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(54) Refrigerating cabinet with mould for forming ice cubes

(57) A refrigerating cabinet, comprising a compartment within which at least a mould for forming ice cubes can be arranged, said mould having a plurality of sockets apt to be filled with water and an axis (A) of minimum encumbrance; according to the invention said mould for forming ice cubes (1, 101) is arranged inside said compartment of the refrigerating cabinet so as to have its axis (A) of minimum encumbrance in horizontal.

In an advantageous embodiment of the invention, said compartment has a door (17) wherein one or more seats (18) are defined to hold one or more of said moulds.

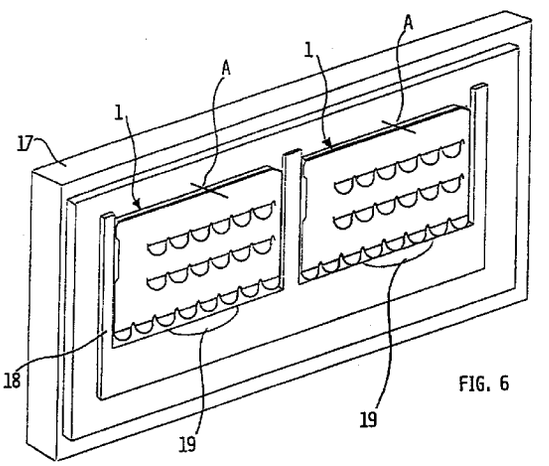

FIG. 6

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Description

[0001] The present invention refers to a refrigerating cabinet, of the type comprising a compartment within which at least a mould for forming ice cubes can be housed, said mould having a plurality of sockets apt to be filled with water and an axis of minimum encumbrance, as well as to an improved mould, which can be used in connection with a refrigerating cabinet.

[0002] As generally known, refrigerating cabinets equipped with a compartment for the storage of fresh food and a freezer compartment or refrigerating cabinets equipped with either one freezer compartment or one compartment for the storage of fresh food, can be provided with moulds for forming ice cubes, which are usually obtained by a plastic or metal-sheet tray.

[0003] Said trays have dividing inserts inside, which define a number of sockets arranged on a horizontal plane, usually in a substantially chequered pattern.

[0004] For its use, the sockets of the tray are first filled up with water and then the tray is placed in its horizontal position either inside the freezer compartment or in a special compartment provided in the compartment for the storage of fresh food, so as that the water contained in the tray can solidify.

[0005] As a result, ice cubes are formed inside the sockets, which can be released from the dividing inserts through a mechanical action. To this purpose, dividing inserts are sometimes mutually articulated and fitted with a lever, whose actuation eases the ice cubes release.

[0006] Many improvements and changes have been made to the type of mould for forming ice cubes described above, as well as to its use; specifically the use of individual plastic cups housed in the tray to define the sockets have been provided instead of the dividing inserts, so as to make ice cubes release easier through deformation of the cup itself.

[0007] The trays for forming ice cubes previously described have However quite a number of drawbacks.

[0008] First of all, the risk of pouring part of the water contained in the not very deep trays, when transferring them from the water tap to the refrigerating cabinet, is extremely high. As a result, not only the kitchen floor and furniture can be splashed with water, but especially the bottom and sides of the tray itself will be wet and tend to adhere to the compartment walls of the refrigerating cabinet during the water hardening process.

[0009] Similarly, once the trays are placed inside the compartment in the refrigerating cabinet and a tray is accidentally hit while the water contained in it has not yet turned to ice, then water may be splashed all over in the compartment.

[0010] Above all said trays take a lot of space inside the compartment where they are positioned; to this purpose it should be appreciated that quite often the freezer compartment where said trays are usually placed has small dimensions; as a matter of fact, the known solution always provide for said trays to be placed in a horizontal position, thus reducing the space available for the storage of food.

[0011] It should also be appreciated that the food to be stored cannot be placed on top of said known trays if water has not yet solidified, or due to poor cleanliness, since the trays are usually not provided with a lid.

[0012] The extraction of the ice cubes from said trays also requires handling the latter to a considerable extent, with a possible ice cubes contamination.

[0013] Finally, the sublimation of solidified water from the trays expedites a phenomenon, i.e. the ice formation on the refrigerating cabinet walls, which should be always reduced in the refrigerating cabinets.

[0014] The present invention has the aim to solve the above drawbacks and provide a refrigerating cabinet equipped with a mould for forming ice cubes, as well as a mould, which has a more efficient and improved realization and performance compared to previous solutions.

[0015] In this frame, it is the main aim of the present invention to provide a refrigerating cabinet equipped with a mould for forming ice cubes, which detracts as little space as possible from the space for the storage of food.

[0016] A second aim of the present invention is to provide a refrigerating cabinet wherein water dripping caused by accidental shaking or tilting of a mould for forming ice cubes is either minimized or removed.

[0017] A third aim of the present invention is to provide a refrigerating cabinet equipped with a mould for forming ice cubes, which hinders the water contamination during its solidification and ice cubes release.

[0018] A fourth aim of the present invention is to provide a refrigerating cabinet equipped with a mould for forming ice cubes, which allows the distribution of ice cubes without the need of picking them up either with one's hands or with the aid of tongs.

[0019] A fifth aim of the present invention is to provide a mould for forming ice cubes, which can be employed more rationally inside a refrigerating cabinet.

[0020] In order to achieve such aims, it is the object of the present invention a refrigerating cabinet, a mould for forming ice cubes and a method for forming ice cubes incorporating the features of the annexed claims, which form an integral part of the present description.

[0021] Further aims, features and advantages of the present invention will become apparent from the following detailed description and the annexed drawings, which are supplied by way of non limiting example, wherein:

- Fig. 1 shows schematically a mould for forming ice cubes for a refrigerating cabinet, according to the present invention;
- Fig. 2 shows schematically a vertical section of a mould for forming ice cubes for a refrigerating cabinet, according to the present invention;

- Fig. 3 shows schematically the mould for forming ice cubes of Fig. 1 in a first working position;
- Fig. 4 shows schematically the mould for forming ice cubes of Fig. 1 in a second working position;
- Fig. 5 shows schematically the mould for forming ice cubes of Fig. 1 in a third working position;
- Fig. 6 shows schematically the mould for forming ice cubes of Fig. 1 in a possible application;
- Fig. 7 shows schematically a possible embodiment of a mould for forming ice cubes for a refrigerating cabinet, according to the present invention;
- Fig. 8 shows schematically a vertical section of the mould for forming ice cubes of Fig. 7.

[0022] Fig. 1 shows schematically a mould for forming ice cubes 1 according to the present invention, which consists of an internally hollow housing 2, having a generally parallelepipedon shape; said housing 2 is completely closed save for a side opening 3, which is provided for water inlet; said opening 3 may be fitted with a plug or similar closing means, not represented in the figures for simplicity's sake.

[0023] The housing 2 can be manufactured in two halves to be joined and sealed together, either fixedly or removably through the aid of a gasket for easier cleaning inside; this may be convenient when the use of thermosetting plastic materials or metal materials is desired.

[0024] Alternatively, the mould 1 can be manufactured as a one-piece element through a moulding or blow-moulding process in a simple and fast way.

[0025] In the annexed figures, the internal elements of the mould 1 are directly visible also from the outside of the housing 2 for simpler representation (to this purpose, it is assumed that the mould 1 is manufactured with a transparent material).

[0026] Three arrays of sockets 7 are defined within the housing 2, indicated with 4, 5 and 6 from top to bottom, respectively, which are arranged one on top of the other and extend between the two walls of the housing 2 having larger surface. Depending upon the chosen embodiment, the arrays of sockets 7 can be manufactured integrally with one of the two halves of the housing 2, or integrally with the one-piece element realizing it.

[0027] The sockets 7 consist of substantially hemispheric recesses or cavity, which are separated between them by partition walls 8. In the above example, arrays 4 and 5 carry an equal number of sockets 7 (six sockets), even if a different number of sockets may be contained; the array 6 forming the bottom of the housing 2 carries a higher number of sockets 7 compared to arrays 4 and 5 (eight sockets).

[0028] The three arrays 4, 5 and 6 substantially define three areas inside the housing 2, indicated with 9, 10 and 11 respectively, which are open on the side closer to the opening 3; said three areas 9, 10 and 11 are also in communication on the opposite side through a calibrated passageway 12.

[0029] Fig. 2 shows a section of a likely embodiment of the mould for forming ice cubes 1, where it can be seen how the three arrays 4, 5 and 6 actually define three areas 9, 10 and 11; in this figure it can be seen also how the partition walls 8 have a depression 15, whose function is to improve the throughflow and the levelling of water between the sockets 7.

[0030] From Fig. 2 it can be seen also how above the partition walls 8 there is enough space to let ice cubes go through, when they have to be released from the sockets, as better described in the following.

[0031] Above all, the section represented in Fig. 2 shows the presence of a axis A of minimum encumbrance, i.e. an axis according to which the housing 2 has a substantially smaller dimension than the one of the other two axis; such a dimension is substantially equal to the width of the sockets 7.

[0032] In Fig. 3 the mould for forming ice cubes 1 is represented in a first operating position, which is vertical, i.e. the position where water is filled in it through the opening 3.

[0033] As it can be appreciated, in this position, water is filled to the same level in all three areas 9, 10 and 11, since in this position they intercommunicate on their bottom through the calibrated passageway 12. During this step, water is filled in the housing 2 until it reaches a preset level 16, indicated by a proper notch 20, engraved and clearly visible from outside the housing 2, which is manufactured in a substantially transparent material.

[0034] Then, as represented in Figs. 4 and 5, the mould for forming ice cubes 1 is rotated (counterclockwise, with reference to said figures) so that the water contained in the areas 9, 10 and 11 can be distributed inside the sockets 7 of the three arrays 4, 5 and 6.

[0035] Since the number of sockets 7 in the arrays 4 and 5 is smaller than the number of sockets provided for in the array 6, and due to the fact that areas 9, 10 and 11 are initially filled with the same volume of water, it is clear that areas 9 and 10 will have water in excess compared to the water required to fill the sockets 7 of arrays 4 and 5.

[0036] During rotation of the mould 1, such an excess water is free to overflow towards the array 6 of the area 11 or simply flow down through the calibrated passageway 12; thus, an equal filling of sockets 7 in all three arrays 4, 5 and 6 will be reached.

[0037] To this purpose, as it can be noticed, the partition walls 8 ensure water levelling in the adjacent sockets 7 through their respective depressions 15; they have the function of avoiding a continuous ice crust formation over any of said arrays 4, 5 or 6.

[0038] Once the mould 1 is placed in the position of Fig. 5, and consequently the three arrays of sockets are filled with water, the mould itself can be introduced inside a freezer compartment of the refrigerating cabinet according to the invention, not shown here, i.e. with the arrays 4, 5 and 6 of sockets 7 being arranged one on

top of the other, so that the space occupied in plan by the housing 2 is reduced to a strip having a width substantially equal to the diameter of a socket 7.

[0039] It should also be noted that the passageway 12, may be restricted to let the area 9 intercommunicate with the area 10 alone, if so required.

[0040] In this instance, in the mould 1 water inlet will be provided until a level 16B is reached (Fig. 3), being higher than the level 16 of areas 9 and 10 only; according to such an embodiment the area 11 and the relevant array 6 of sockets 7 will be filled only by overflow from the overstanding arrays 4 and 5. Said solution allows for eventually obtaining a passageway 12 having a larger section, requiring less moulding precision for the manufacture of the housing 2.

[0041] Fig. 6 shows the mould for forming ice cubes 1 in a possible way of arranging it in the refrigerating cabinet according to the present invention. In this figure, number 17 indicates a door of a refrigerator compartment, for example of the freezing compartment, whose internal face or inner door panel is fitted with proper racks or seats 18 to house two moulds 1 in their working position.

[0042] In this figure number 19 indicates some cavities obtained in the racks 18 allowing for the insertion of one's hand fingers, so making the withdrawal of moulds 1 easier.

[0043] When water in the sockets 7 has solidified and ice cubes are needed, it will be enough to withdraw the housing 1 from the compartment of the refrigerating cabinet wherein it is housed and apply a twisting force to the housing 2, similarly to the operation required for the moulds according to the prior art, in order to realize the release of the ice cubes from the sockets 7.

[0044] As previously mentioned, since arrays 4, 5 and 6 are sufficiently apart from each other, the expulsion of the ice cubes is possible from the sockets 7 in the areas 9, 10 and 11 and subsequently through the opening 3 of the housing 2, for example to be expelled directly in an ice-bucket, not shown here for simplicity's sake.

[0045] Figs. 7 and 8 represent a mould for forming ice cubes 101 whose geometric configuration is suitable for allowing a blow-moulding manufacturing process, and therefore manufactured in one single piece.

[0046] Said mould 101 consists of a housing 102 having a circular opening 103, which in this instance is placed on a side wall of the housing 102, and of three arrays 104, 105, 106 of sockets 107, with their respective partition walls 108 and leveling depressions 115. As it can be noticed, also in this instance a calibrated passageway 112 is provided, which puts in communication areas 109, 110 and 111 defined by the arrays 104, 105, 106 within the housing 102.

[0047] Moreover, the mould 101 has wings 122, which are used to insert the mould for forming ice cubes 101 in proper guides when it is placed in the racks 18 of the door 17 (Fig. 6).

[0048] In the instance of the mould shown in Fig. 7, an overflow hole 120 may be provided instead of a notch (20, Fig. 3) to mark the filling level 116, to allow for excess water to flow out of the housing 120 during the filling operation; this may prove useful should said notch not be directly visible, for example because the housing 102 is manufactured in a matt material.

[0049] Fig. 8 represents a section of the mould for forming ice cubes 101 of Fig. 7, where it can be appreciated how the configuration of areas 109, 110, 111 and of sockets 107 may concur to form a geometric configuration to make mechanical action on sockets 107 easier.

[0050] In particular, such a geometric configuration makes it possible to grip the sockets 107 directly with one's fingers; this also allows for licking the rear and bottom sides of the sockets with some hot water eventually used to favour ice cubes release.

[0051] Moreover, according to a further variant embodiment, the opening 103 may be conceived in order to favour the ice cubes distribution, i.e. avoiding the use of tongs or even anybody's hands to distribute the ice cubes in glasses, carafes or other containers.

[0052] Specifically to this purpose, the opening 103 can be provided in such a way to allow the passage of one ice cube at a time, for example as provided in dispenser systems for sweets handy packs; wherever required, said opening 103 can be fitted with a lid or movable partition.

[0053] The features and the advantages of the present invention are clear from the above description.

[0054] According to the invention, due to the fact that the mould for forming ice cubes has a highly reduced thickness and that it can be placed in an upright position, the space required in plan in the compartment of a refrigerating cabinet is smaller.

[0055] To this purpose, the refrigerating cabinet according to the invention is advantageously equipped with a door whose inner-door panel has at least a proper recess or seat to house the improved mould for forming ice cubes.

[0056] A further advantage is due to the fact that the mould described by way of example is manufactured, which is realized as a closed housing, can be handled in a simpler and safer manner with respect to the known state of the art, removing all the problems associated with water dripping caused by accidental shaking or tilting deriving from the use of flat trays.

[0057] Moreover, the use of a closed housing allows for reducing or totally removing any contacts with the ice cubes, either directly or with the aid of tools, with the result of a more comfortable and healthier use.

[0058] The closed housing is also advantageous while the mould is staying inside the freezer compartment, as it protects the cubes from contamination and prevents that water, while sublimating, determines condensation on the freezer compartment walls, with the consequent frost forming; as a result, defrost cycle times will be shorter for the refrigerating cabinets.

[0059] It is obvious that many changes are possible for

the man skilled in the art to the refrigerating cabinet and/or the mould for forming ice cubes described above by way of example, without departing from the novelty spirit of the inventive idea, and it is also clear that in practical actuation of the invention the components may differ in form and size from the ones described and be replaced with technical equivalent elements.

[0060] By way of example, the guiding wings (122) for inserting the mould in its relevant guides or seats on the inner-door panel may be configured as hooking means to ensure coupling on proper supports or even inside the selected compartment.

[0061] According to a further variant embodiment, the mould for forming ice cubes may be equipped with a pedestal or a flat base for allowing its location directly on the bottom of the compartment, instead of using the inner door panel.

[0062] The materials which can be used for the manufacture of the mould are available from a wide selection, either plastic or metal; plastic materials can be either clear or matt, according to technical and aesthetic requirements, either hard or flexible according to their moulding and assembly process; as mentioned above, the shapes of the mould and its various elements may differ from the ones described by way of example in order to favour the manufacturing operations.

[0063] As previously mentioned, if the water level inside the mould is not visible when matt materials are used, then proper overflow holes may be provided in the mould housing at the height of the preset filling levels, so as to prevent water from exceeding a preset volume.

[0064] When hard materials are employed, the release of ice cubes can be simply obtained through the thermal action of tap water, whereas when flexible materials are used, the exertion of a mechanical actuation will favour the release of the ice cubes.

[0065] The number of arrays and sockets will obviously differ according to the needs and geometrical requirements of the various possible installations; also the shape of the sockets may differ from the one described above, based on manufacturing and aesthetic necessity.

[0066] Finally, the opening for water inlet can be provided on one of the sides walls having greater surface of the mould, as shown in the Fig. 7, to ensure the filling of the mould by keeping it in its horizontal position. Obviously, this can be reached by properly positioning the notch 20 or the overflow hole replacing it.

[0067] In this instance, the mould will be positioned so as to have its axis (A) of minimum encumbrance in a vertical position; then the mould will be lifted up until the axis (A) of minimum encumbrance reaches its horizontal position. Thereafter the mould will be rotated to let the water introduced in the housing to flow to all the sockets of the arrays as foreseen, and be ready to be housed inside the refrigerating cabinet.

Claims

1. Refrigerating cabinet, comprising a compartment within which at least a mould for forming ice cubes can be arranged, said mould having a plurality of sockets apt to be filled with water and an axis (A) of minimum encumbrance, characterized in that said mould for forming ice cubes (1, 101) is arranged inside said compartment of the refrigerating cabinet so as to have its axis (A) of minimum encumbrance in horizontal.

2. Refrigerating cabinet, according to claim 1, characterized in that said compartment has a door (17) wherein one or more seats (18) are defined to arrange one or more of said moulds (1, 101), and/or has guides and/or hooks for at least one of said moulds (1, 101) are defined.

3. Refrigerating cabinet, according to claim 1, characterized in that said mould (1, 101) consists of an closed housing (2, 102) being internally hollow and provided with water inlet means (3, 103).

4. Refrigerating cabinet, according to claim 3, characterized in that within said housing (2, 102) at least two arrays (4, 5, 6; 104, 105, 106) of sockets (7, 107) are provided, said arrays (4, 5, 6; 104, 105, 106) being one on top of the other when said mould (1, 101) is arranged in said compartment.

5. Refrigerating cabinet, according to claim 4, characterized in that said arrays (4, 5, 6; 104, 105, 106) of sockets (7, 107) define separate areas (9, 10, 11; 109, 110, 111) within said housing (2, 102), at least some of said areas (9, 10, 11; 109, 110, 111) being in particular intercommunicating through at least a calibrated passageway (12, 112).

6. Refrigerating cabinet, according to claim 3, characterized in that said housing (2, 102) is equipped with means (20, 120) for indicating the maximum water volume to be let in.

7. Refrigerating cabinet, according to at least one of the previous claims, characterized in that said mould (1, 101) has at least an opening (3, 103), whose configuration is fit for the distribution of ice cubes from said sockets (7, 107) outside said housing (2).

8. Method for forming ice cubes, which uses a mould for forming ice cubes being filled with water and then housed inside a refrigerating cabinet to cause water solidification, characterized in that it provides for the following steps:

   a) introduction of water in a mould (1, 101) con-

sisting of an internally hollow closed housing (2, 102), which contains arrays (4, 5, 6; 104, 105, 106) of sockets (7, 107) defining separate areas (9, 10, 11; 109, 110, 111) within the housing (2, 102) itself, said water inlet occurring through an opening (3, 103) of the housing (2, 102) being arranged above the inlet of said areas (9, 10, 11; 109, 110, 111);

b) rotation of the mould (1, 101) in order to cause a flow of the water introduced in the housing (2, 102) to all sockets (7, 107) of the provided arrays (4, 5, 6; 104, 105, 106);

c) location of the arrays (1, 101) in the refrigerating cabinet.

9. Method for forming ice cubes, according to claim 8, characterized in that, during the execution of step a), the mould (1, 101) is placed with its opening (3, 103) on the top and its axis (A) of minimum encumbrance in a horizontal position.

10. Method for forming ice cubes, according to claim 8, characterized in that it provides:

i) filling of the mould (101) in such a position to have the axis (A) of minimum encumbrance in vertical;

ii) lifting the mould (101) until the axis (A) of minimum encumbrance reaches an horizontal position;

iii) steps b) and c).

11. Mould for forming ice cubes of the type comprising a plurality of sockets apt to be filled with water and suitable to be arranged within a refrigerating cabinet to obtain solidification of the water contained in the sockets, said mould for forming ice cubes having an axis (A) of minimum encumbrance, characterized in that said axis (A) of minimum encumbrance lays in horizontal; so as that the mould can be arranged in the refrigerating cabinet in a vertical position.

12. Mould for forming ice cubes, according to claim 11, characterized in that said mould (1, 101) consists of an closed housing (2, 102) being internally hollow having water inlet means (3, 103).

13. Mould for forming ice cubes, according to claim 11, characterized in that at least two arrays (4, 5, 6; 104, 105, 106) of sockets (7, 107) are provided within said housing (2, 102), said arrays (4, 5, 6; 104, 105, 106) being arranged one on top of the other when said mould (1, 101) is arranged in said compartment, where in particular said arrays (4, 5, 6; 104, 105, 106) of sockets (7, 107) define distinct areas (9, 10, 11; 109, 110, 111) within said housing (2, 102), at least some of said areas (9, 10, 11; 109, 110, 111) being intercommunicating through at least a calibrated passageway (12, 112).

14. Mould for forming ice cubes, according to claim 13, characterized in that said housing (2, 102) is equipped with means (20, 120) for indicating the maximum water volume to be let in.

15. Mould for forming ice cubes, according to at least one of the previous claims, characterized in that said mould (1, 101) is manufactured in moulded or blow-moulded plastic material, or in metal material, and in particular is obtained by joining two movable half-elements.

16. Mould for forming ice cubes according to at least one of the previous claims, characterized in that it has a pedestal for its arrangement within the refrigerating cabinet.

17. Mould for forming ice cubes, according to at least one of the previous claims, characterized in that said mould (1,101) has at least one hole (120) suitable for allowing the overflow of the water when this latter reaches the maximum level required inside said housing (2, 102).

18. Mould for forming ice cubes, according to at least one of the previous claims, characterized in that said sockets (7, 107) are separated between them by partition walls (8, 108), which are provided with leveling depressions (15, 115).

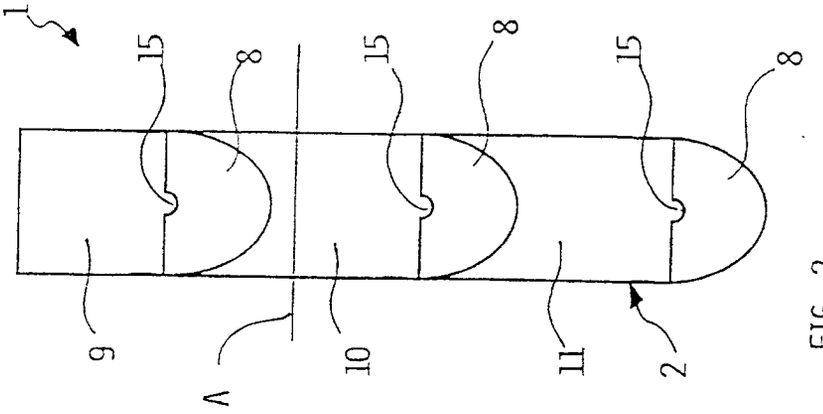

FIG. 2

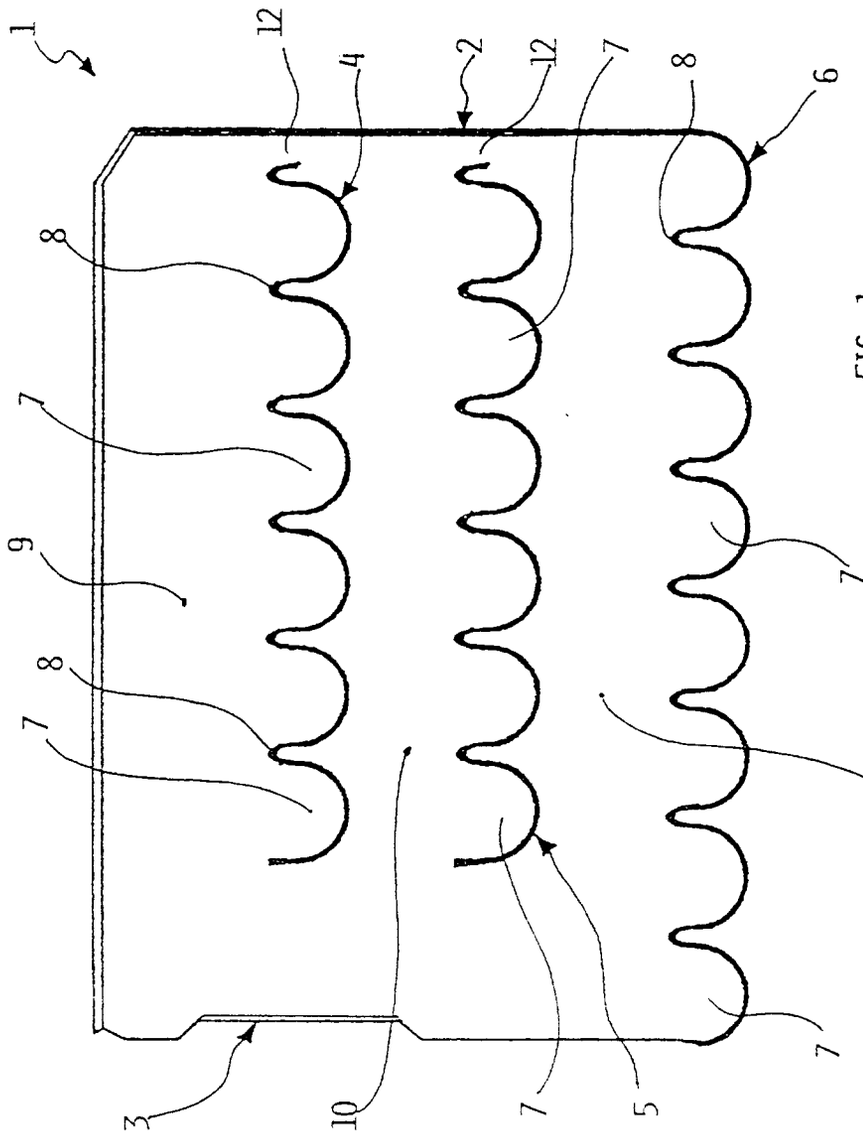

FIG. 1

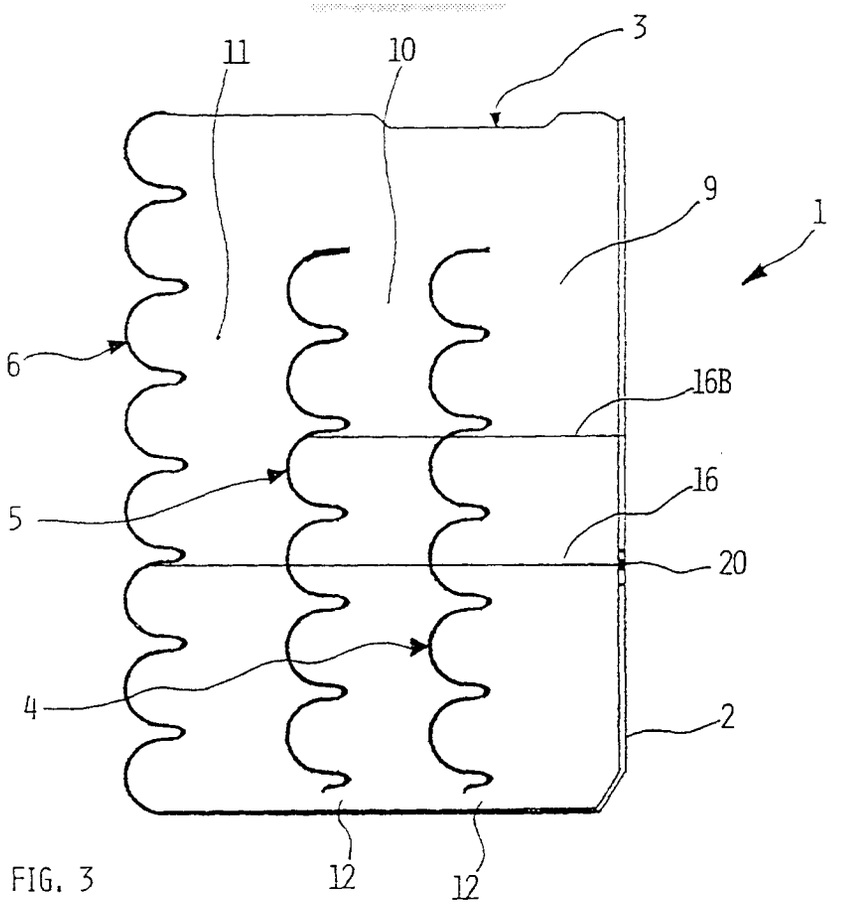

FIG. 3

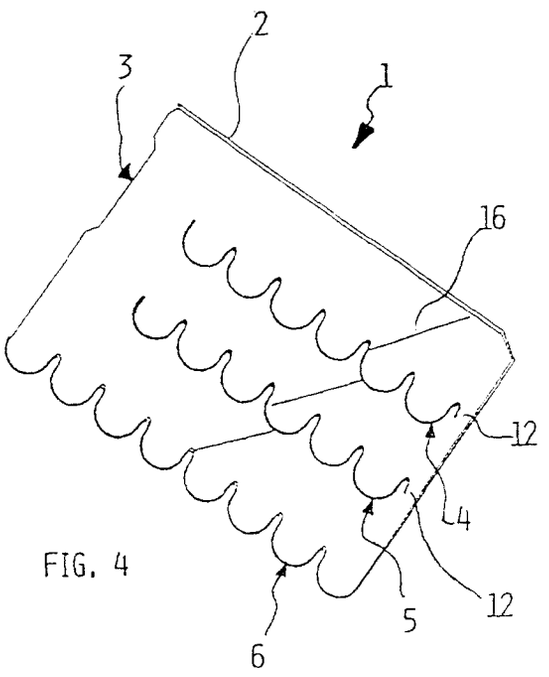

FIG. 4

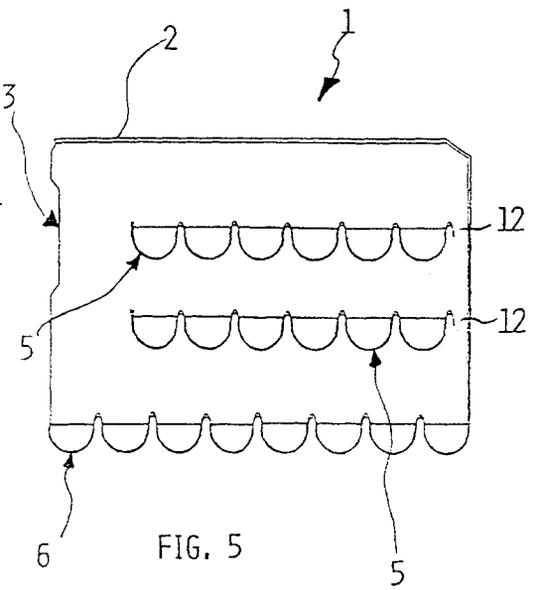

FIG. 5

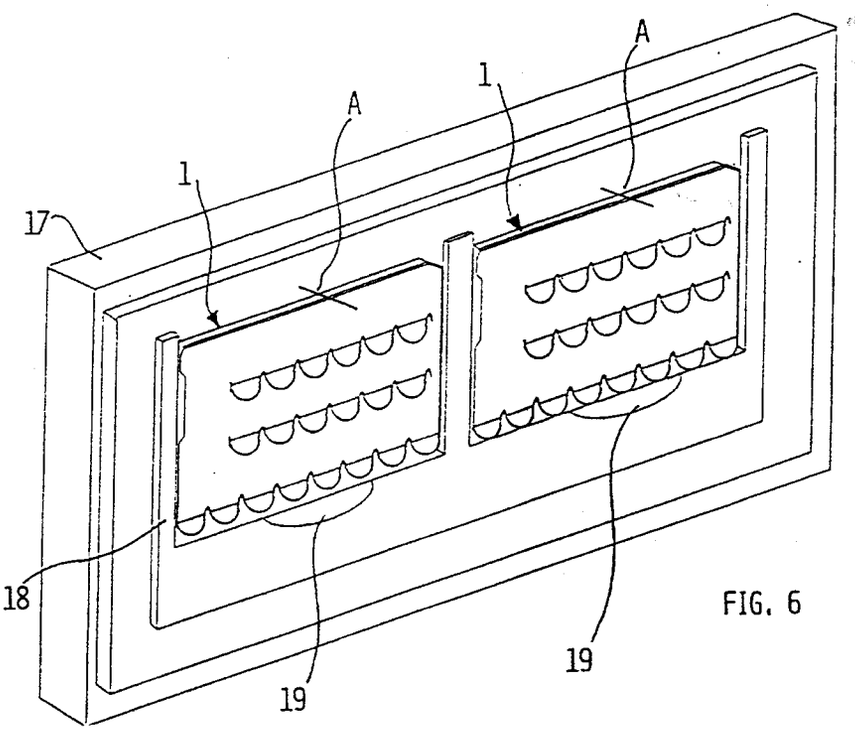

FIG. 6

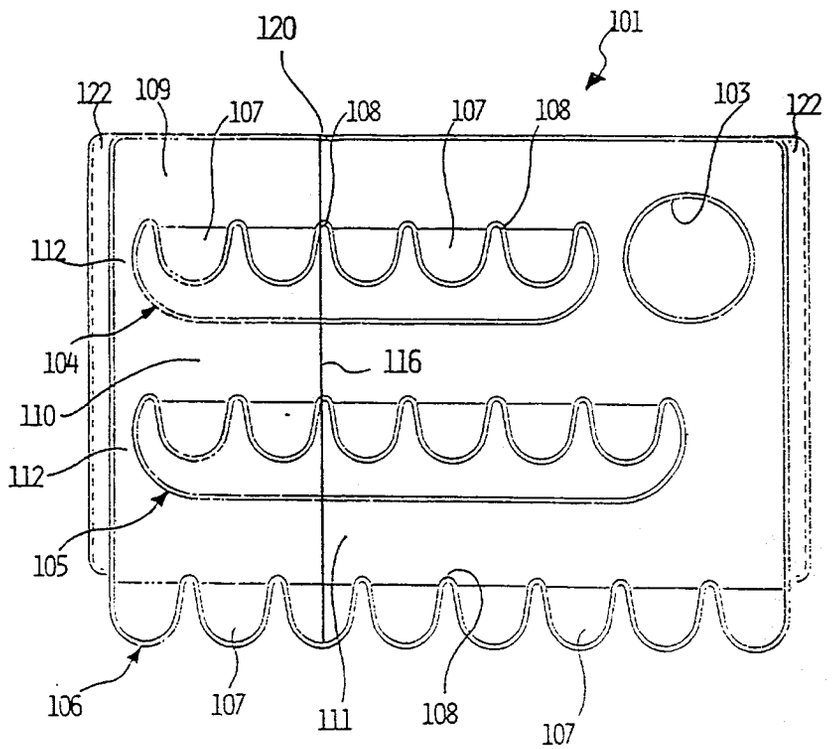

FIG. 7

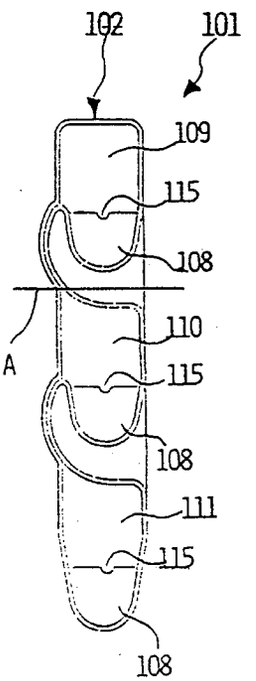

FIG. 8