hinging points (P), depart from said substantial portion (5A).

23. A refrigeration apparatus according at least to one of the previous claims, **characterized in that** each one of said orthogonal wings (5B) is apt to enter in a respective space delimited between one of said raised side sections (4A) of said container (3,4) and one of said side walls (2).

24. A refrigeration apparatus according at least to one of the previous claims, **characterized in that** said hinging points (P) are located at a higher level than said striker points (7).

25. A household refrigeration apparatus, in particular a refrigerator, comprising a storing compartment, wherein a sliding container (3-4) is located in it, having a front cover (5) angularly movable from a closed condition to an open condition, where actuating means (P,7,5B) are provided for producing an angular movement of the front cover (5) following a linear movement to said sliding container (3-4), **characterized in that**, said actuating means (P, 7,5B) comprise one or more hinging locations (P) of said cover (5), which are movable with said container (3,4) and one or more fixed striker points (7), against which at least a surface of said cover (5) is apt to slide during said angular movement, where in the course of said linear movement of said container (3,4) a displacement of the relevant position of said hinging points (P) is obtained with respect to said striker points (7), with a consequent change-over of said cover (5) from said closed position to said open position, and vice-versa.

26. A household refrigeration apparatus, in particular a refrigerator, comprising a storing compartment with a sliding container (3-4) located in it, having a front cover (5) angularly movable from a closed condition to an open condition, where actuating means (P, 7,5B) are provided for producing an angular movement of said front cover (5) following a linear movement to said sliding container(3-4), **characterized in that**,

- said cover (5) is hinged to said container (3,4),
- it provides striker means (7) in a fixed position, against which at least a surface of said cover (5) is apt to slide during said angular movement,
- said compartment(3,4) delimits at least a housing space (S), being apt to receive at least a substantial portion (5A) of said cover (5), when the latter is in said open condition.

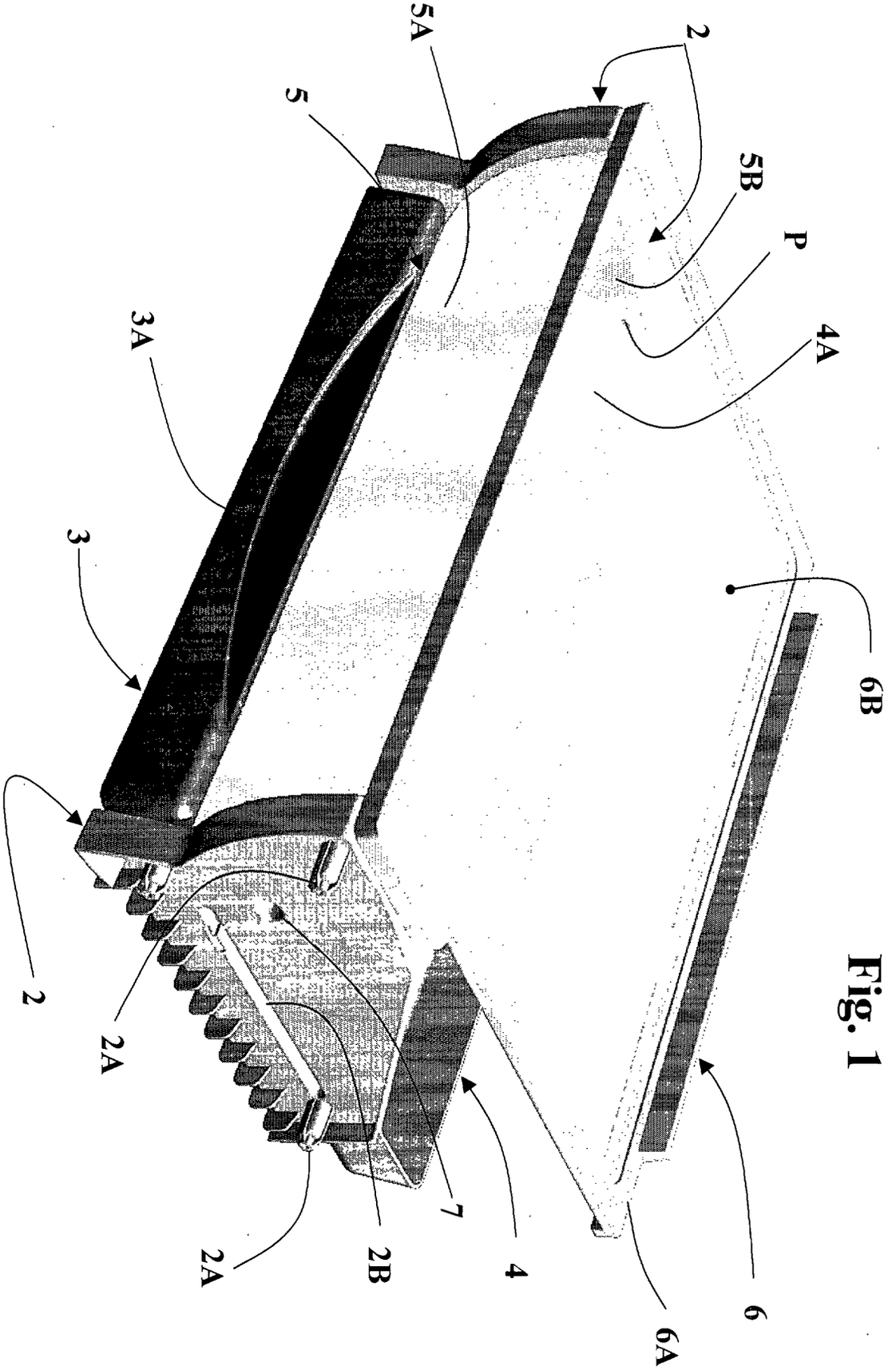

Fig. 1

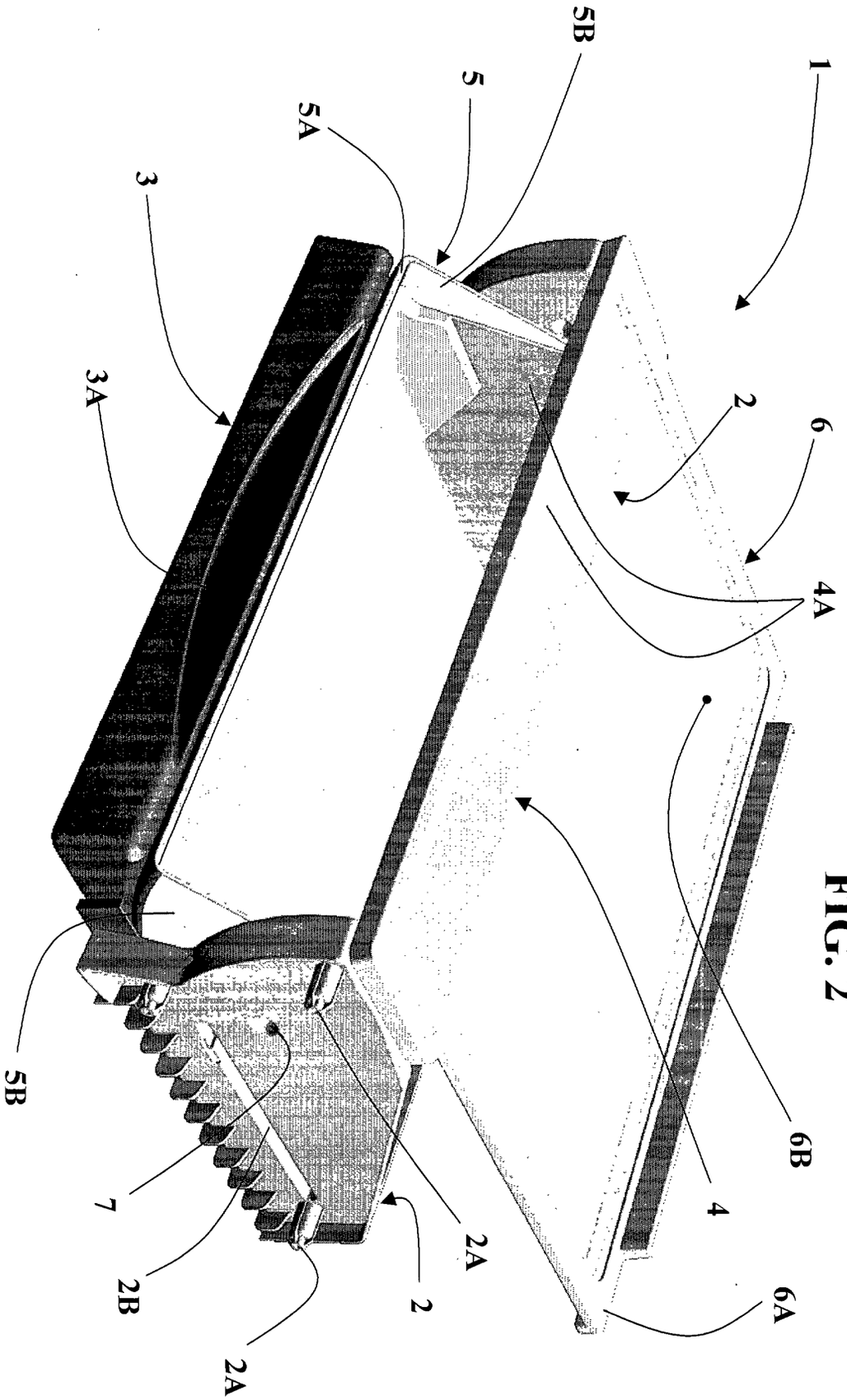

FIG. 2

Fig. 3

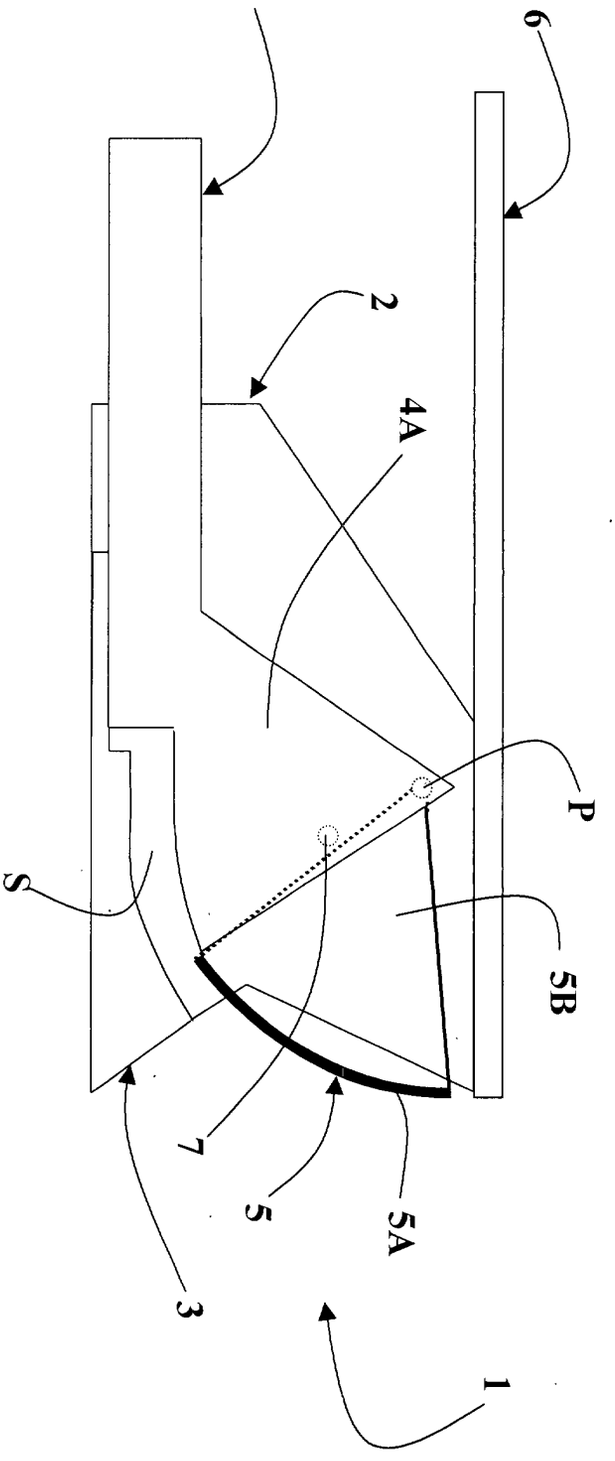

Fig. 4