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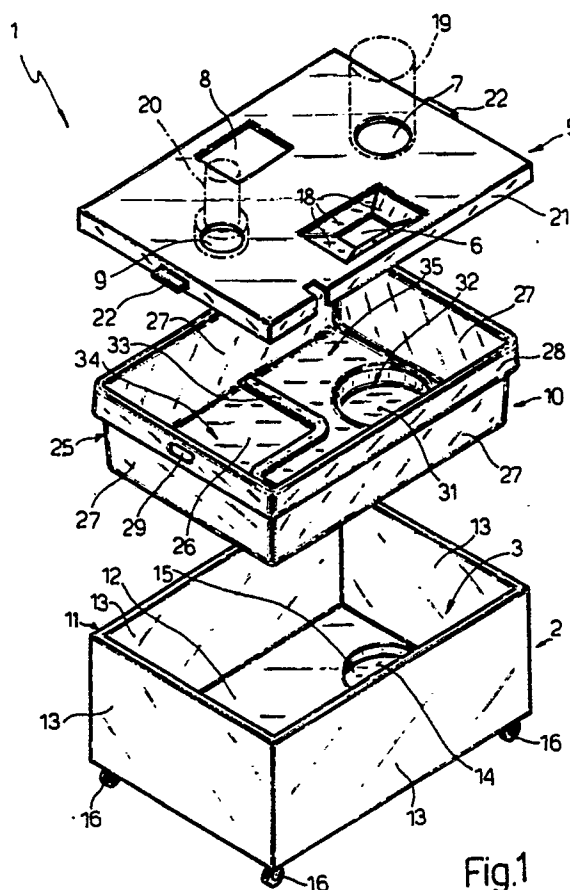
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⑤④ **Processing fluid container.**

⑤⑦ A processing fluid container substantially comprising a supporting body (2), and a disposable cartridge (10) supported on the supporting body (2) and designed to contain the aforementioned processing fluids; which cartridge (10) is formed from chemically-inert, synthetic material poorly wettable by the processing fluids.



**Fig.1**

## PROCESSING FLUID CONTAINER

The present invention relates to a processing fluid container.

The term "processing fluid" used in the above title and following description, claims and abstract is intended to mean any fluid (regardless of viscosity) which, by virtue of its physical properties, adheres readily to the walls of traditional containers, thus making them extremely difficult to clean. Such fluids preferably, though not exclusively, include paint, coloured ink, adhesive and various types of solvent (ethyl acetate, ethyl alcohol, isopropyl alcohol, heptane, methyl-ethyl-ketone, etc.).

The above types of processing fluid are commonly employed on printing machines (rotogravure, flexographic, offset, letterpress, etc.) or machines for coating or mating soft packaging materials, all of which are hereinafter referred to generally as "soft packing machines."

Soft packing machines are known to feature containers for supplying and/or storing at least one processing fluid required for a given function (printing, painting, mating, etc.).

Currently used containers, which are usually cup-shaped and made of stainless steel, present a number of drawbacks as regards cleaning of the inside of the container after each operation performed on the machine. Foremost of these is that, due to the adhesive nature of the fluid, which clings readily to the steel wall of the container, thorough cleaning of the container requires the use of a considerable amount of solvent. The frequent use of large quantities of solvent obviously results in high-cost storage of both fresh and used solvent pending disposal, and considerable downtime while the container is being cleaned, thus seriously reducing the average efficiency of the machine.

Moreover, a relatively large part of the working day of at least one operator is devoted to the job of cleaning the container, which, in the long run, may seriously impair the health of operator who is frequently subjected to harmful fumes from at least some of the processing fluids employed.

The aim of the present invention is to provide a processing fluid container designed to overcome the above drawbacks typically associated with known containers.

With this aim in view, according to the present invention, there is provided a processing fluid container, characterised by the fact that it comprises:

a supporting body; and  
a disposable cartridge supported on said body and designed to house said processing fluids; said cartridge being formed from chemically-inert synthetic material poorly wettable by said processing fluids.

Two preferred non-limiting embodiments of the

present invention will be described by way of example with reference to the accompanying drawings, in which:

Fig.1 shows an exploded view in perspective of a first embodiment of the processing fluid container according to the present invention;

Fig.2 shows a larger-scale view in perspective of a detail in Fig.1;

Fig.3 shows a top view of the Fig.2 detail;

Fig.4 shows a section along line IV-IV in Fig.3;

Fig.5 shows a smaller-scale side view of Fig.3;

Fig.6 shows an exploded view in perspective of a second embodiment of the processing fluid container according to the present invention.

Number 1 in Fig.1 indicates a processing fluid container in accordance with the present invention and designed for use on soft packing machines (not shown).

Said container 1 substantially comprises:

- a supporting body 2 having a seat 3;
- a cover 5 which, in use, fits over the top of seat 3 in body 2, and presents a number of openings 6, 7, 8 and 9 enabling at least the throughput of said processing fluids; and
- a disposable cartridge 10 housed inside seat 3 between supporting body 2 and cover 5, and housing said processing fluids; said cartridge 10 being formed from chemically-inert synthetic material poorly wettable by said processing fluids.

Body 2 consists of a cup-shaped container 11 having a rectangular bottom 12 and four rectangular side walls 13 extending perpendicularly from bottom 12. Said bottom 12 presents a circular sunken portion 14 defining a well 15, and is fitted underneath with four wheels 16 for enabling troublefree handling of container 11.

Opening 6 in cover 5 is defined peripherally by a concave, truncated-pyramid portion 18 for guiding insertion of the operating fluid inside cartridge 10.

Opening 7 in cover 5 is of circular shape and, in use, houses a pump 19 for withdrawing the fluid from cartridge 10. Opening 8 is of rectangular shape and provides, in use, for feeding the unused fluid back into cartridge 10 via a recirculating duct (not shown).

Opening 9 is of circular shape and, in use, is engaged by an instrument 20 (e.g. a viscosity meter) for measuring at least one property of the processing fluid inside cartridge 10.

Cover 5 is of rectangular shape, and presents a down-turned edge 21, the internal dimensions of which are greater than the corresponding external

dimensions of the top edge of container 11, so as to effectively close the top of the same. From opposite sides of edge 21 of cover 5, two handles 22 extend outwards for enabling troublefree fit and removal of cover 5.

Supporting body 2 and cover 5 are preferably made of stainless steel.

Cartridge 10 substantially consists of a tank 25 slightly smaller than the inside of container 11 so as to fit inside the same. Said tank 25 presents a rectangular bottom 26 and four rectangular side walls 27 extending substantially perpendicular to bottom 26.

Side walls 27 present a top edge 28 turned down outwards so as to fit perfectly over the top edge of container 11, against which it is locked by edge 21 of cover 5. On opposite sides, edge 28 presents two slots 29 by which tank 25 is gripped by the operator for insertion and removal inside/from container 11.

Bottom 26 presents a circular sunken portion 31 defining a well 32 which, in use, fits inside well 15 in container 11 and defines a seat for the suction end of pump 19.

Bottom 26 also presents a projection 33 (Fig.3) dividing the bottom of tank 25 into a first chamber 34, located in use beneath opening 8 (fluid recirculation) and opening 9 (measuring instrument), and a second chamber 35 located in use beneath opening 6 (fluid input) and opening 7 (fluid withdrawal by pump 19).

Projection 33 is roughly 6-7 cm high, and originates at side wall 27 adjacent in use to opening 8, and extends, appropriately shaped, to a point facing the opposite wall 27, so as to leave a passage 36 enabling the processing fluid to flow from chamber 34 to chamber 35. According to the present invention, cartridge 10 is preferably formed from one of the following material: polyester, polyethylene terephthalate, polythene, polypropylene, acrylonitrile butadiene styrene (ABS). Said materials, to which suitable sliding substances are added, are placed inside a mold with a highly smooth (e.g. chromium-plated) inner surface, to produce a cartridge 10 having an inner surface of minimum roughness and wettability in contact with said processing fluids.

As cartridge 10 is supported in use on body 2, and thus need not necessarily be self-supporting, it may be made from fairly thin material (about 0.5 mm).

To prevent the walls of cartridge 10 (particularly near the edges) from buckling when handled, especially when it contains a fairly large amount of fluid, the mating portions between adjacent walls and between the side walls and turned-down edge are all rounded for improving load distribution and so minimising the formation of

bends and/or cracks.

Number 41 in Fig. 6 indicates a processing fluid supply and storage container which may be used to advantage on a soft packing machine (not shown).

A first part of container 41 is made of metal, e.g. stainless steel, and consists of a roller 42 for drawing off fluid from inside a semicylindrical tray 43, and an elongated tank 44 supporting opposite end edges 45, 46 of tray 43.

According to the present invention, each container (tray 43 and tank 44) houses a respective disposable cartridge 47, 48 designed to hold said processing fluids and formed from chemically-inert synthetic material poorly wettable by the same. Each container defines, with its respective cartridge, a unit 51, 52 containing a processing fluid, e.g. printing ink, and the disposable part (cartridge) of which is changed whenever an operation requiring a change in processing fluid is undertaken.

Each cartridge 47, 48 is formed in the same way and using the same materials as for cartridge 10.

Units 1, 51 and 52 are used in exactly the same way as known units, except that cartridges 10, 47 and 48 are first fitted inside their respective supports.

The major difference as compared with known containers becomes apparent at the end of the operation.

According to the present invention, in fact, the metal support requires no cleaning whatsoever, the cartridge simply being removed and the excess fluid being poured back into its original container.

By virtue of the chemical and physical properties of the cartridge material, only minute particles of the processing fluid adhere to the cartridge, which thus requires no additional cleaning.

This therefore provides for numerous advantages:

- no solvent cleaning;
- no solvent required, thus reducing storage space (for both fresh and used solvent) and eliminating used solvent disposal costs;
- reduced downtime for cleaning;
- improved working conditions for cleaning personnel.

To those skilled in the art it will be clear that changes may be made to the containers, in particular to the respective cartridges, described and illustrated herein without, however, departing from the scope of the present invention.

For example, different cartridge materials may be employed, providing they present the chemical and physical properties (inertness and unwettability) mentioned herein.

The structure of cartridges 10, 47 and 48 may be radically changed, e.g. to adapt to containers

other than those illustrated herein.

To strengthen the structure of cartridge 10, provision may be made for strengthening ribs on side walls 27, or for vertical, e.g. triangular, strengthening walls, connecting bottom 26 to side walls 27.

For compact storage of cartridges 10, side walls 27 may be designed to slope outwards for enabling stacking.

As the supporting body provides solely for supporting the cartridge, and not for containing the processing fluid, it may therefore be dispensed with and replaced by a straightforward supporting frame, not necessarily made of stainless steel, with obvious advantages in terms of overall cost.

The protective scope of the present invention also covers the manufacture and sale of loose disposable cartridges designed to contain any type of processing liquid as described herein.

## Claims

1) - A processing fluid container, characterised by the fact that it comprises:  
a supporting body (2, 43, 44); and  
a disposable cartridge (10, 47, 48) supported on said body (2, 43, 44) and designed to house said processing fluids; said cartridge (10, 47, 48) being formed from chemically-inert synthetic material poorly wettable by said processing fluids.

2) - A container as claimed in Claim 1, characterised by the fact that said cartridge (10, 47, 48) is substantially cup-shaped.

3) - A container as claimed in Claim 2, characterised by the fact that said cartridge (10, 47, 48) presents flared side walls.

4) - A container as claimed in Claim 2 or 3 wherein said cartridge (10) substantially consists of a tank (25), characterised by the fact that said tank (25) presents a top edge (28) turned outwards and designed to cooperate with a corresponding top edge of said supporting body (2).

5) - A container as claimed in Claim 4, characterised by the fact that, on opposite sides, said edge (28) presents gripping means (29) enabling said edge (28) to be gripped by the operator for inserting and removing said tank (25) inside/from said supporting body (2).

6) - A container as claimed in Claim 4 or 5 wherein said tank (25) presents a bottom (26) and at least a side wall (27), characterised by the fact that said bottom (26) presents a sunken portion (31) defining a well (32) from which said processing fluid is withdrawn by means of suction.

7) - A container as claimed in Claim 6, characterised by the fact that said bottom (26) presents a projection (33) dividing the bottom of said tank (25)

into a first chamber (34) and a second chamber (35); said projection (33) presenting a passage (36) for enabling communication between said first and second chambers (34, 35).

8) - A container as claimed in Claim 7, characterised by the fact that said projection (33) is a few centimetres high.

9) - A container as claimed in any one of the foregoing Claims, characterised by the fact that said cartridge (10, 47, 48) is preferably made from one of the following materials: polyester, polythene, polyethylene terephthalate, polypropylene, acrylonitrile butadiene styrene (ABS).

10) - In a processing fluid container comprising a supporting body (2, 43, 44);  
a disposable cartridge (10, 47, 48) supported on said supporting body (2, 43, 44) and designed to contain said processing fluids; said cartridge (10, 47, 48) being formed from chemically-inert, synthetic material poorly wettable by said processing fluids.

11) - A cartridge as claimed in Claim 10, characterised by the fact that it is substantially cup-shaped.

12) - A cartridge as claimed in Claim 11, characterised by the fact that it presents flared side walls.

13) - A cartridge as claimed in Claim 11 or 12, characterised by the fact that it substantially consists of a tank (25) having a top edge (28) turned outwards and designed to cooperate with a corresponding top edge of said supporting body (2).

14) - A cartridge as claimed in Claim 13, characterised by the fact that, on opposite sides, said top edge (28) presents gripping means (29) enabling said top edge (28) to be gripped by the operator for inserting and removing said tank (25) inside/from said supporting body (2).

15) - A cartridge as claimed in Claim 13 or 14 wherein said tank (25) presents a bottom (26) and at least a side wall (27), characterised by the fact that said bottom (26) presents a sunken portion (31) defining a well (32) from which said processing fluid is withdrawn by suction.

16) - A cartridge as claimed in Claim 15, characterised by the fact that said bottom (26) presents a projection (33) dividing the bottom of said tank (25) into a first chamber (34) and a second chamber (35); said projection (33) presenting a passage (36) enabling communication between said first and second chambers (34, 35).

17) - A cartridge as claimed in Claim 16, characterised by the fact that said projection (33) is a few centimetres high.

18) - A cartridge as claimed in any one of the foregoing Claims from 10 to 17, characterised by the fact that it is preferably formed from one of the following materials: polyester, polythene, polyethyl-

ene terephthalate, polypropylene, acrylonitrile butadiene styrene (ABS).

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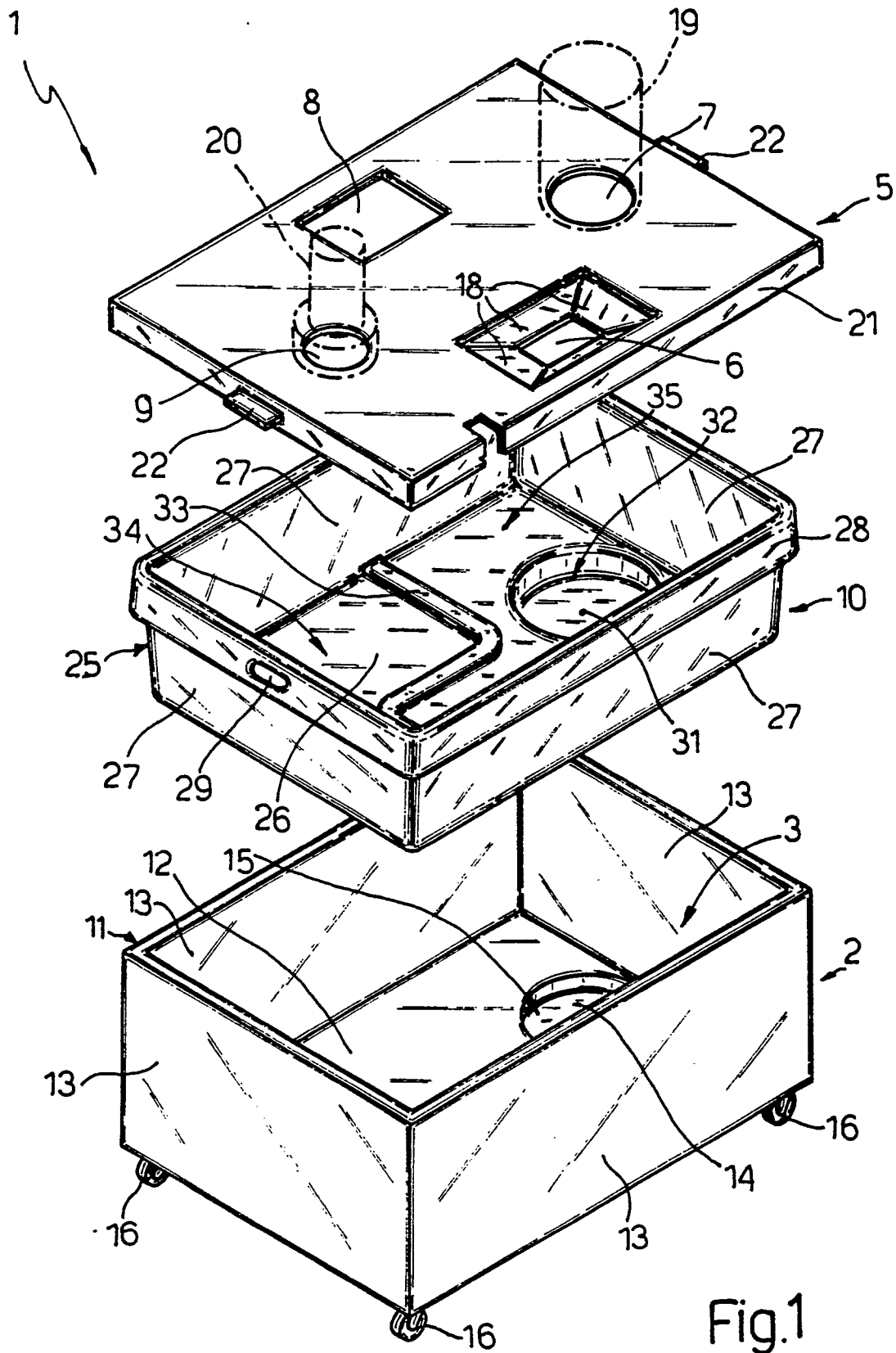
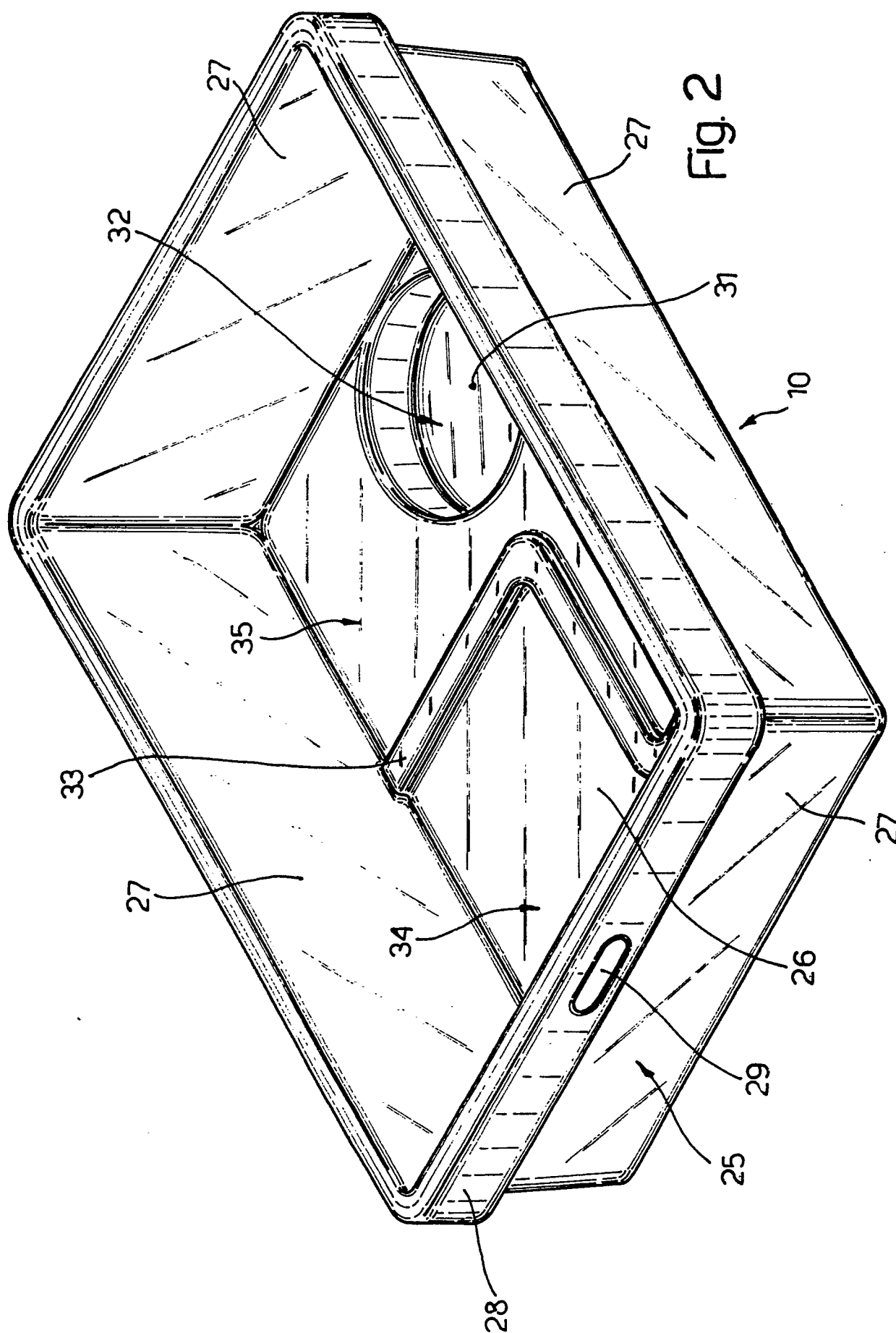
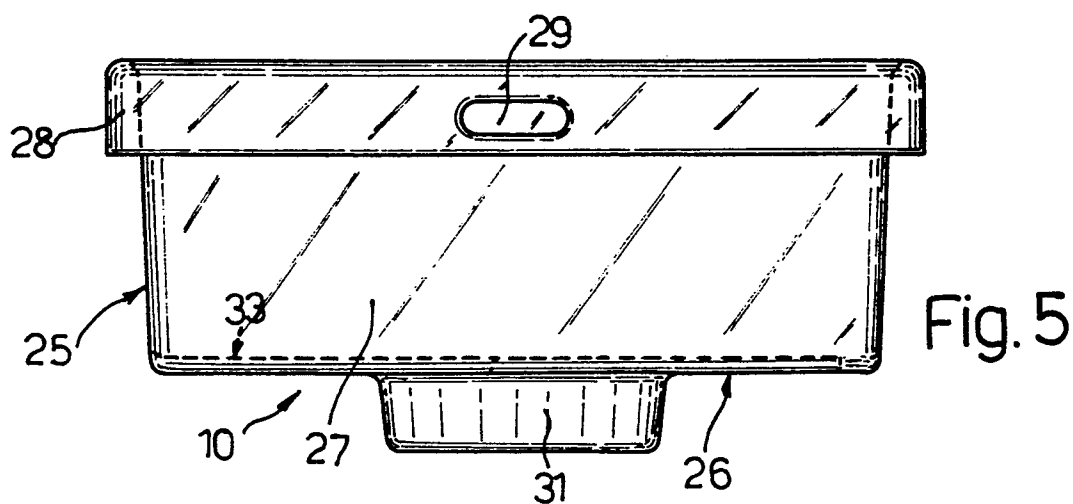
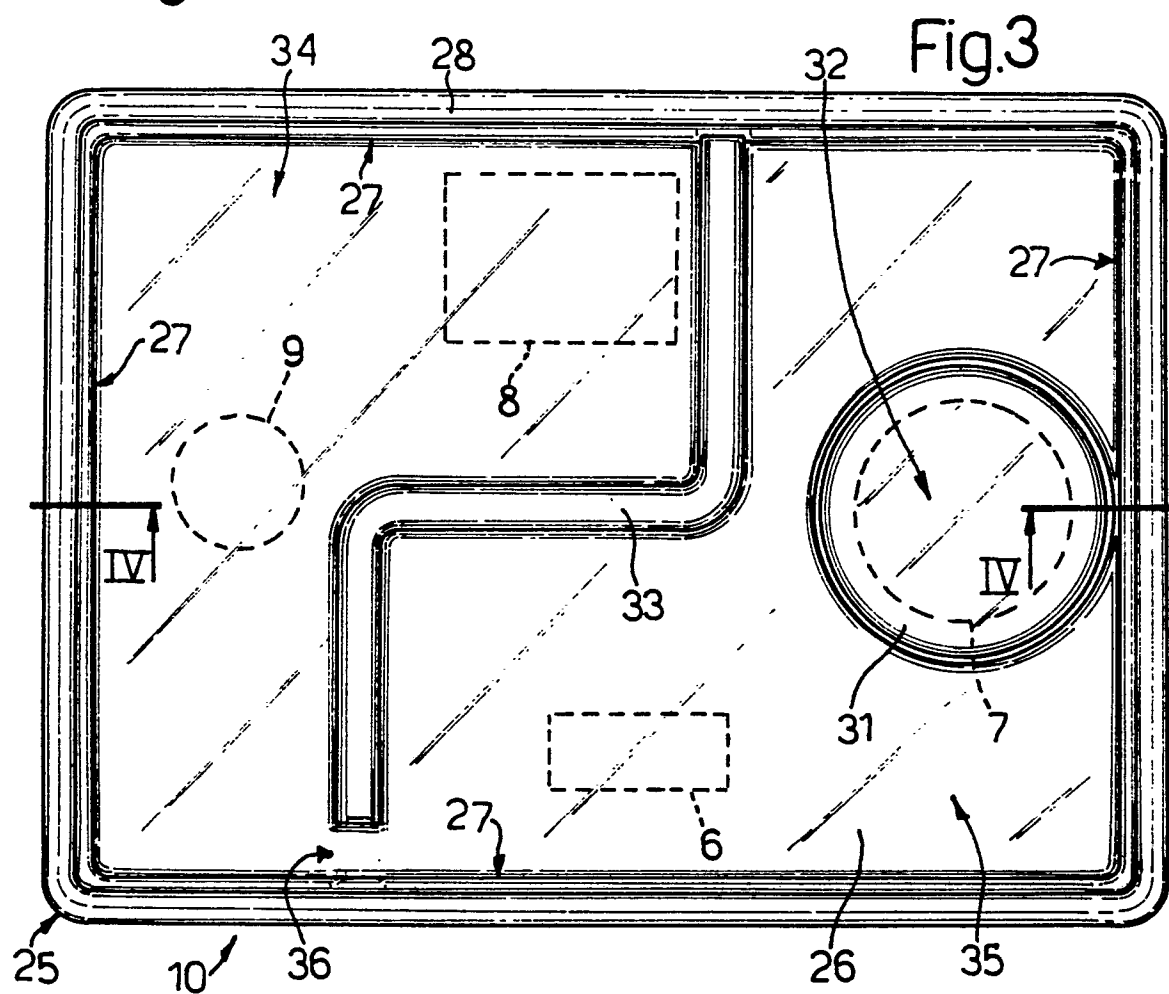
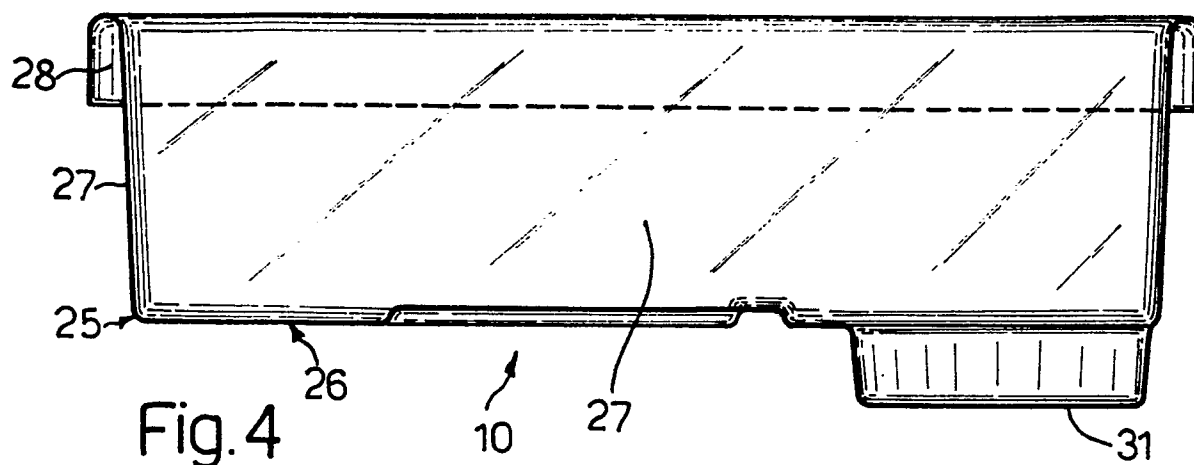


Fig.1







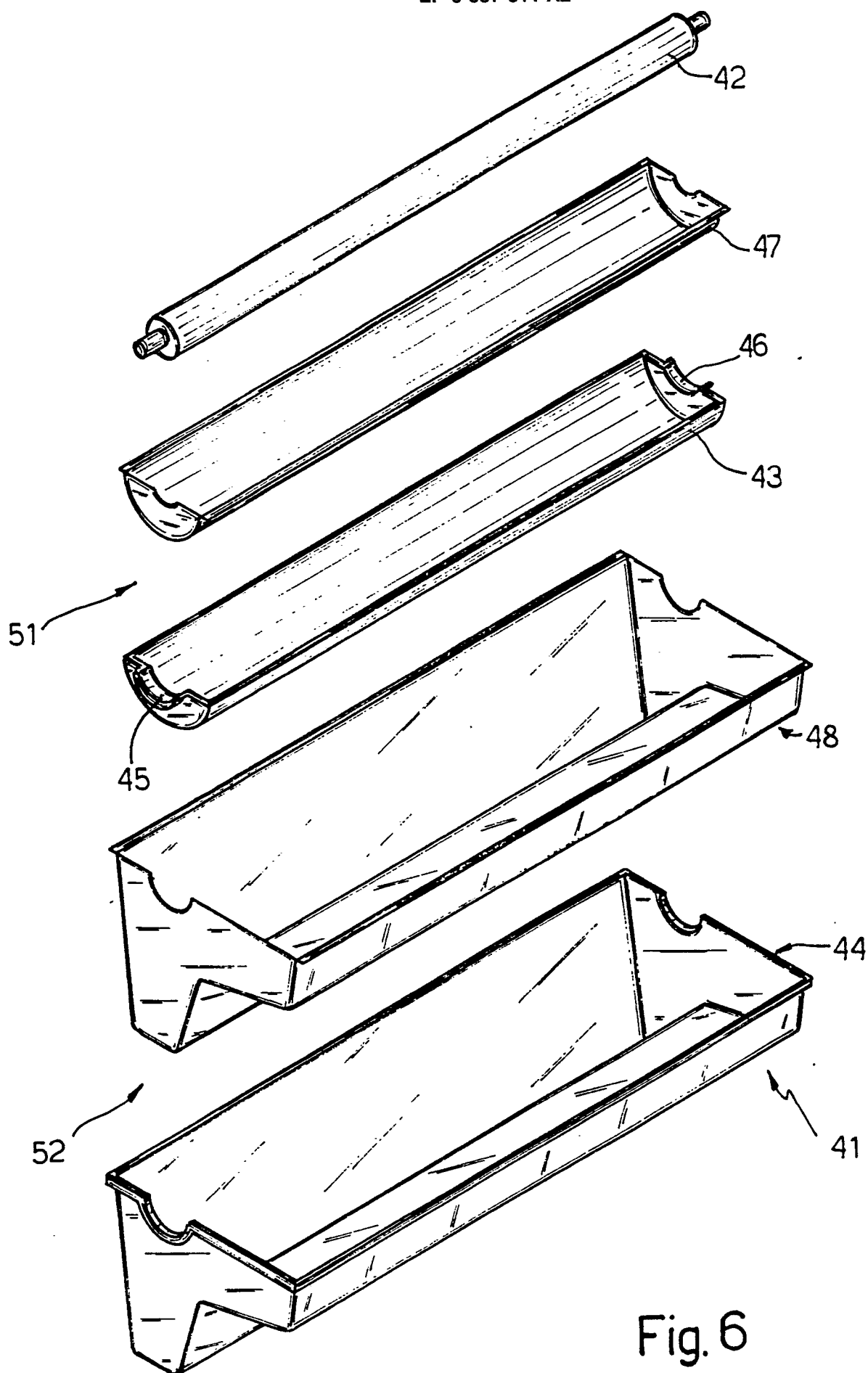


Fig. 6