

REFRIGERATOR STORAGE TRAYBACKGROUND OF THE INVENTION

This invention relates generally to the storage of material inside a refrigerator, cold room or the like referred to generally hereinafter as "a refrigerator".

Refrigerators are often provided with large single compartment drawers and fixed shelves.

A typical refrigerator is used with a large number of relatively small items which are sequentially packed onto the shelves. Consequently when an item must be retrieved from an inner end of a shelf it is necessary to unpack the preceding items to gain access to the desired item. This can be a tedious process.

US patent No. 5,182,923 described a refrigerator unit for food products which is used for storing and serving salads and the like. The unit provides access from above to various food pans when a cover is lifted.

US patent No. 5,527,016 relates to a carousel device for freezing drops of a liquid reagent for biological samples.

US patent No. 5,305,615 also describes a carousel device, but for the dispensing of frozen food.

US patent No. 4,831,841 shows a cooling system for a merchandising machine which makes use of a rotatable drum.

5 International application No. WO99/56071 illustrates medicine refrigerating drawers, in a column configuration.

Devices of the preceding types are generally custom-made for a particular purpose or cooling arrangement and do not address the problem referred to, viz the convenient
10 accessibility of food or other items in a typical refrigerator, such as a domestic refrigerator.

SUMMARY OF THE INVENTION

The invention is concerned with a storage tray which at least partly alleviates the
15 aforementioned problem.

The invention provides a storage tray for use in a refrigerator, the tray including a body and a plurality of formations on or in the body which define receptacles or with which
containers are engageable.

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The formations may be openings on or in the body, be channels, ribs, flanges or the like, or have any other suitable shape or form.

The formations may define respective openings or inlets to, or mouths of, receptacles
25 which are integrally formed with the body. Alternatively a plurality of containers may respectively be engaged with the formations.

The openings may be formed so that they are of the same size or in at least two different sizes.

- 5 The body of the storage tray may be formed to accommodate at least one drawer which is mounted to, and which is slidably movable relatively to, the body.

At least one lid may be provided for covering at least one respective container or receptacle. According to requirement each of the containers or receptacles may be
10 covered directly or indirectly by one or more lids. The lids may sealingly engage with the body so that the respective containers or receptacles are effectively isolated and sealed. As indicated the receptacles may be formed integrally with the tray and the mouth of each receptacle may define a respective opening.

- 15 As used herein, only to avoid confusion, the word "receptacle" designates a compartment, holder, or the like, formed integrally with the tray body, while the word "container" designates a compartment, holder, or the like, which is separable from the body.

The receptacles may define respective recesses in an upper surface of the tray.

20 Alternatively, as indicated, separate containers are engageable with, or insertable into the formations in the tray. In one embodiment the formations are mouths of respective receptacles and the containers are shaped so that they can be inserted with ease into the receptacles.

25 Preferably the containers are tapered so that engagement of the containers with the respective receptacles, formations or openings, as the case may be, is facilitated.

The invention also provides, in combination, a refrigerator and a tray of the preceding type,

5 the tray being mounted to the refrigerator for sliding movement relatively to the refrigerator.

In one form of the invention the refrigerator includes a shelf and the tray is supported on the shelf and is slidably movable relatively to the shelf. The tray may be guided for movement by means of at least one guide which is fixed to the shelf.

10 In a different form of the invention the tray, in effect, forms a shelf, which preferably is slidably movable relatively to the refrigerator.

Containers which are engageable with the tray (ie. the shelf) may be slidably movable
15 relatively to the tray. The tray body may have slide ribs or other formations and each container may have complementary formations which are engageable therewith.

In a different form of the invention the combination includes at least one slide mechanism with at least first and second relatively slidable members, the first member being fixed to
20 the refrigerator and the second member being fixed to the tray so that the tray is slidingly movable relatively to the refrigerator.

The tray may be made from any suitable material eg. it may be moulded from a suitable plastics material and, for example, except for the openings, may be in sheet form. It is
25 possible though to fabricate the tray from a mesh material eg. a wire or plastics mesh. In this instance the openings may be defined by apertures in the mesh.

The invention also extends to a storage tray for use in a refrigerator, the tray including a body with a plurality of container-receiving formations on the body, and mounting

5 formations for mounting or installing the body inside a refrigerator.

In one form the invention the container-receiving formations are respective openings or recesses in the body into which a plurality of containers are at least partly respectively insertable.

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In a different form of the invention the container-receiving formations are guide formations with which a plurality of containers are respectively slidably engageable.

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Preferably the mounting formations permit sliding movement of the body relatively to the refrigerator.

BRIEF DESCRIPTION OF THE DRAWINGS

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The invention is further described by way of examples with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a tray according to one form of the invention,

Figure 2 is a perspective view of a tray according to a second form of the invention,

Figure 3 is a side view of a slide mechanism which is suitable for use with a tray of the invention,

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Figure 4 is an end view of the slide mechanism of Figure 3,

Figure 5 is a perspective view of a tray according to a different form of the invention,

Figure 6 is a view of a receptacle which is engageable with the tray of Figure 5,

Figure 7 illustrates an expansion mechanism for use with a tray which is retro-fitted to a refrigerator,

- 5 Figure 8 is an end view of a different slide mechanism,
Figure 9 is a view of a shelf-tray slide arrangement,
Figure 10 illustrates a tray according to the invention which is made from mesh, and
Figure 11 shows another variation of the invention.

10 DESCRIPTION OF PREFERRED EMBODIMENTS

Figure 1 of the accompanying drawings illustrates a tray 10 according to one form of the invention which is made from any suitable material. The tray may for example be injection moulded from PVC so that it is in sheet material form.

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The tray includes a body 12 which has a base 14 and a surrounding side wall 16.

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A number of internal walls 18 traverse the base and form, in this example, six small compartments or receptacles 20 and a single relatively large receptacle 22. Each receptacle has a respective mouth or opening 23.

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A tray of the kind shown in Figure 1 is dimensioned to fit, making effective use of available space, inside a domestic refrigerator, not shown. The tray is slidably located on a conventional shelf inside the refrigerator and can be pushed so that it rests wholly on the shelf or it can be withdrawn to a desired extent from the shelf and, if required, can be removed totally from the refrigerator. A catch or hook formation, of any appropriate type (not shown), can be used to prevent the tray from inadvertently being totally withdrawn from the shelf.

- 5 The tray could alternatively be engaged with guide or slide formations fixed to the refrigerator, so that it does not rest on a shelf.

The various receptacles 20 and 22 are used for the storage of separate items. The receptacles keep the items separated from one another. A principal benefit which arises from the use of the tray is that it is no longer necessary to remove items sequentially from
10 a shelf inside a refrigerator to access an item at an inner end of the shelf. All that is necessary is to withdraw the tray, select the desired item and then replace the tray on the shelf.

- 15 The tray may include a handle 24, on a front side of the side wall, to facilitate handling and sliding movement of the tray.

Items may be placed directly in the receptacles 20 and 22 or alternatively use may be made of custom-designed containers 30, as shown in Figure 1. Each container 30 is
20 designed to receive food or liquid directly and is dimensioned so that it fits through a respective mouth or opening 23 and snugly into a respective receptacle 20 which thus acts as a container-receiving formation on the tray body. Side walls 32 of the container may be slightly tapered to facilitate insertion of the container into a receptacle. The container may be used in conjunction with a removable lid 34.

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Figure 2 illustrates a tray 40 according to a different form of the invention. The tray has a base 42 and a side wall 44.

The tray has an upper plate 46 and, on one side, the plate is formed with a plurality of

5 openings 48. Each opening forms the mouth of a respective receptacle 50 of rectangular dimensions. In this case the receptacles are formed in at least two sizes.

Each receptacle has a removable lid 52 which is transparent so that the contents of the receptacle can be viewed. Again it is possible to place a removable container with food in
10 each receptacle instead of, for example, placing food directly into a receptacle.

On a front side 54 of the wall 44 two openings 56 and 58 are formed. These openings accommodate drawers 60 and 62 respectively which are slidably engaged with the remainder of the tray.

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The tray can, as is the case with the Figure 1 embodiment, be accommodated on a conventional shelf in a refrigerator. Alternatively the tray is attached to the refrigerator by means of slide mechanisms 64 which are further illustrated in Figures 3 and 4.

20 Each slide mechanism includes three telescopic components 66, 68 and 70 and a number of rollers 72 and 74. The component 68 can move with a sliding action into the component 70, riding on the rollers 74, and in a similar way the component 66 can move with a sliding action into the component 68, moving over the rollers 72. The component 70 can be attached to an inner side wall 76 of a refrigerator by means of fasteners 78, as is shown
25 in Figure 4, and an outer end 80 of the component 66 is secured by means of a fastener 82 to the wall 44 of the tray.

If the slide mechanisms are used then the tray is not supported on a shelf inside the refrigerator but is supported only by the slide mechanisms. The tray can be withdrawn from

5 the refrigerator to access the containers or the receptacles, when required, and is then restored with a sliding action to its original position.

By making use of the trays of the invention easy access to items in a refrigerator is afforded. The trays can be made in different sizes and shapes to ensure that they can be
10 used with practically any refrigerator in a manner which ensures effective use of available space.

Figure 5 shows a tray 90 which is moulded from a suitable plastics material and which is formed with a number of rectangular formations or openings 92. Figure 6 shows a
15 container 94, which is one of a number of similar containers, not shown, which are respectively insertable into the openings of the tray of Figure 5.

Each container has an upper rim 96 which rests on a perimeter of the opening into which the container is inserted, thereby keeping a mouth 98 of the container slightly above the
20 upper surface of the tray.

A lid 91, which preferably is transparent, is engageable with the receptacle.

The tray has rollers or slides 100 on its side which are engageable with guides, not shown,
25 installed inside a refrigerator. Alternatively the tray has slide mechanisms of the kind shown in Figures 3 and 4 fixed to opposed sides of the tray. Either approach allows the tray to be moved into the refrigerator and withdrawn when needed to allow for access to a desired container. A handle 102 on what, in use, is a front side of the tray, facilitates movement of the tray. Stops 104 which are optionally used, depending on the slide

5 arrangement adopted, prevent total inadvertent withdrawal of the tray from its installed position.

The tray of the invention can be made to fit closely inside a refrigerator, particularly as original equipment, to maximize space utilization. There is, however, a need for an after
10 market, or retro-fit, arrangement and to this end trays can be made in a range of sizes but, nonetheless, it may not be possible to arrange matters to ensure that a tray can be easily and effectively fitted inside a refrigerator. Figure 7 illustrates one possible approach to the problem.

15 In Figure 7 a tray 120, of the general kind described in connection with Figure 5, is formed with side flanges 122. A guide rail 124 is mounted to threaded spigots 126 which are fixed, eg. adhesively or by means of suitable fasteners, to an inner surface of a side wall
128 of a refrigerator. The guide rail 124 is locked to the spigots by means of respective lock nuts 130. It is evident that the guide rail can be moved towards or away from the side
20 wall 128 so that, within reason, adjustments can be made to take account of the available space for installing the tray 120 inside the refrigerator.

Figure 8 shows a tray 140 with a side flange 142 which fits inside a slotted guide rail 144 which is fixed to a side wall 146 of a refrigerator. The side flange 142, if initially oversized,
25 can be trimmed or cut to size to enable the tray to be installed effectively inside the refrigerator.

Figure 9 shows a shelf-tray slide arrangement wherein a tray 160, with downwardly extending sides 162, is mounted to a mesh or wire shelf 164 installed as original standard

5 equipment in a refrigerator 166. Each side terminates in a lower longitudinally extending enlarged bead 168 which is slidably engaged in a channel 170 of a slide 172. A lower channel 174 in the slide is clipped onto a wire 176 of the shelf 164. Thus the tray 160 is on top of the shelf and in a sense "stands" on its sides as opposed to being suspended from guide rails which are fixed to walls of the refrigerator and accordingly is independent
10 of the inner width of the refrigerator. Again it is to be noted that the tray 160, or the shelf 164, could have a catch formation (not shown) of any appropriate type which prevents the tray from accidentally being pulled off the shelf.

In the preceding examples the trays are moulded from a plastics material and have a sheet
15 material form. This is not limiting though for the tray could alternatively be made from a different material eg. a wire mesh. Figure 10 for example shows a tray 180 which is made from a wire mesh 182 with a plurality of small apertures, in which are formed larger openings 184 which receive respective containers 186, similar to the arrangement of Figures 5 and 6. The wire tray is similar to the tray 160 of Figure 9 in that it has
20 downwardly extending sides 188 which are slidably engaged with guides 190 fixed to an upper surface of a shelf (not shown).

Figure 11 shows another form of the invention wherein a tray 200 has a body 202 made, for example, from wire mesh, with a number of parallel guide wires 204 which stand proud
25 of transverse supports 206.

The tray could be fixed in position inside a refrigerator, not shown, or could be mounted for sliding movement relatively to the refrigerator using techniques of the kind already described. A number of custom-made containers 208, only one of which is shown, are

5 engageable with the tray body. Each container is moulded from a plastics material and has a number of grooves 210, in its undersurface, which are respectively engageable with the guides 204. The grooves could engage with the guides with a clip action, which permits the aforementioned sliding action but which prevents inadvertent disengagement of the container from the guides. Alternatively a different type of retaining mechanism is
10 used for this purpose. The container could include internal partitions 212.

The arrangement of Figure 11 is used in the same way as the trays and containers (or receptacles) already described and displays similar advantages.

5 **CLAIMS**

1. A storage tray for use in a refrigerator, the tray including a body and a plurality of formations on or in the body which define receptacles or with which containers are engageable.



2. A tray according to claim 1 wherein the formations include openings in the body.
3. A tray according to claim 2 wherein the openings are formed in at least two different sizes.
4. A tray according to claim 2 or 3 wherein the openings define respective openings to, or mouths of, receptacles which are integrally formed with the body.
5. A tray according to claim 4 which includes at least one lid for covering at least one respective receptacle.
6. A tray according to claim 2 or 3 in combination with a plurality of containers which are removably engageable with the respective openings.
7. A tray according to claim 6 wherein the containers are shaped to facilitate engagement of the containers with the respective openings.
8. A tray according to claim 6 or 7 wherein the containers are insertable into the openings so that mouths of the containers are slightly above an upper surface of

5 the tray.

9. A tray according to any one of claims 1 to 8 which includes at least one drawer which is mounted to, and which is slidingly movable relatively to, the body.

10 10. A tray according to any one of claims 1 to 9 which is moulded from a plastics material.



11. A tray according to any one of claims 1 to 9 which is made from a mesh material.

15 12. In combination a refrigerator, and a tray according to any one of claims 1 to 11, the tray being mounted to the refrigerator for sliding movement relatively to the refrigerator.

20 13. A combination according to claim 12 wherein the refrigerator includes a shelf and the tray is supported on the shelf and is slidingly movable relatively to the shelf.

14. A combination according to claim 13 which includes guides which are fixed to the shelf and with which the tray is slidingly engaged.

25 15. A combination according to claim 12 which includes guides which are fixed to walls of the refrigerator and with which the tray is slidingly engaged.

16. A combination according to claim 12 which includes at least one slide mechanism with at least first and second relatively slidable members, the first member being

5 fixed to the refrigerator and the second member being fixed to the tray so that the tray is slidingly movable relatively to the refrigerator.

10 17. A storage tray for use in a refrigerator, the tray including a body which has a plurality of openings in the body, and formations on the body which are slidingly engageable with guides.



18. A tray according to claim 17 in combination with a plurality of containers which are removably engaged with the openings.

15 19. A storage tray for use in a refrigerator, the tray including a body with a plurality of container-receiving formations on the body, and mounting formations for mounting or installing the body inside a refrigerator.

20 20. A tray according to claim 19 wherein the container-receiving formations are respective openings or recesses in the body into which a plurality of containers are at least partly respectively insertable.

25 21. A tray according to claim 19 wherein the container-receiving formations are guide formations with which a plurality of containers are respectively slidingly engageable.

22. A tray according to claim 19, 20, or 21 wherein the mounting formations permit sliding movement of the body relatively to the refrigerator.