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02613802

ABOUT WHIRLPOOL

Whirlpool Inc, US is one of the leading manufacturers and marketers of major home appliances.

PRINCIPAL BRANDS

Whirlpool
Bauknecht
Ignis
Kitchen Aid
Raybo

ZONES

Whirlpool North America
Whirlpool Europe
Whirlpool Latin America
Whirlpool Asia

ABOUT WHIRLPOOL ASIA

Focused principally on two countries:
India
China

PRODUCTS

Automatic and semi-automatic washing machines, microwave ovens, refrigerators

MANUFACTURING FACILITIES

Faridabad, India (direct cool refrigerators)
Pondicherry, India (automatic and semi-automatic washing machines)
Pune (Ranjangaon) (no frost refrigerators)

Shanghai, China (automatic washing machines)
Shunde, China (microwave ovens)

TECHNOLOGY CENTRES

Shanghai, China
Ranjangaon, India
Pondicherry, India

WHIRLPOOL OF INDIA LTD. (WIL)

Incorporated in 1960, Whirlpool of India –was formerly Kelvinator of India.

Now,the company has grown into a multi-unit company manufacturing refrigerators, deep-freezers, compressors, electrical grade laminations, cash registers, thermostats, microwave ovens and mopeds.

In 1994-95, it tied up with Whirlpool Corporation, US and the company acquired its present name.

WIL has its main plant at Faridabad in Haryana - to manufacture refrigerators and freezers.

The washing machine unit is located at Pondicherry.

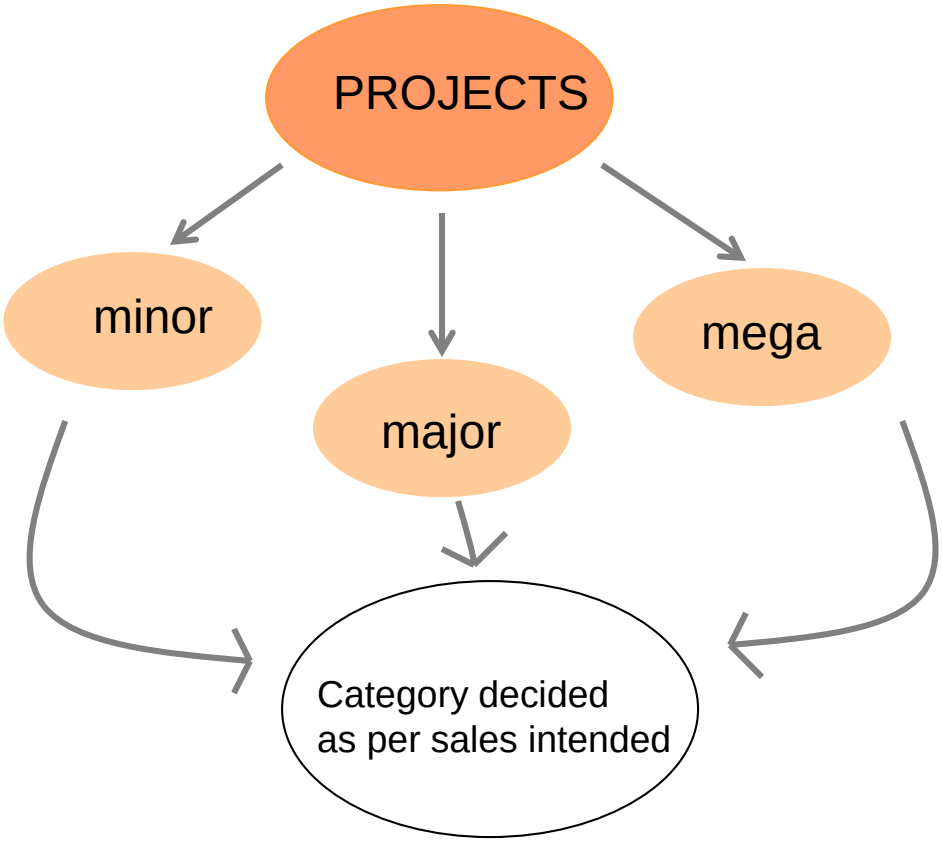
WIL - RANJANGAON

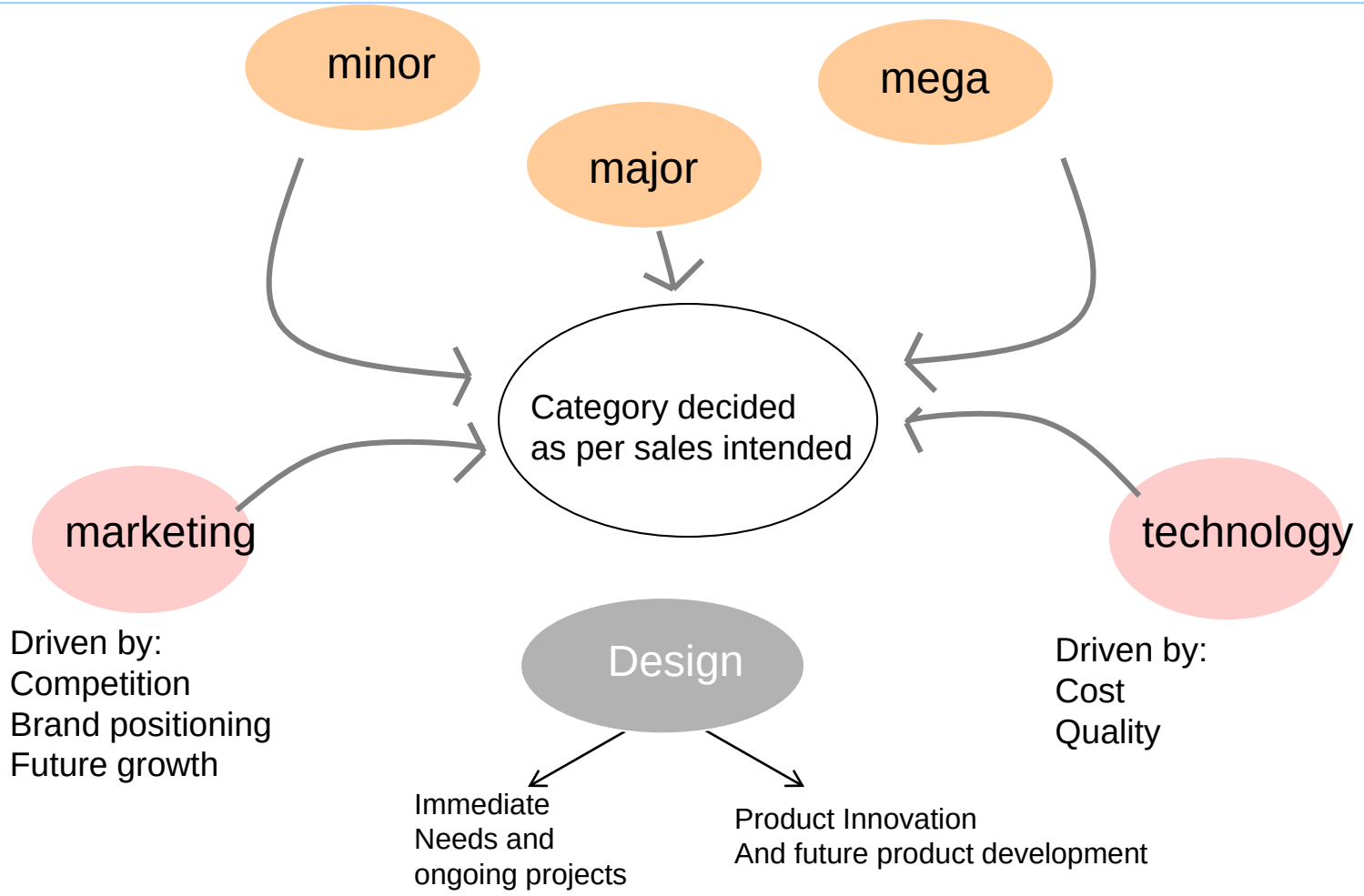
In 1998, the company established another refrigeration plant at Ranjangaon near Pune.

This plant is also equipped with one of the Technology Centres of Whirlpool, more known as the Product Development Cenrtre or PDC.

Here, Whirlpool's technology and procurement operations are organized by integrating the recent practices in

- product creation and development
- advance technology development
- manufacturing processes
- supply-base management
- globalization


PROJECTS
minor
major
mega
Category decided
as per sales intended

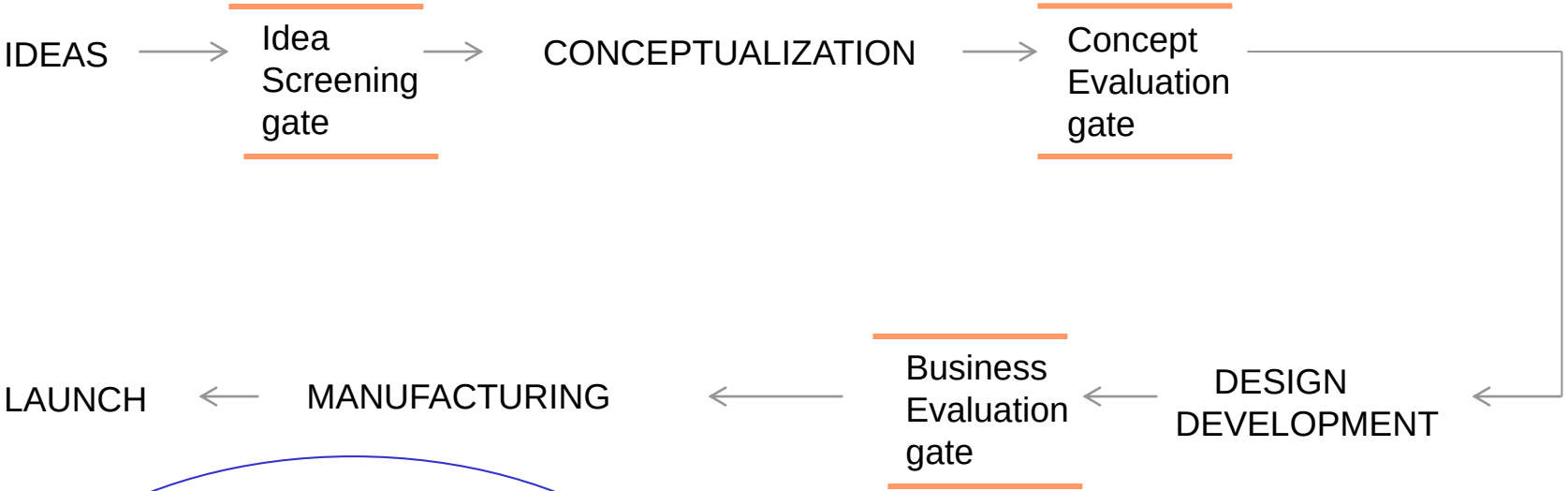

minor
major
mega
Category decided
as per sales intended
marketing
technology
Driven by:
Competition
Brand positioning
Future growth
Design
Driven by:
Cost
Quality
Immediate
Needs and
ongoing projects
Product Innovation
And future product development

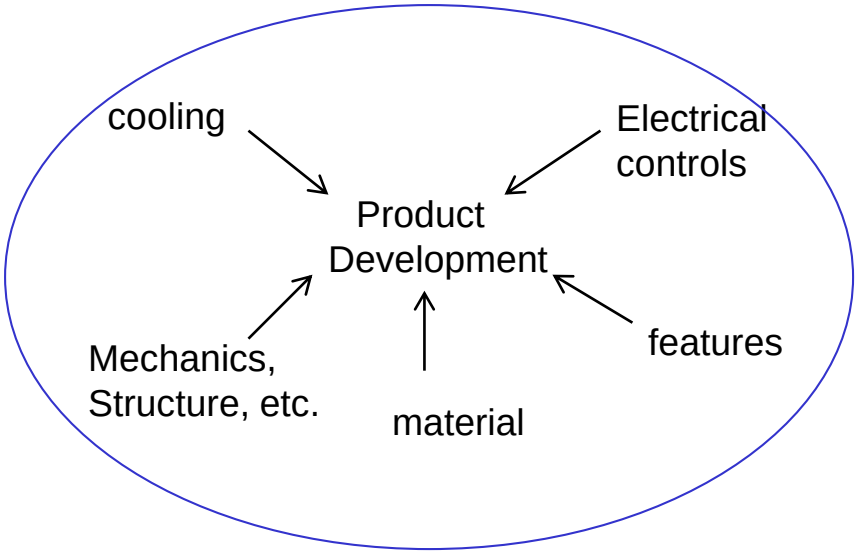
PRODUCT DEVELOPMENT

Product design and development is based on the principle of Robust Design with emphasis on

- customer focus
- translation of customer insights into design ideas, etc.
- rigorous design (FMEAs, etc.)

DESIGN METHODOLOGY





PRODUCT DEVELOPMENT CENTRE

Material testing lab- material testing for various engg. tests like strength, impact tests related to aging and environmental impacts on material performance.

Structural testing lab- testing of components by putting them to work. tests like door opening, ice try twisting etc.

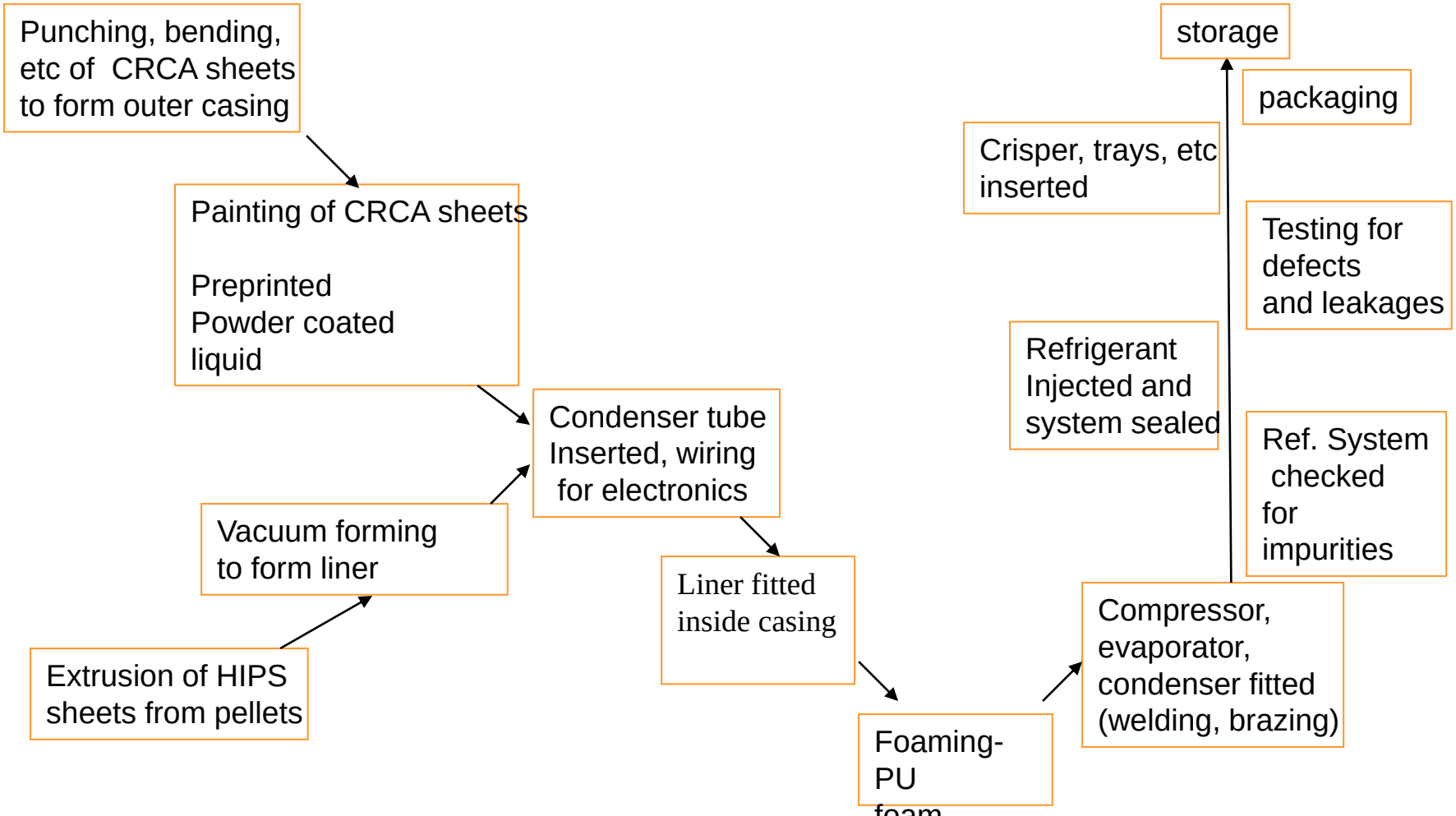
Sound/vibration testing lab- testing related to compressor vibration levels

Performance lab- testing by simulating various environmental conditions. chambers for humidity, temp control.

Electrical lab- testing and development of electrical components

Design-product features- adding features for future products.

ASSEMBLY LINE



PROJECT WORK

Generation of concepts for space optimization.
Product familiarization-aesthetics, product detailing, etc
Understanding of materials and processes on the assembly line
Understanding cost and manufacturing and other constraints
Design methodology and team work
Communication techniques

METHOD

User survey

Documentation of different products kept in the refrigerator

Insights

Ideation – developing concepts for

- **aesthetics for the diffuser**
- **crisper separator (focus on saving cost and material)**
- **storage concepts for the refrigerator (focus on usability and flexibility of use)**
- **innovative concepts for refrigerators**
- **idea bank – futuristic concepts for refrigerators**

Crisper
separator

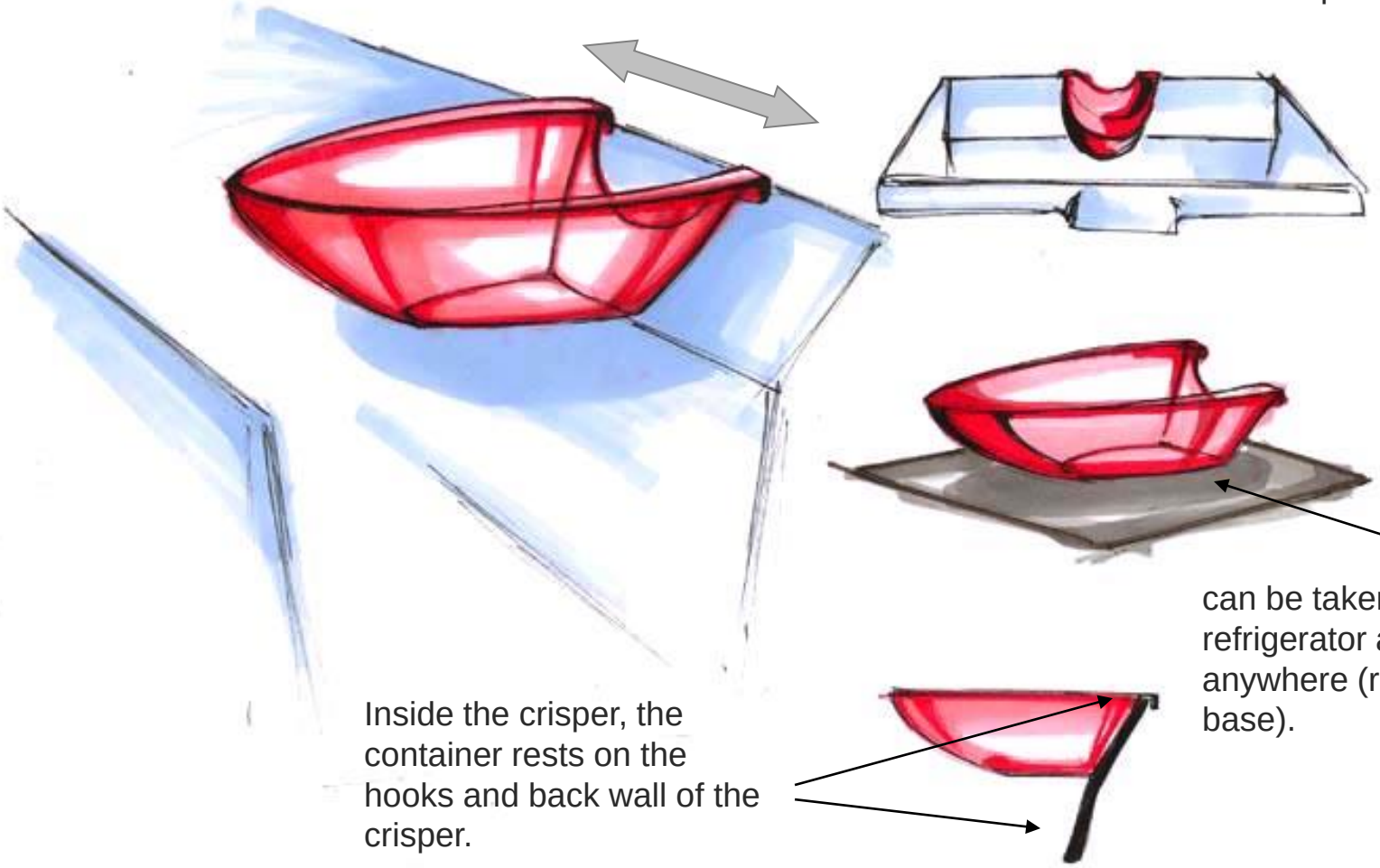
Crisper separator

Not a must be feature of the refrigerator
novelty and usable tool
Flexibility

Reduce material content – cost benefit
Added functionality

The dome like shape of the container helps in keeping the material usage minimum and easy accessibility of container items for the user.

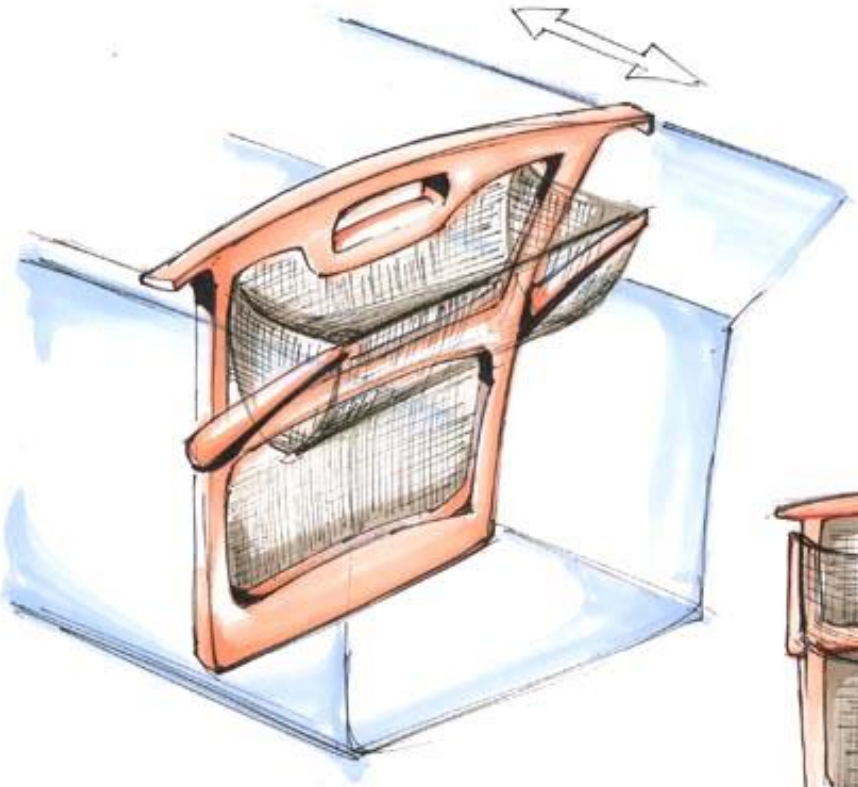
does not block the view of the crisper. Easy accessibility of the items in crisper box.

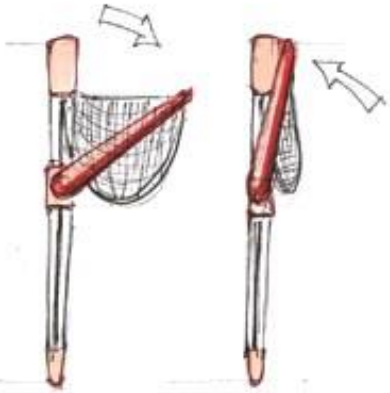


can be taken out from the refrigerator and kept anywhere (rests on the flat base).

Inside the crisper, the container rests on the hooks and back wall of the crisper.

The outer plastic case can slide on the crisper walls. Net is fitted in the plastic case as well as in between the hinged member and the case.



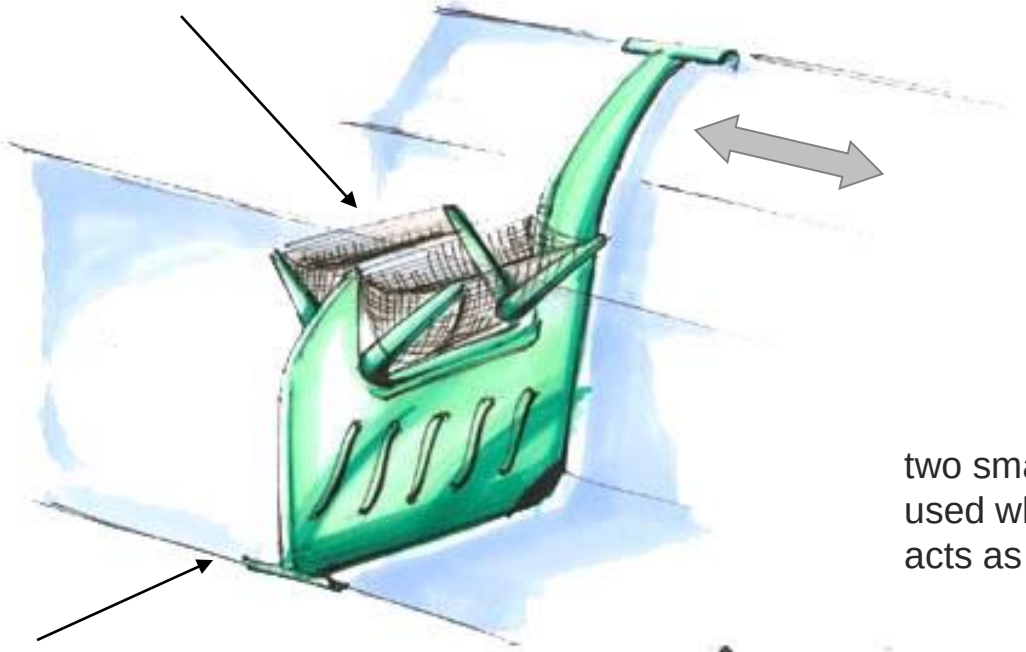


the folding feature adds the flexibility of use.

The hinged member can be opened when container is needed. the in between net acts as container. when not needed it can be simply folded back. After folding it is used as separator, improving the accessibility of the crisper box.

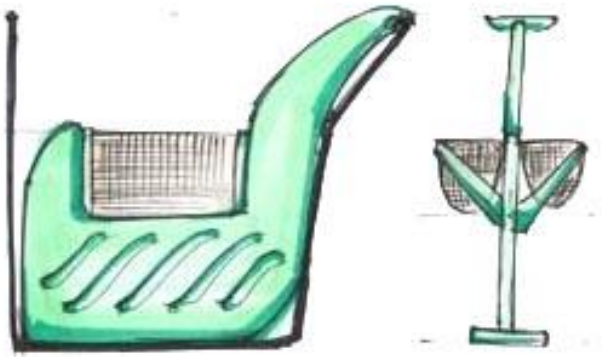
net is used to reduce the material content.

Instead of full separation partial separator is given which facilitates storage of longer items in the crisper.
It has provision to make two small net baskets in it.

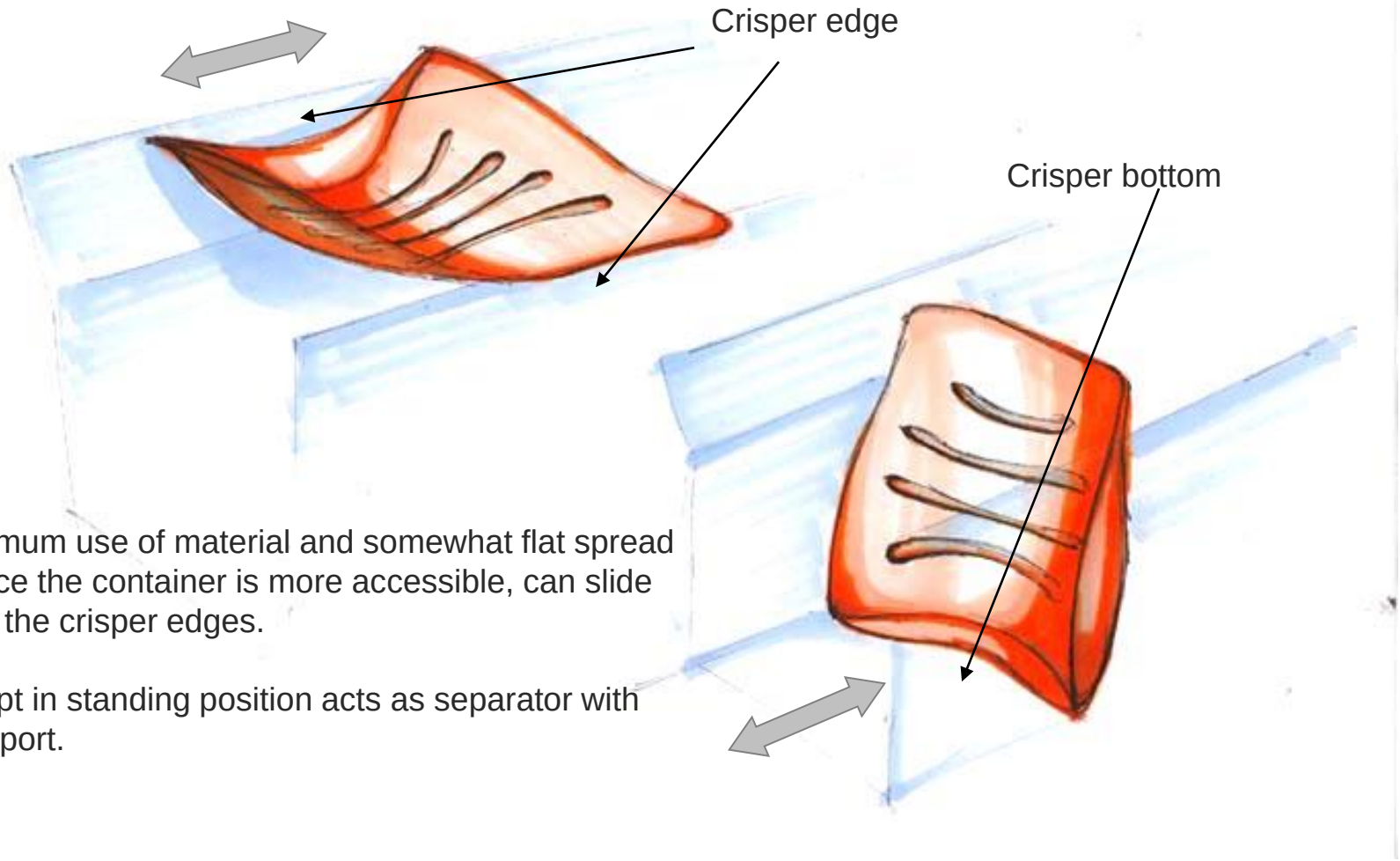


a slider at the top and a support at the bottom gives stability.

two small net baskets can be used when needed otherwise acts as just separator.



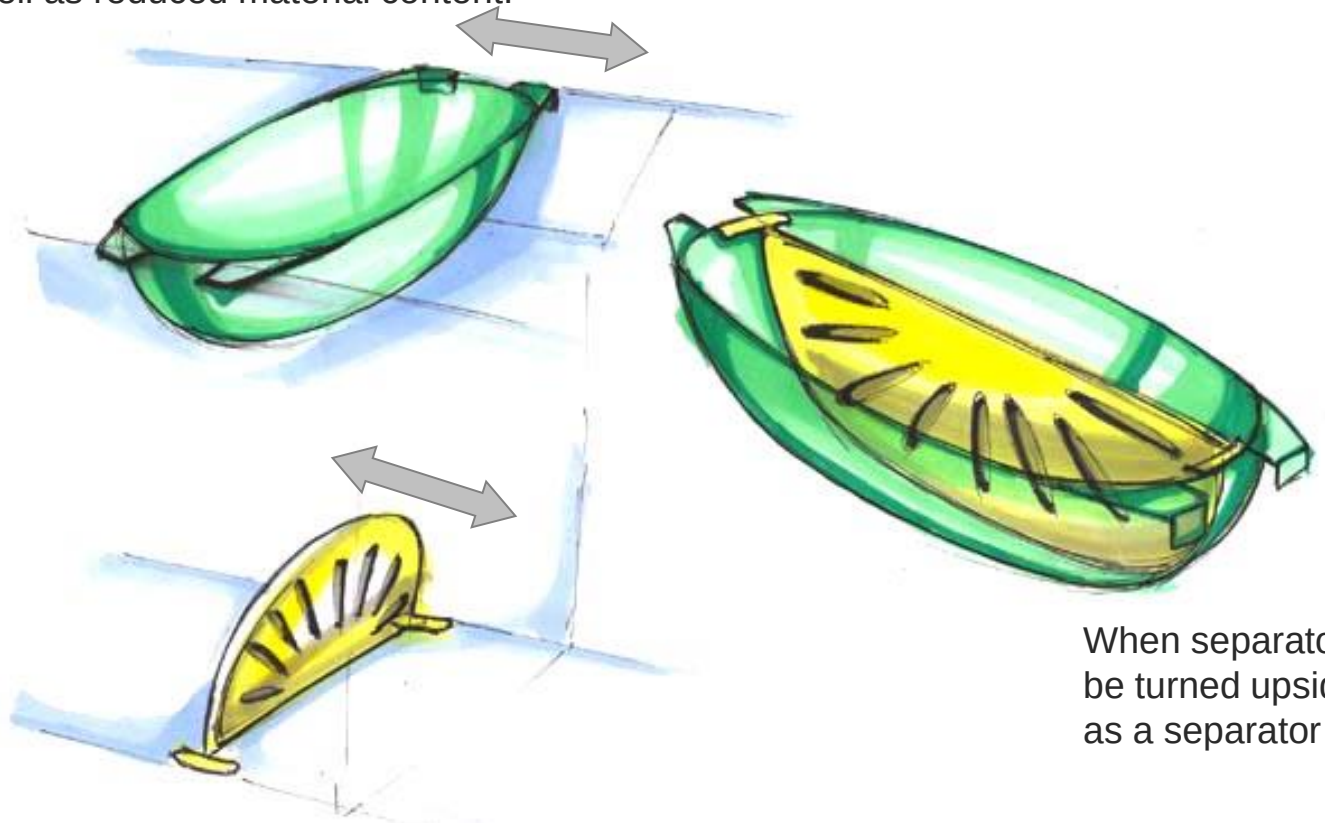
The same piece acts as container and separator as and when needed.



with minimum use of material and somewhat flat spread out surface the container is more accessible, can slide easily on the crisper edges.

When kept in standing position acts as separator with base support.

spheroid like shaped container with smooth surface (less edges and fillets) makes taking out things from the container easy.
As well as reduced material content.

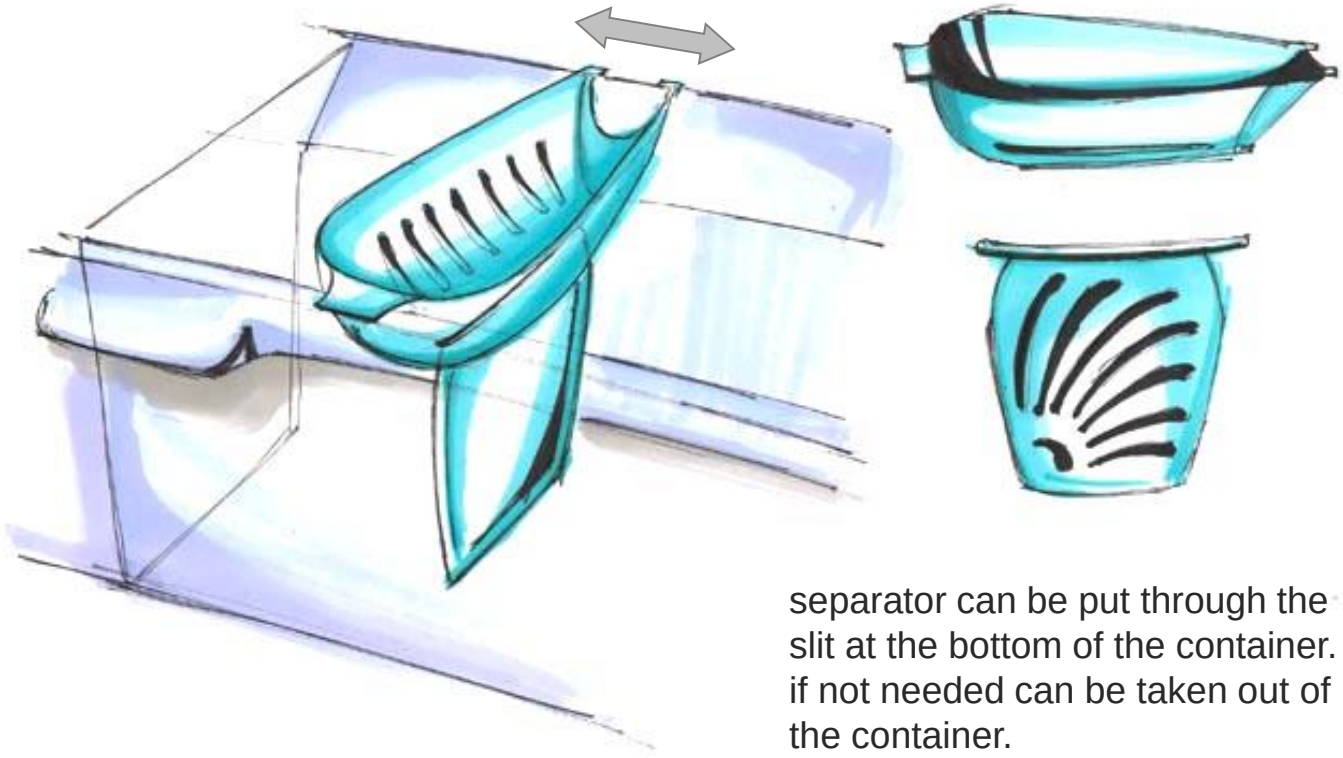


When separator not needed can be turned upside down and used as a separator for the container.

the small separator taking support from the bottom of the crisper.
allows smaller items keep separated.
longer items can be stored over it.

here the container and separator are two different parts which can be used in conjunction.
For lower end models only container can be provided.

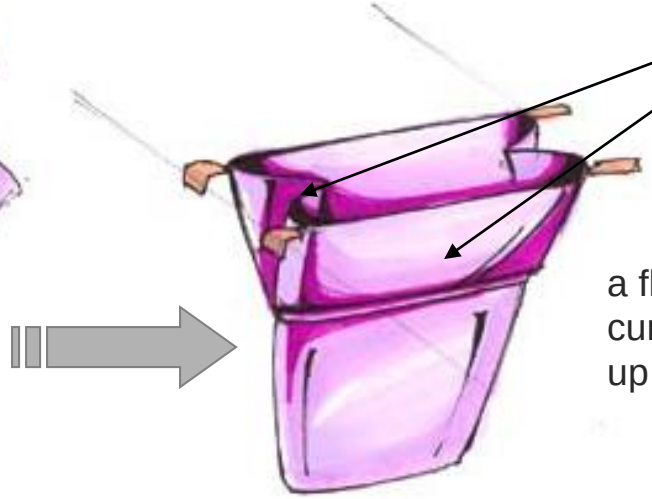
the spheroid shaped container consumes minimum material.also less no of edges and fillets gives continuous surface all over.



separator can be put through the slit at the bottom of the container. if not needed can be taken out of the container.

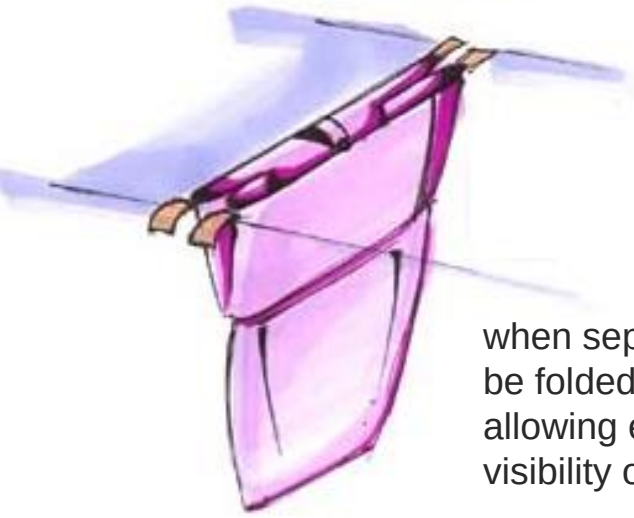
a flexible plastic sheet with some support plate.(metal / plastic)

Two flexible sheets joined together

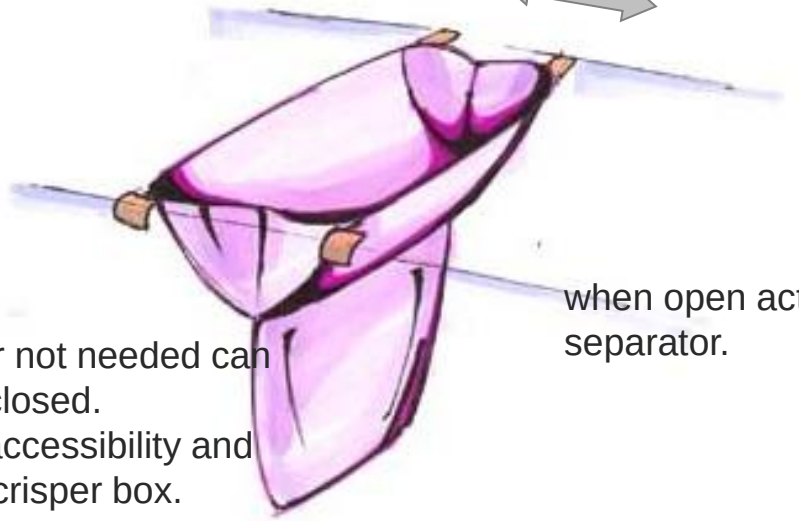


a flexile ,foldable crisper separator cum container made
up of two sheets as shown.

rests and slides on the support plate ends.



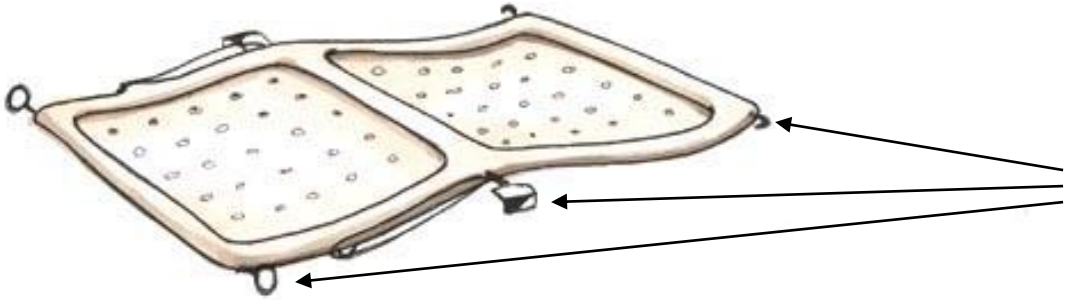
when separator not needed can be folded and closed.
allowing easy accessibility and visibility of the crisper box.



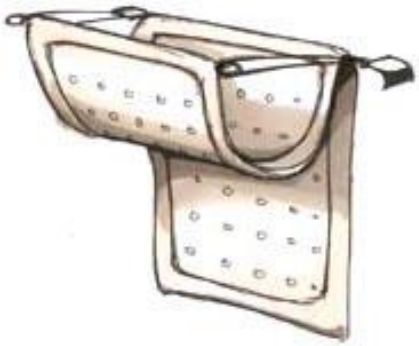
when open acts as container and separator.

This concept gives the flexibility to the user to use as separator / container / both at a time as and when required.

a flexible plastic sheet with reinforced metal wires.



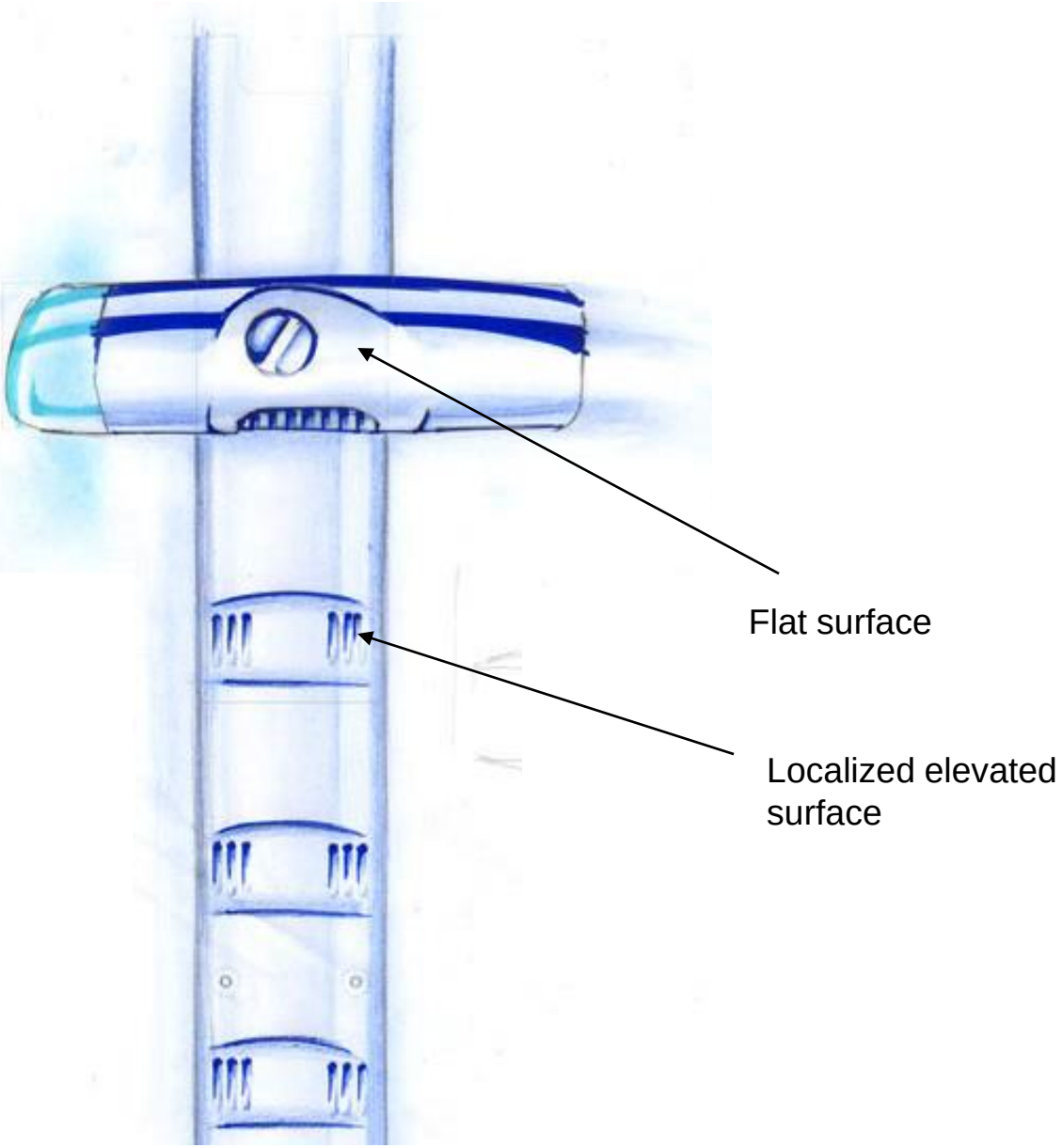
folded condition :
used as separator alone.

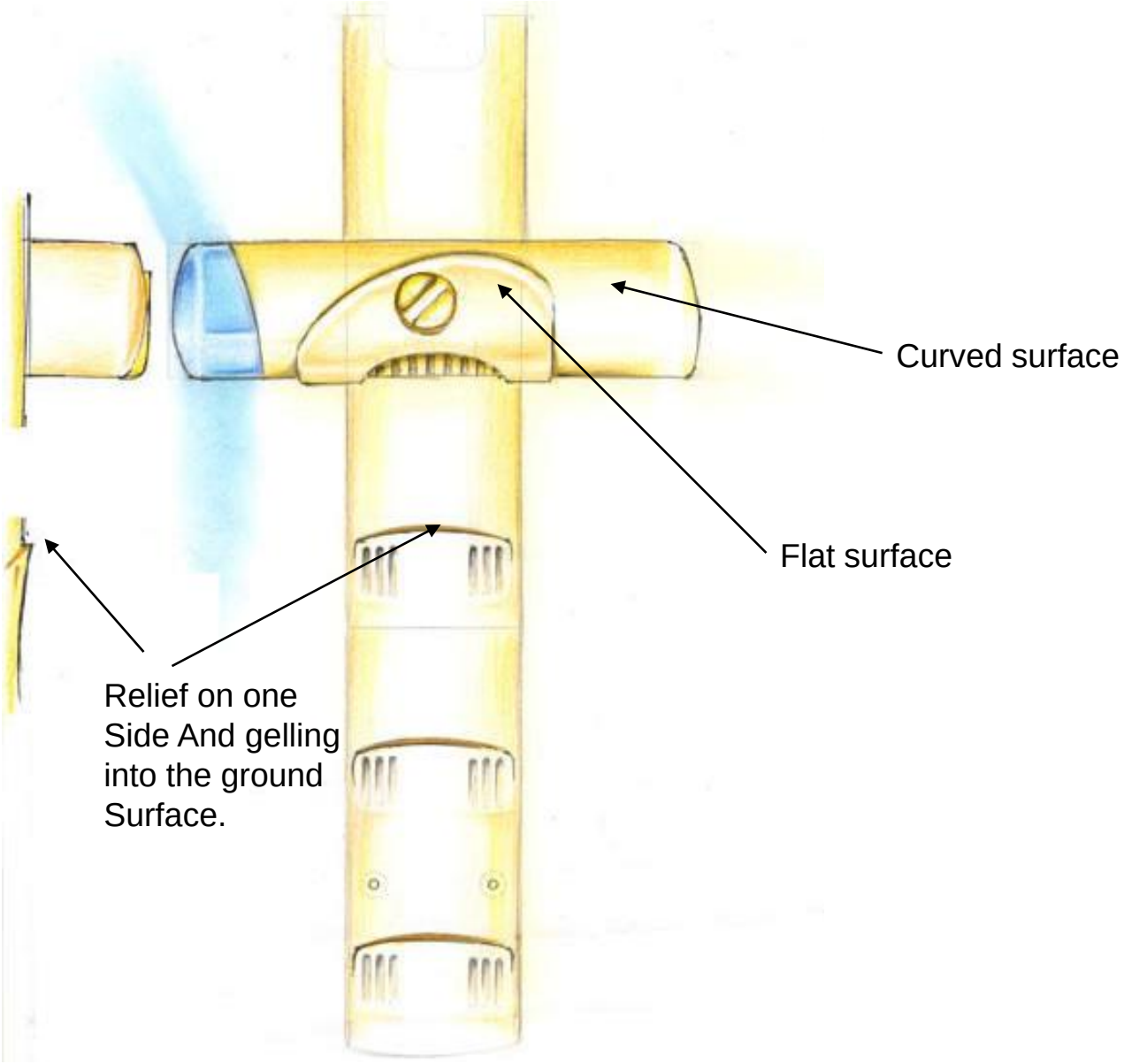


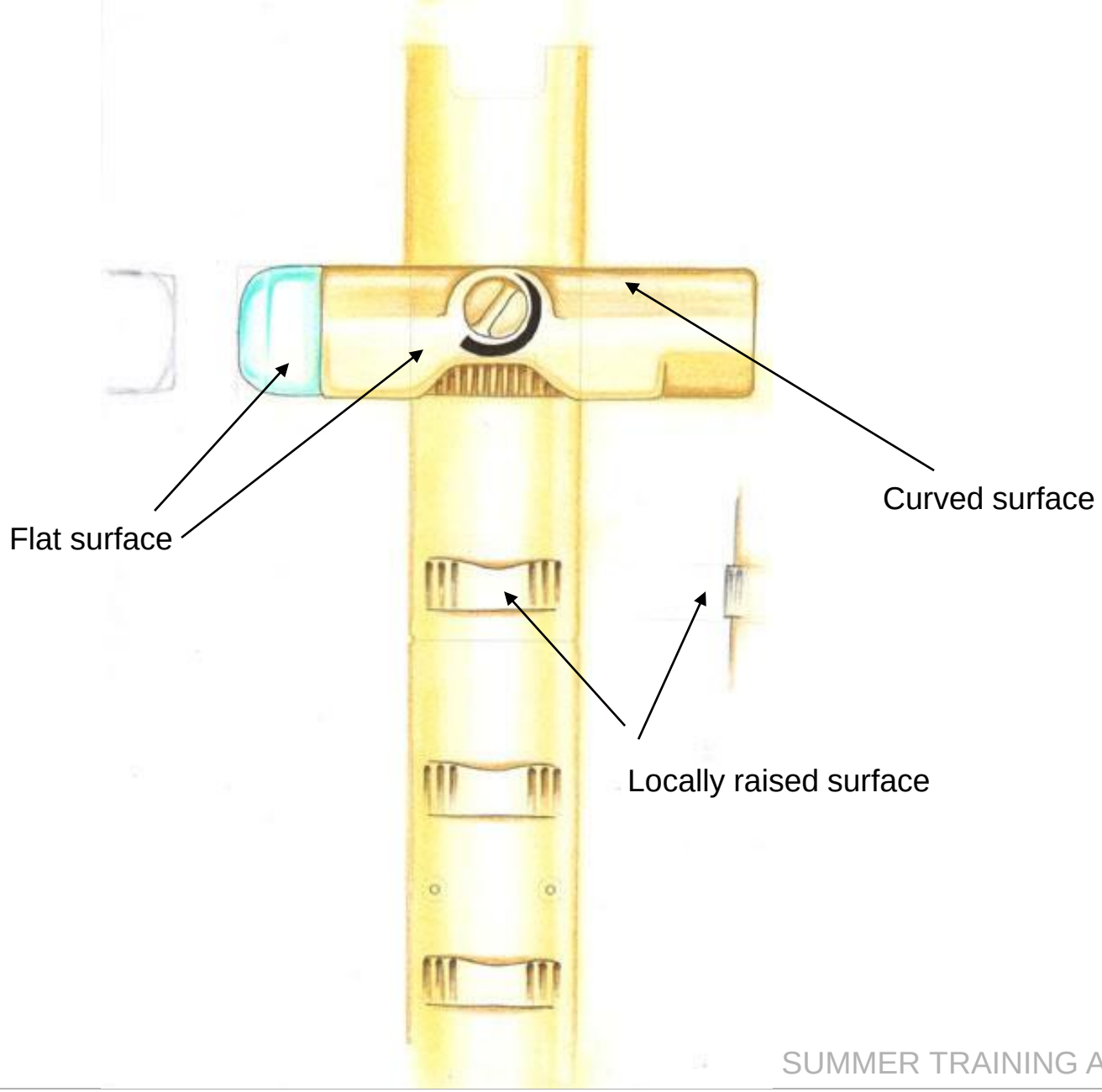
one part hooked and another open :
used as a container plus separator.

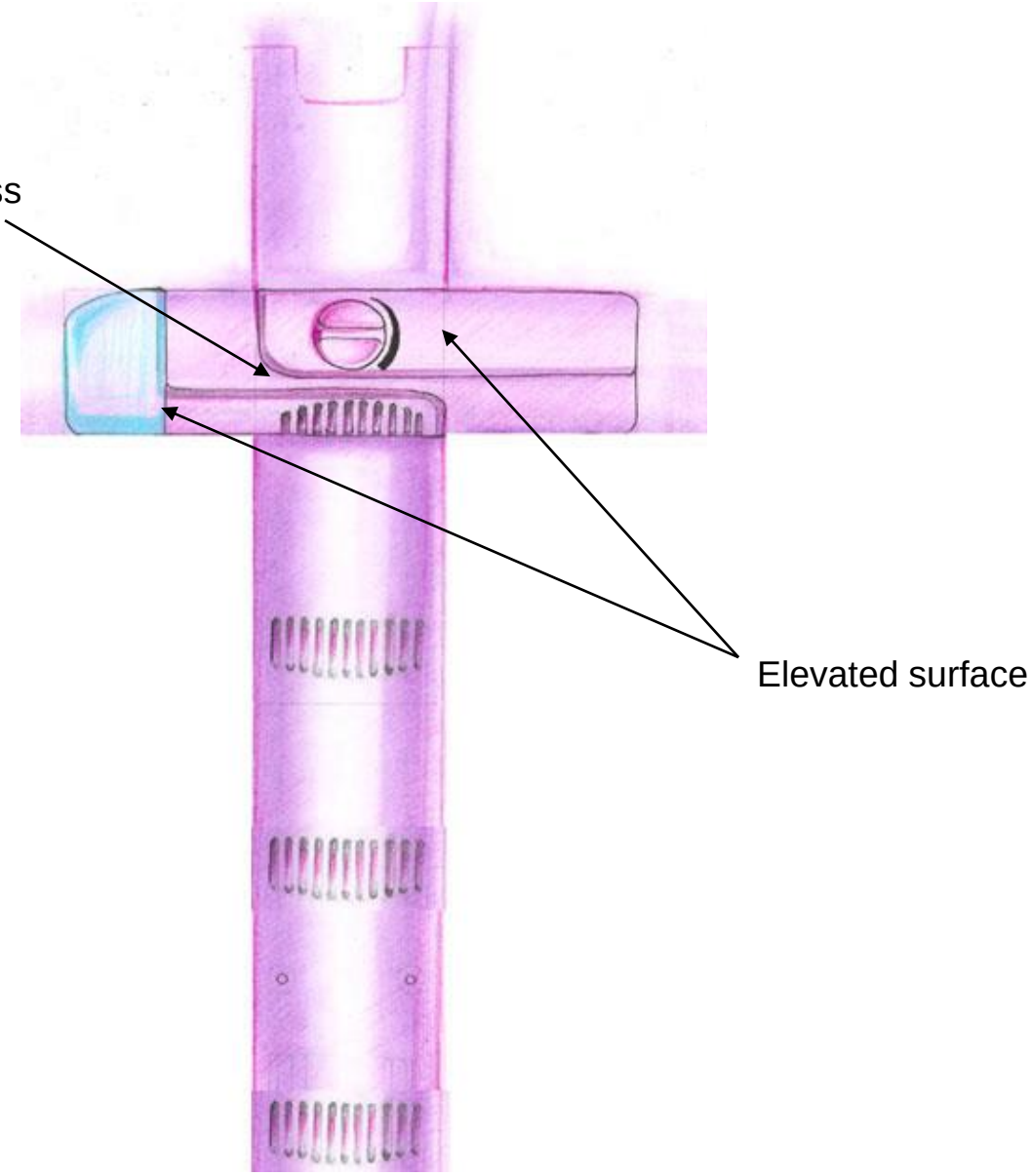
both parts hooked :
used as container.

Diffuser and
control box


Flat surface
Localized elevated surface


Curved surface
Flat surface
Relief on one
Side And gelling
into the ground
Surface.


Flat surface
Curved surface
Locally raised surface


recess
Elevated surface

Pickle holder

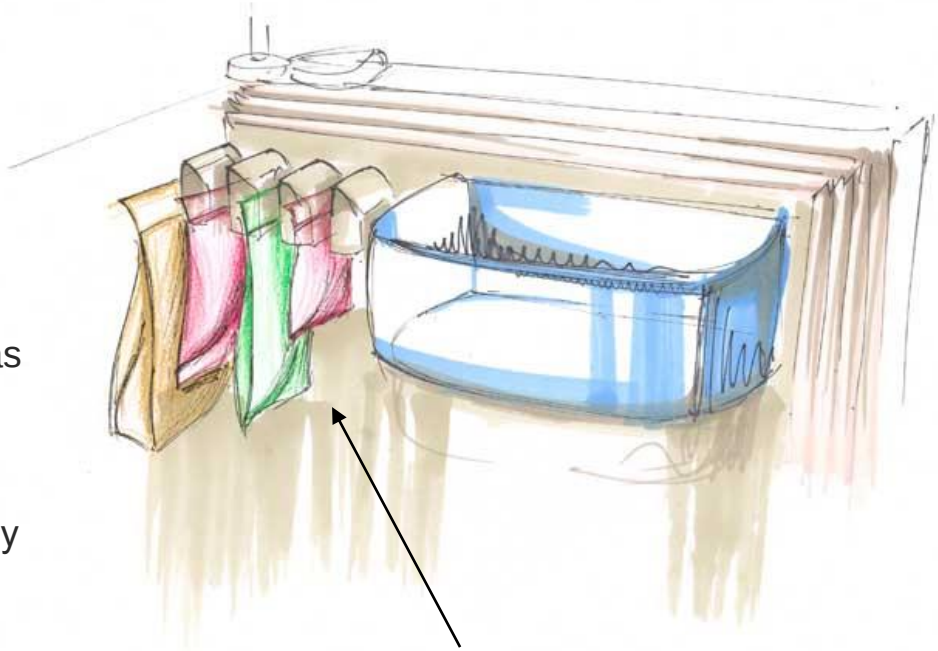
Concept :

In kitchen many items are used which comes packed in small plastic pouches. Some examples are pickle, masalas,garlic /ginger pastes etc. They come in nearly same range of sizes.

Keeping these packets is always a trouble as there is no special place for them.
These plastic bags which are cut from one corner normally makes the clean surfaces dirty. Also the plastic pouches don’t have any base on which they can stand.

Here are some concepts which can give solutions to some of these problems.
Some of the door compartment space can be organized for these items.

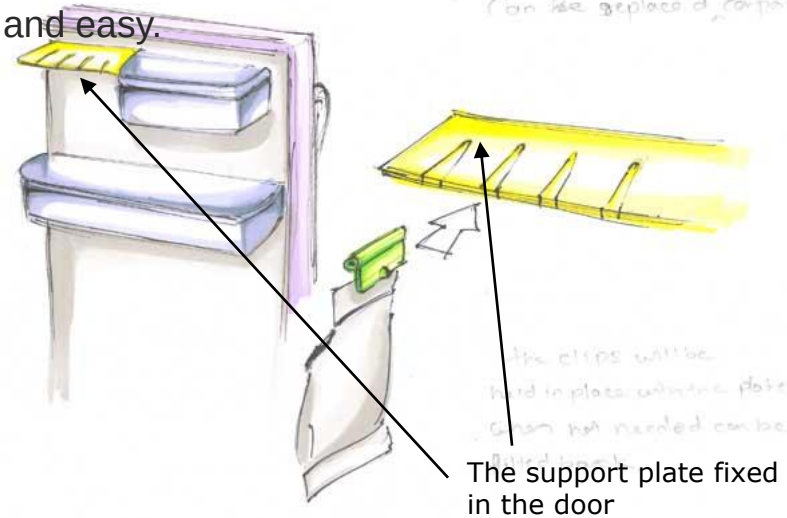
Customer benefit:
user gets a organized and defined space for putting the plastic pouches.
The convenience for storing the things can be increased.

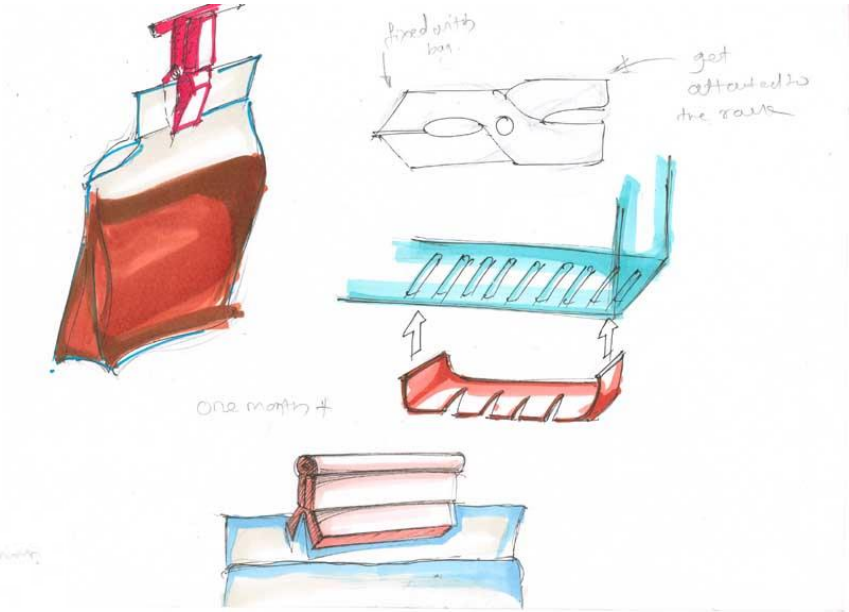


Some of the door compartment space is organized for storing plastic pouches

The plastic packets normally stays in the refrigerator for a month plus time.

Concept:
some clips can be provided which can be fitted to the plastic pouches for the period of usage.
The clip can be easily inserted in some slots in a support plate in the door.
Thus the operation for keeping and taking out the plastic pouches becomes very convenient
and easy.



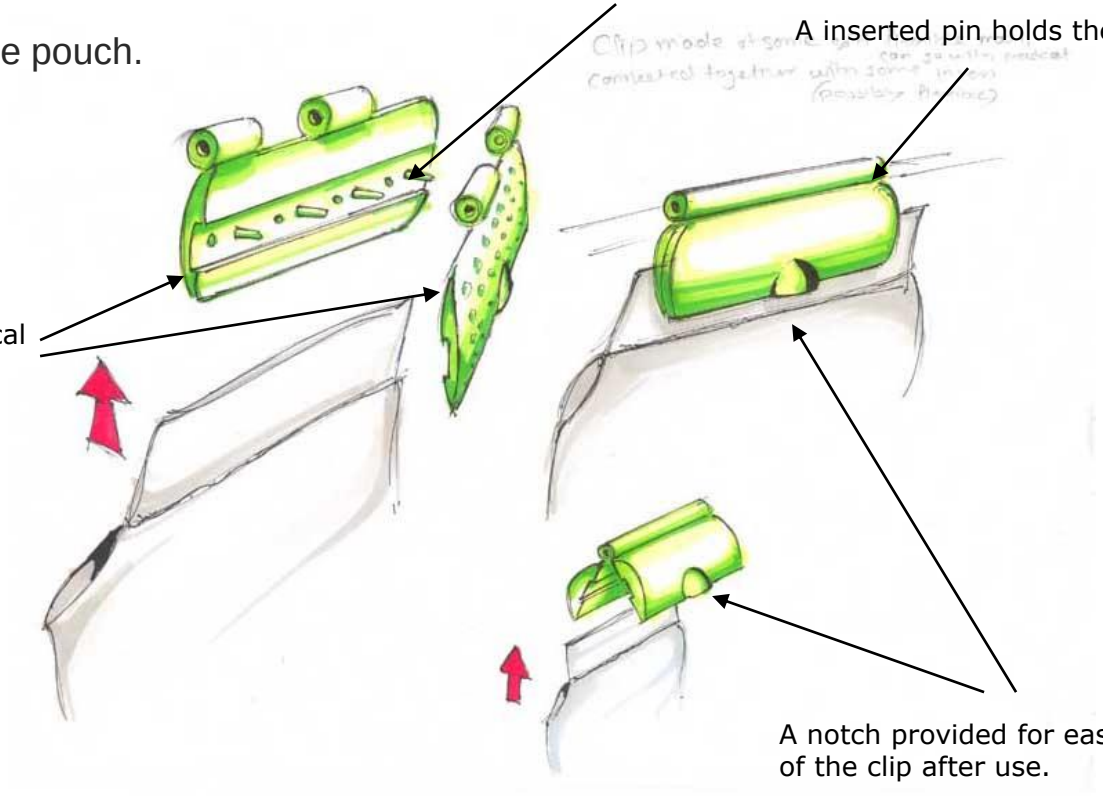


1. The user purchases the pouches from market, after opening the pouch user attaches the clip to the pouch.

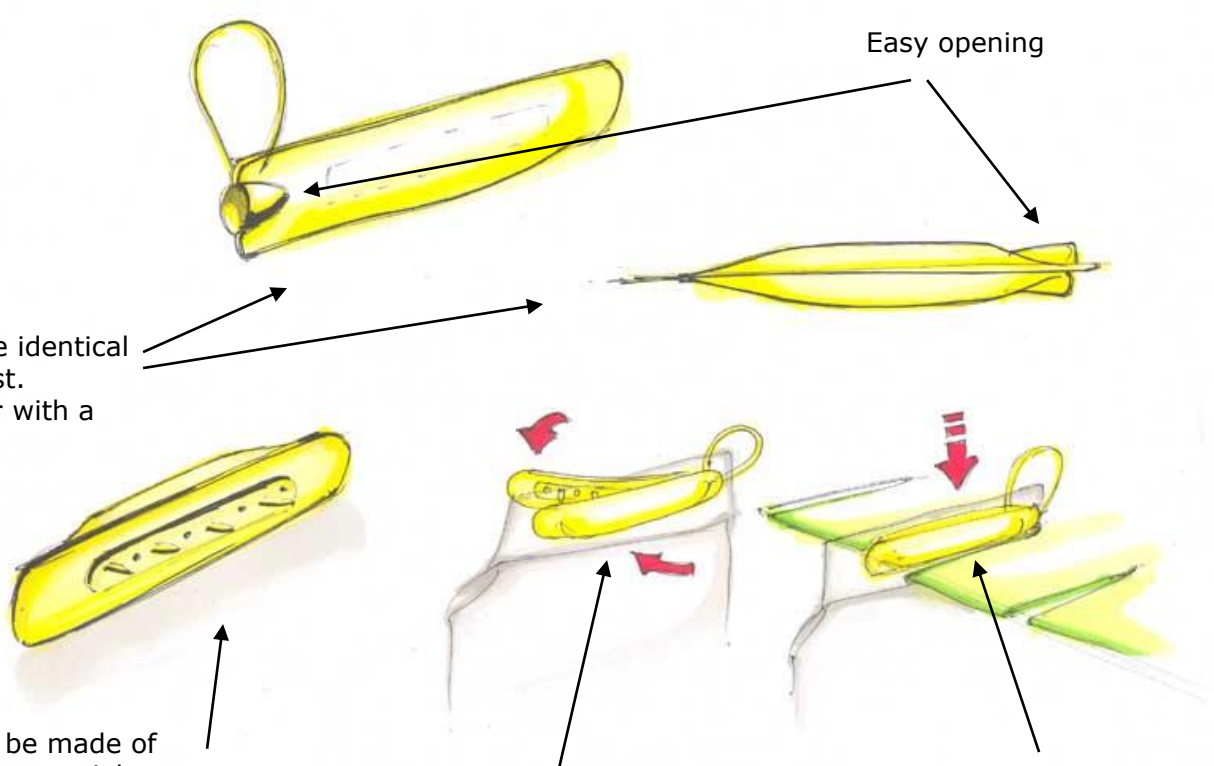
2. Every time, user uses the clip to conveniently take out and keep the pouch in place from fridge.

3. When the content of the pouch ends, user takes out the clip , hangs it to the support plate in ref. Door, and then throws out the empty plastic pouch.

The clip is made made from same part joined together with a inserted pin.
The clip has some protrusions to get proper hold of the pouch.
The clip is fitted to the pouch.

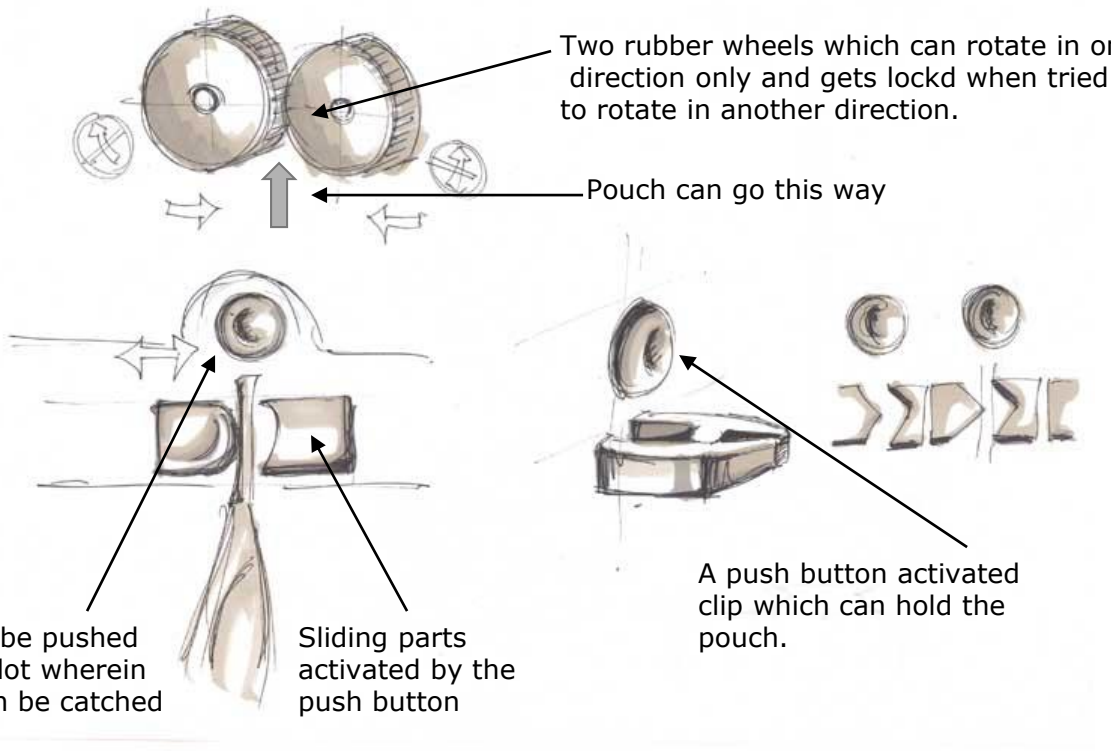


A variation of the first concept :



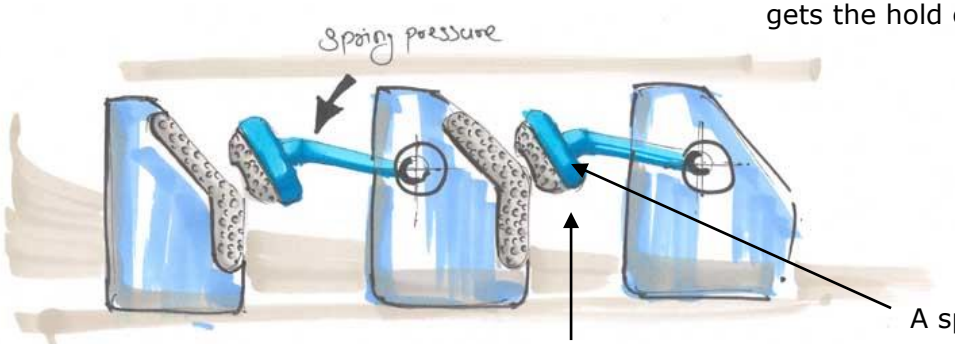
Other concepts for holding the pouches can be:

Something in which user can just insert the pouch or put it, and the mechanism gets the hold of the pouch



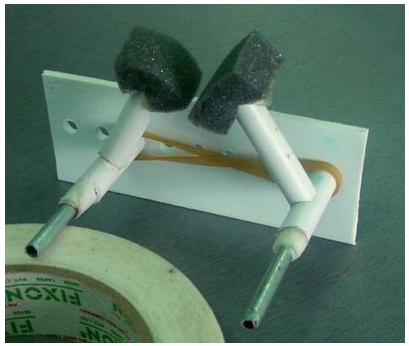
concept for holding the pouch

Something in which user can just insert the pouch or put it, and the mechanism gets the hold of the pouch

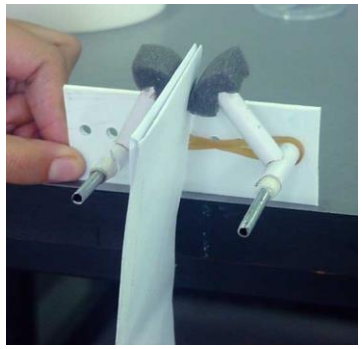


A spring loaded flap with a rubber tip resting on good grip rubber surface

The flap is pushed from down and the pouch is hanged in place. The griping rubber faces and spring does not allow the pouch to fall



The two hinged members are connected with flexible rubber to assure same rotation



When the pouch tries to come down the the members rests against each other. The friction between rubber and pouch helps the holding.

Bottle holder

Concept :

The need of more space in the refrigerator door can be reduced with this concept.

Instead of keeping the bottles in the door bins, the bottles can hang below the bin and the freed up bin-base can be used for storing small items.

Customer benefit:

increased storage area without adding extra bins in between.

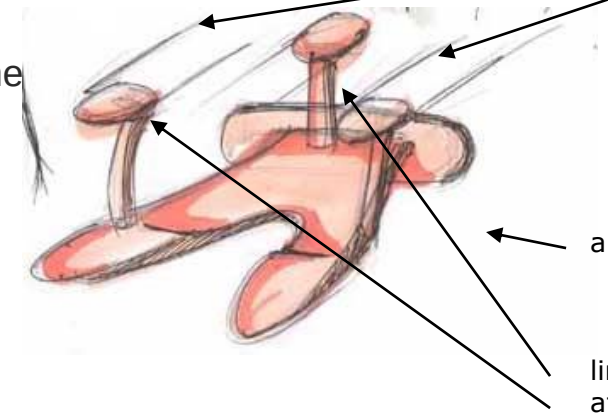
The bottle holder can be a small snap-on part which fits in the grooves below the existing bins.

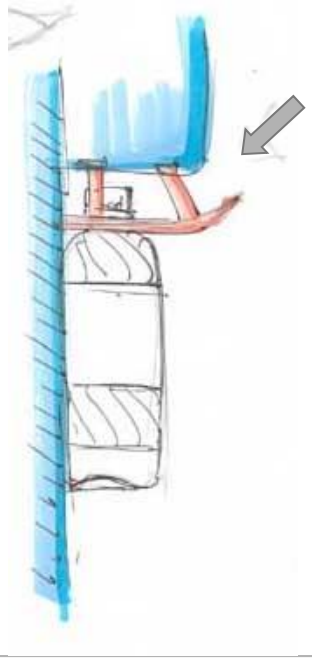
And can be attached in preferred position.

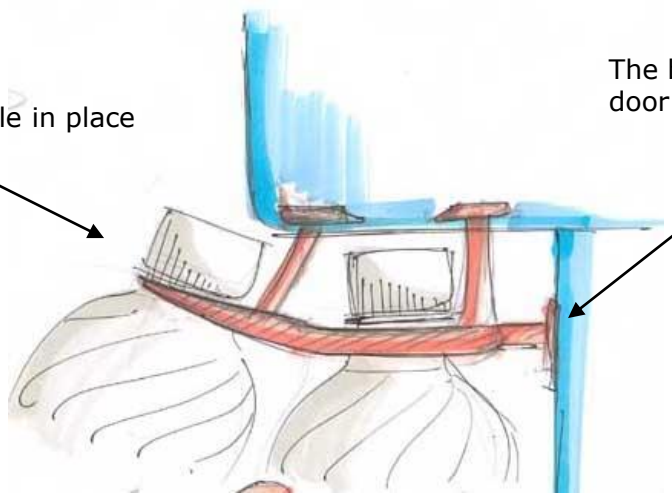
All types of commonly used PET bottles like cold-drinks / mineral water can be hanged.

a small plastic component which has links which snap into the slots at the bottom of the bin.

Front links can be flexible and to ease the action of taking the bottle out and back links can be more rigid to ease the action of putting the bottle in place.







A raw model is made to explore the possibilities

Bottles of different capacities filled with water were tested.

The bottles were positioned at the rightmost side of the door
to understand the maximum forces involved while closing the door

500 ml water bottle

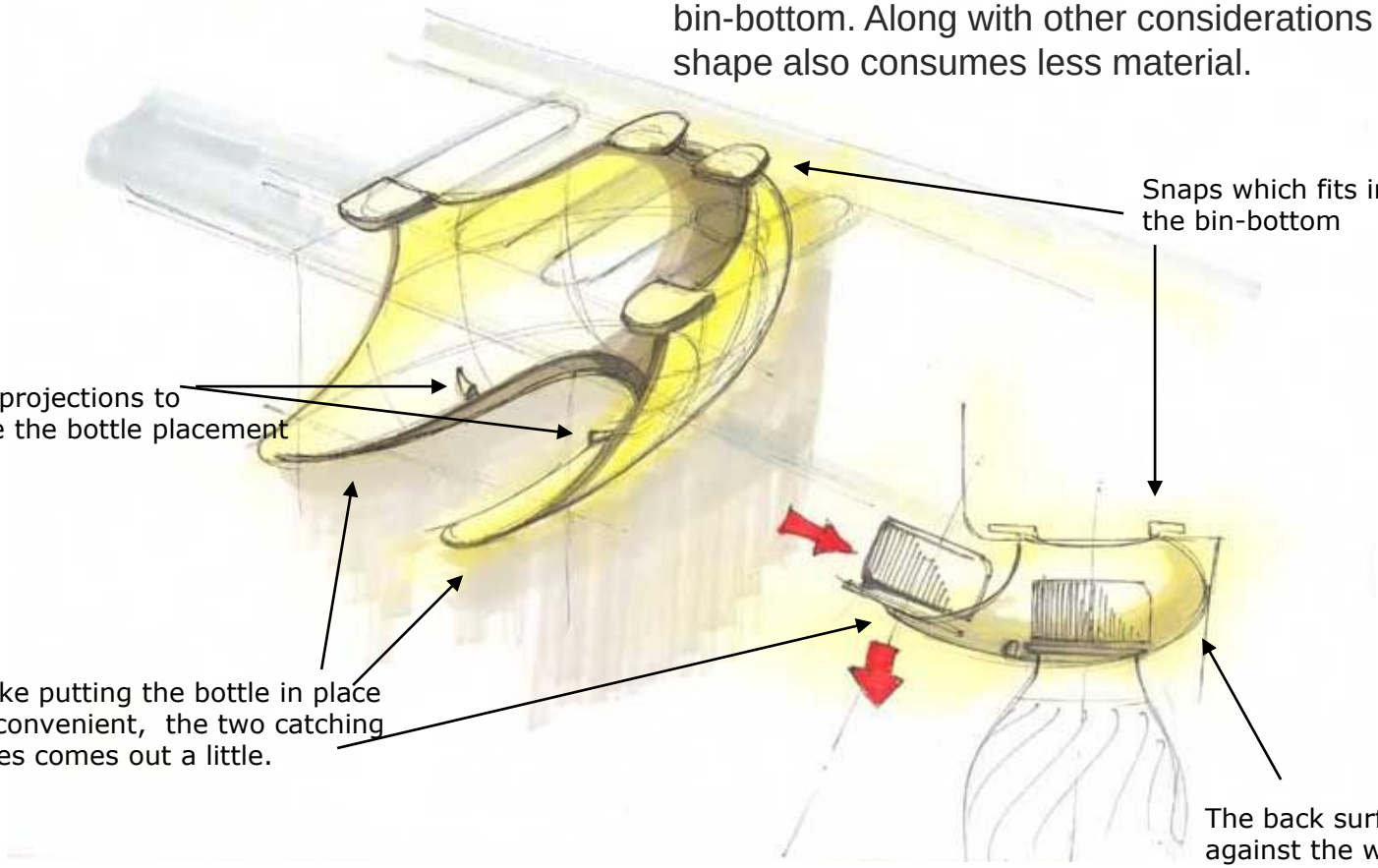
1liter water bottle (filled)

1.5 liter Pepsi bottle (water filled)

Putting the bottle in

The component can be something like this :

The bottle holder uses 4 of the rectangular slots on bin-bottom. Along with other considerations the shape also consumes less material.

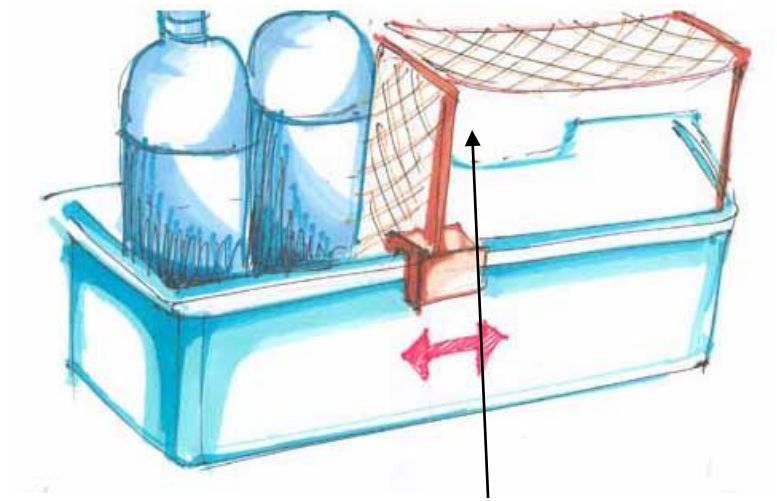


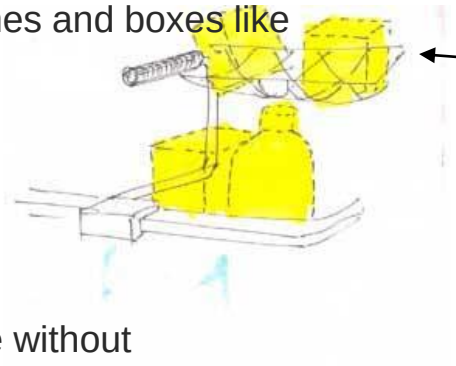
Door
space

Concept :

when the bins are not filled with bottles, the space above the bin usually goes waste as the height of the items stored is normally lower.

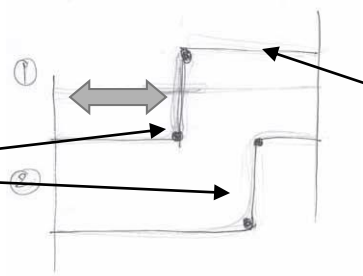
For proper utilization of the space,
the function of the bin separator(bottle separator)can be extended to carry flexible net.
The net can act as a storage place for small items like small pouches and boxes like Glucon-D.





Net acting as a holding bag for small items

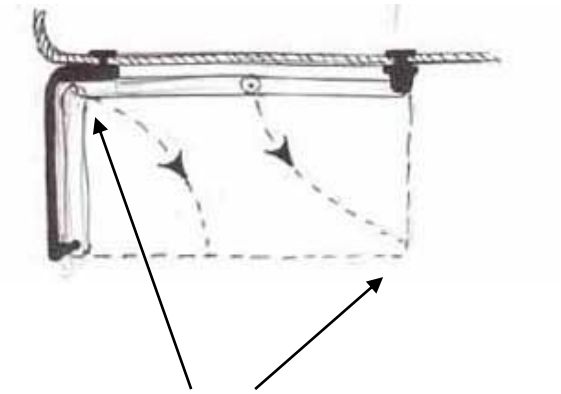
The total length of the net is fixed.
According to separator position only the width of the net on both sides of the separator changes



Customer benefit:
the increased space without adding any extra treys.
The net can host some small things with a convenient access for the user.

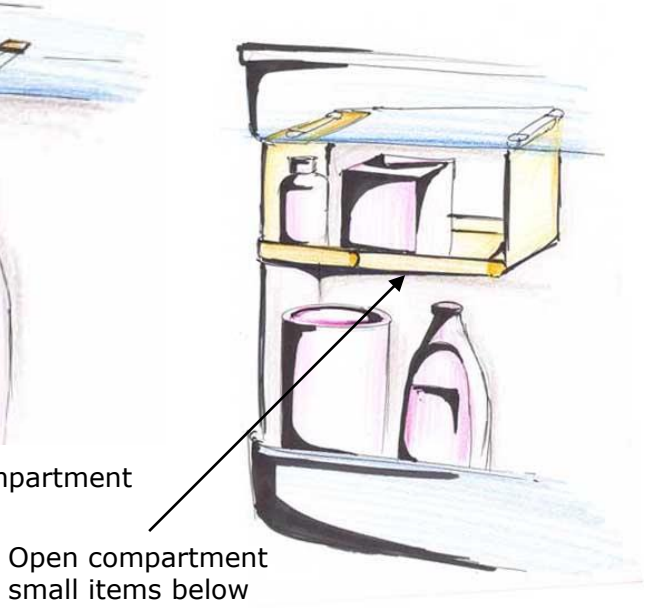
Concept :

the foldable treys provide a good option to utilize the door space with giving flexibility to the user.some concepts of the foldable treys :



The 'L' shaped trey made with 3 joined hinged plates can stay in 2 positions i.e. open or closed

Closed position of compartment big bottles below



Open compartment small items below

Customer benefit :

When the bottles are stored the folded compartment can collapse along the walls as if they are absent.

When there are small items in the bins and user needs some extra space for keeping things the compartment can get open and act like a separate storage place.

the user has the flexibility to use it or when not needed forget it.

1.The closed position of the compartment. Compartment plates staying along the door and bin wall.

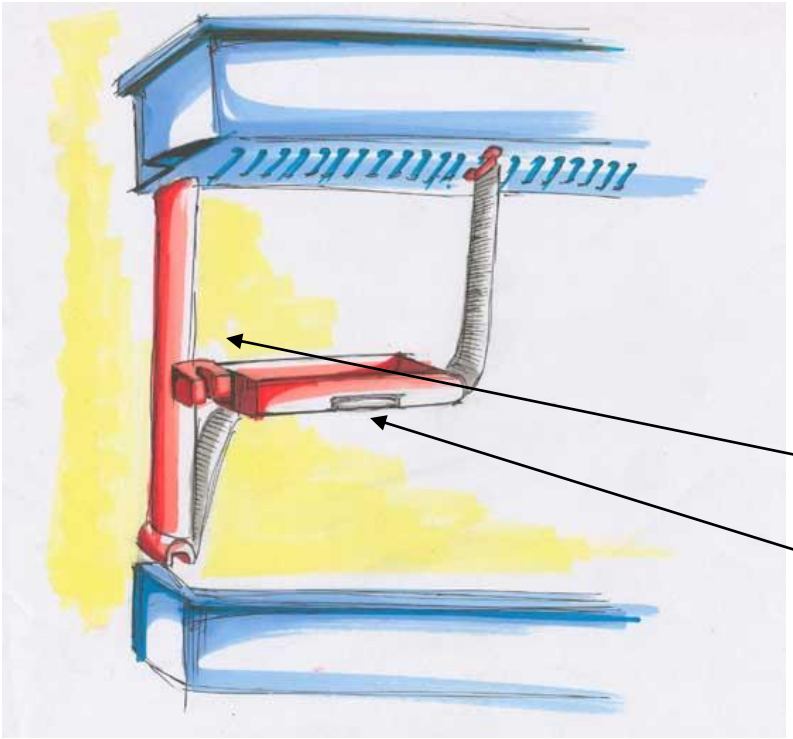
2.The middle plate can be pulled down in certain way to open the compartment.

3.the middle plate is tilted while coming down.

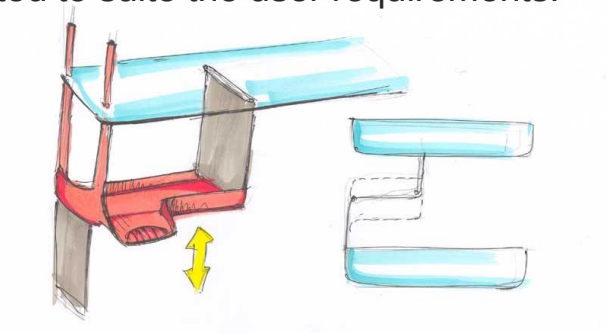
4.the compartment in open position

When the compartment is closed , it can take help of a snap to be in the position.A marked place on the middle plate can guide the user about opening and closing the compartment.The joins in between plates can be worked out to give restricted freedom for the hinges.

The idea of compartments, which in closed position can collapse against the walls of door can be extended for more flexibility for user.



In this concept,
the trey along with a side supporting rod and a belt is used to form a compartment which not only is **collapsible** against the door walls but the **compartment height** can also be adjusted to suite the user requirements.



The trey takes side support from the side bar

The trey gets unlocked from the belt when pressed for moving up or down, otherwise it will get locked with the belt

The whole assembly can go with the existing interiors of door space

1.One of the possible open position of the trey.

The trey can be taken up and down at any height. It slides along the side bar and the belt supports the span of the trey as well as makes a compartment wall for the trey.

2.the trey moves laterally to any position.

User can adjust it for any possible combination of the things to be stored in the bin and trey.

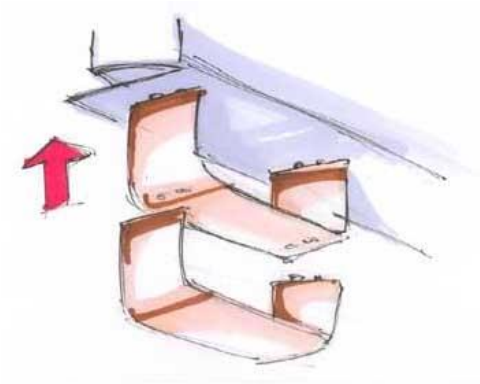
3.When closed position it will not interfere with any user activity. And consumes no space.

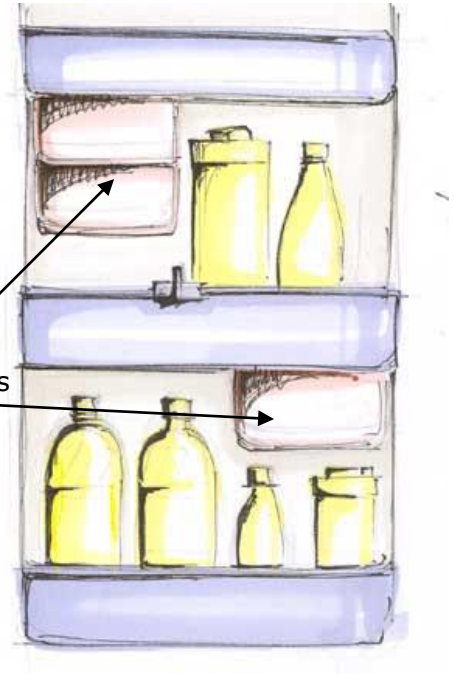
Customer benefit :

the trey offers enormous flexibility of use for the customer. User can adjust the compartment at any level according to the sizes of the items to store.

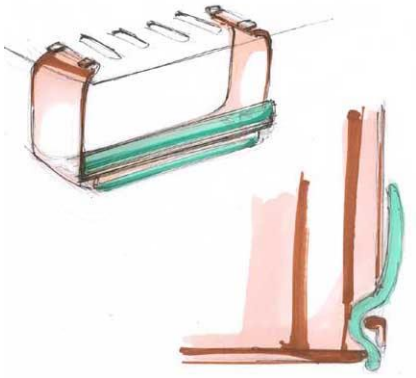
When not in use it doesn't interfere by any means.

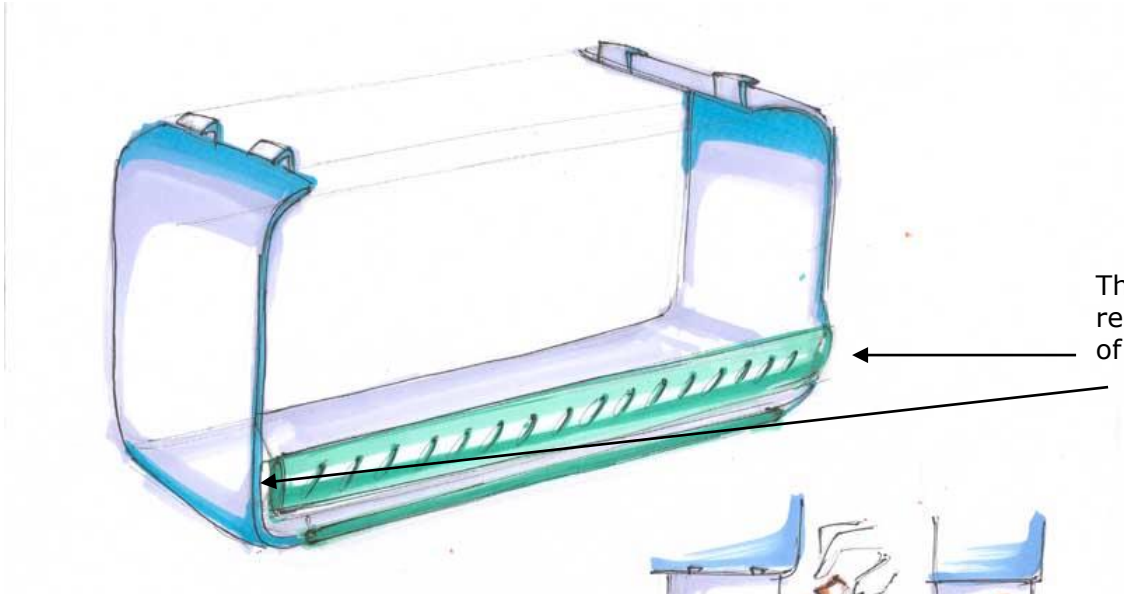
In this concept the idea is to provide flexibility to the user by means of providing a set of portable compartments which can be positioned at any place with ease.
So that user can arrange them according to his needs.





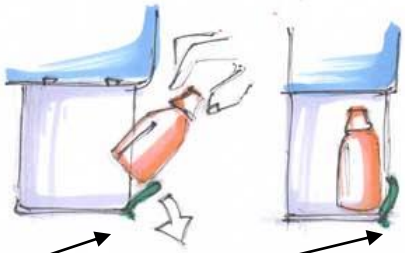
Customer benefit :
The portable compartments are very simple in construction.
The compartment walls can be pressed inside to snap fit them in any slots below the bins/trivets.
They can even be fitted below similar compartment

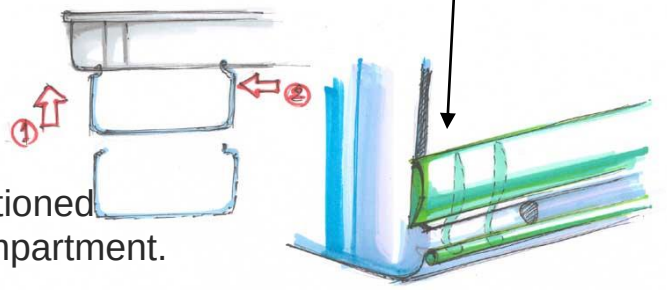




The flexible front edge resting against the walls of the compartment

The front supporting edge is important for any compartment to avoid the sliding of the stuff inside. But it always disturbs the accessibility of the compartment.
Here, a flexible plastic strip is inserted in the compartment front. Normally, the flexible strip rests against the compartment edges. But it can flex to accommodate the things inside the compartment easily.

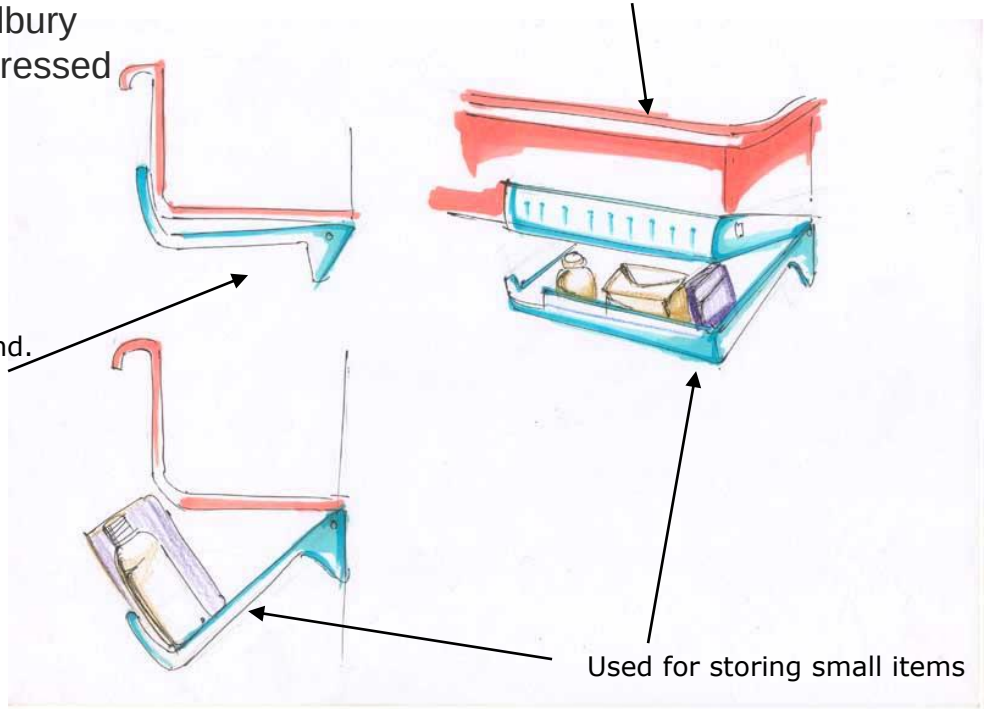




Customer benefit:
easy to use portable compartments which can be positioned at any place with ease below bins or below similar compartment.
The flexibility of arrangement according to use.

Concept :

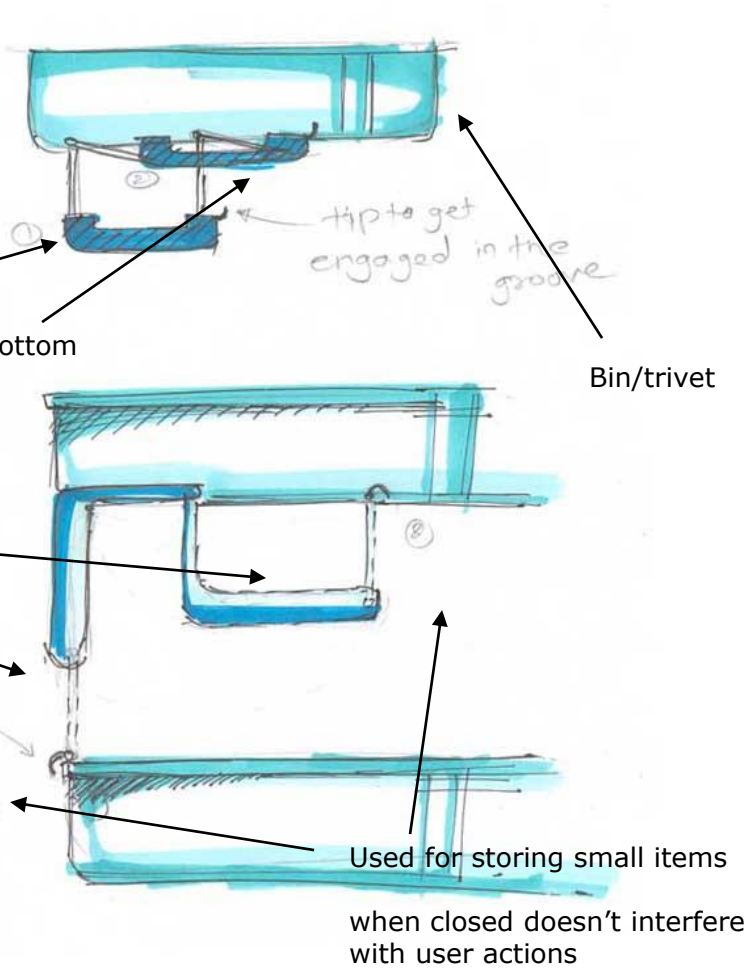
a small hinged trey with a raised front edge can be attached to the exiting bins taking support from the slots etc.
the hinges container will be useful to keep small items like butter,chocolates, Cadbury etc. when not in use it can be simply pressed against the bin bottom.



Customer benefit:
easy to use
convenient for storing small items
the front edge can support and avoid the things from falling

Concept :

small hinged treys can give the user convenient usage and flexibility of use. They can be fitted from below to the bins or trivets.



Customer benefit:

whenever not needed the treys can collapse against the background giving the user the flexibility of use. And no interference with other user actions.