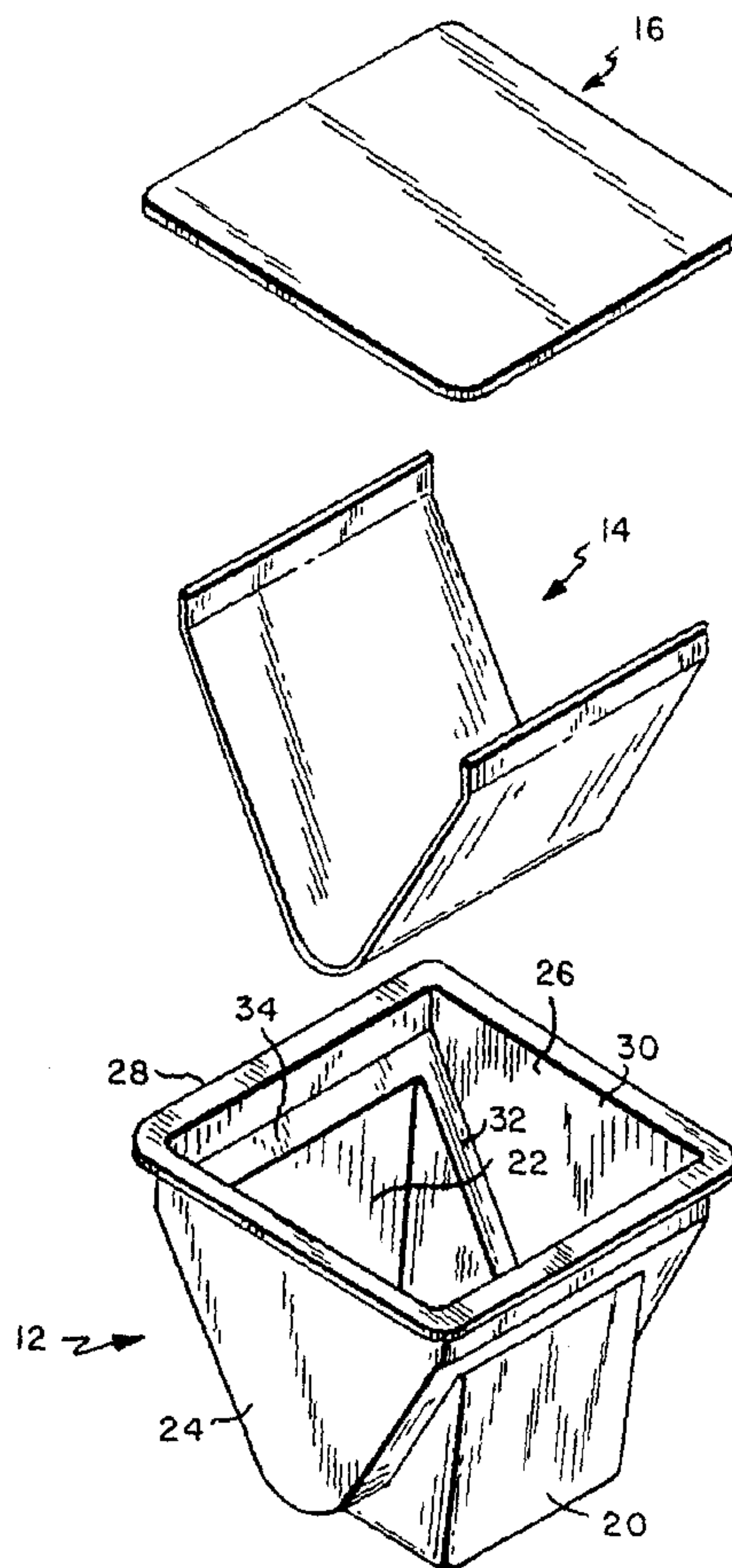




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 (72) Inventeurs/Inventors:
 LAZARIS, NICHOLAS G., US;
 BUCUZZO, WILLIAM P., US
 (73) Propriétaire/Owner:
 KEURIG, INCORPORATED, US
 (74) Agent: FETHERSTONHAUGH & CO.

(54) Titre : CARTOUCHE FILTRANTE POUR BOISSON A EMBALLAGE PERDU
 (54) Title: DISPOSABLE SINGLE SERVE BEVERAGE FILTER CARTRIDGE



(57) **Abrégé/Abstract:**

A beverage filter cartridge includes an outer container (12) with a bottom, and front (20), back and side walls (24, 26) extending upwardly from the bottom to a peripheral rim surrounding an upper opening. The side wall is contoured to define interior ledges (32, 34) located above the bottom and extending between the front and back walls. A planar filter element (14) having front, back

(57) **Abrégé(suite)/Abstract(continued):**

and side edge regions is configured, dimensioned and positioned to subdivide the interior of the container into first and second chambers, with the front and back edge regions of the filter element secured respectively to the front and back walls of the container, and with side edge regions of the filter element secured to respective interior ledges of the container side walls. A beverage medium is stored in the first chamber. A cover (16) is joined to the container rim (28) to close the upper opening. The cover is yieldably piercable to accommodate an inflow of liquid into the first chamber for combination with the beverage medium to produce a beverage. The filter element is permeable to accommodate passage of the beverage from the first chamber into the second chamber, and the container bottom is yieldably piercable to accommodate an outflow of the beverage from the second chamber to the exterior of the cartridge.

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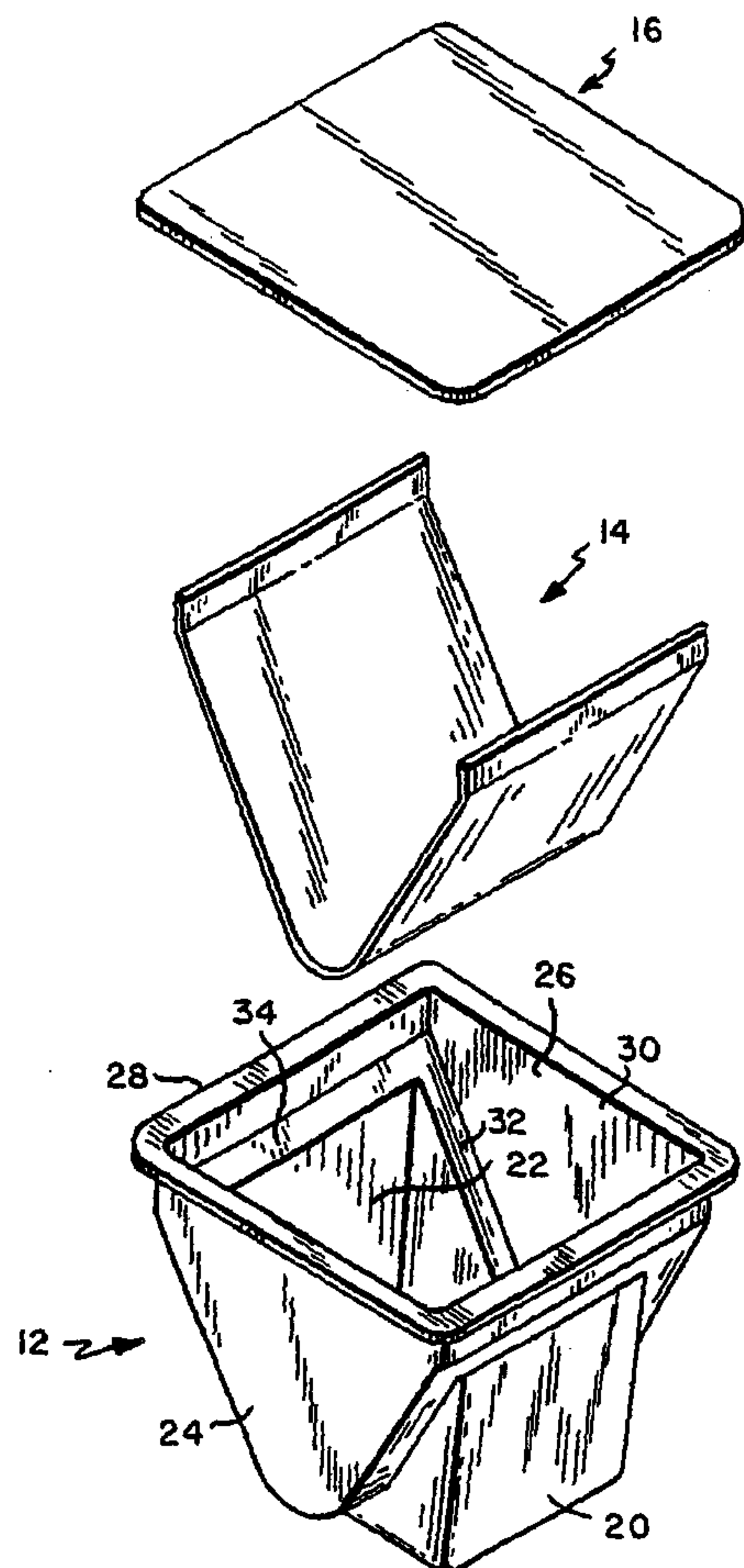
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- (72) Inventors: LAZARIS, Nicholas, G.; 1947 Beacon Street, Newton, MA 02468 (US). BUCUZZO, William, P.; 41 Eudora Street, Haverhill, MA 01832 (US).
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- (71) Applicant: KEURIG, INC. [US/US]; 101 Edgewater Drive, Wakefield, MA 01880 (US).
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[Continued on next page]

(54) Title: DISPOSABLE SINGLE SERVE BEVERAGE FILTER CARTRIDGE



(57) Abstract: A beverage filter cartridge includes an outer container (12) with a bottom, and front (20), back and side walls (24, 26) extending upwardly from the bottom to a peripheral rim surrounding an upper opening. The side wall is contoured to define interior ledges (32, 34) located above the bottom and extending between the front and back walls. A planar filter element (14) having front, back and side edge regions is configured, dimensioned and positioned to subdivide the interior of the container into first and second chambers, with the front and back edge regions of the filter element secured respectively to the front and back walls of the container, and with side edge regions of the filter element secured to respective interior ledges of the container side walls. A beverage medium is stored in the first chamber. A cover (16) is joined to the container rim (28) to close the upper opening. The cover is yieldably piercable to accommodate an inflow of liquid into the first chamber for combination with the beverage medium to produce a beverage. The filter element is permeable to accommodate passage of the beverage from the first chamber into the second chamber, and the container bottom is yieldably piercable to accommodate an outflow of the beverage from the second chamber to the exterior of the cartridge.

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5 DISPOSABLE SINGLE SERVE BEVERAGE FILTER CARTRIDGE

FIELD OF THE INVENTION

10 This invention relates to disposable single serve beverage filter cartridges.

DESCRIPTION OF THE PRIOR ART

 A known disposable single serve beverage filter cartridge is disclosed in U.S.
15 Patent Nos. 5,325,765 and 5,840,189 (Sylvan et al), dated respectively July 5, 1994
and November 24, 1998. This beverage filter cartridge is comprised basically of an
impermeable yieldably piercable cup-shaped container internally subdivided by a
permeable cone-shaped filter into first and second chambers. A granular or powdered
dry beverage medium, e.g., roasted ground coffee, is stored in the first chamber, and
20 the container is closed by an impermeable yieldably piercable lid.

 During a brewing cycle, the lid and container bottom are pierced,
respectively, by tubular inlet and outlet probes. The inlet probe admits heated liquid
into the first chamber for infusion with the beverage medium, and the resulting
brewed beverage passes through the filter into the second chamber from which it
25 exits via the outlet probe for delivery to an underlying cup.

 This known beverage filter cartridge has gained rapid and increasingly
widespread acceptance, notwithstanding certain problems and disadvantages relating
to its production and subsequent use that have persisted since its initial introduction.

 For example, expensive and mechanically complex production equipment is
30 required both to form the cone-shaped filter from a sheet of filter media, and to
insert and secure the thus formed filter cone in the cartridge container. Slight
deviations from close tolerances governing these steps can cause the filter to rupture
or become dislodged from the container wall during the brewing cycle, resulting in
contamination of the brewed beverage with beverage medium residue from the first
35 chamber.

 Because of its cone-shaped configuration, the filter has a limited extract

5 storage capacity of less than 60% of the internal volume of the cup-shaped
container. The unoccupied volume surrounding the filter component, commonly
referred to as "head space", is largely wasted and thus adds disadvantageously to the
overall size of the beverage filter cartridge. The additional head space also increases
the likelihood of residual oxygen being left in the container, thus adversely affecting
10 product shelf life. The cone-shaped configuration of the filter also limits the area
available for lid puncture and inflow of liquid for infusion with the beverage
medium.

Also, the side wall of the cup-shaped container is relatively pliable and thus
prone to buckling as the brewer probes puncture the container bottom and lid at the
15 onset of the brewing cycle. This can adversely affect the puncturing process,
resulting in leakage around the probes.

What is needed, therefore, is an improved beverage filter cartridge which
obviates or at least significantly minimizes the above-noted problems and
disadvantages.

20

SUMMARY OF THE INVENTION

In accordance with the present invention, there is provided a beverage filter
cartridge comprising: an outer container having a bottom and front, back and side
25 walls extending upwardly from the bottom to a peripheral rim surrounding an upper
opening, the side walls being contoured to define interior ledges located above the
bottom and extending between the front and back walls, the interior ledges being
generally V-shaped; a planar filter element having front, back and side edge regions,
the filter element being configured, dimensioned and positioned to subdivide the
30 interior of the container into first and second chambers, with the front and back edge
regions secured respectively to the front and back walls, and with the side edge
regions secured to respective interior ledges of the side walls; a beverage medium
stored in the first chamber; and a cover joined to the rim and closing the upper
opening, the cover being yieldably piercable to accommodate an inflow of liquid
35 into the first chamber for combination with the beverage medium to produce a

5 beverage, the filter element being permeable to accommodate a flow of the beverage from the first chamber into the second chamber, and the bottom being yieldably piercable to accommodate an outflow of the beverage from the second chamber to the exterior of the cartridge.

10 According to another aspect of the invention there is provided a beverage filter cartridge comprising: an outer container having a bottom and front, back and side walls extending upwardly from the bottom to a peripheral rim surrounding an upper opening, the side walls being contoured to define interior first ledges located above the bottom and extending between the front and back walls, the first ledges being generally V-shaped and having sides diverging upwardly at an angle α , the
15 front and back walls having upper sections extending downwardly from the peripheral rim to intermediate sections, and lower sections extending downwardly from the intermediate sections to the bottom, the intermediate sections diverging upwardly at the angle α to define second ledges; a planar filter element having front, back and side edge regions, the filter element being configured, dimensioned and
20 positioned to subdivide the interior of the container into first and second chambers, with the front and back edge regions secured respectively the second ledges, and with the side edge regions secured to respective first ledges of the side walls; a beverage medium stored in the first chamber; and a cover joined to the rim and closing the upper opening, the cover being yieldably piercable to accommodate an
25 inflow of liquid into the first chamber for combination with the beverage medium to produce a beverage, the filter element being permeable to accommodate a flow of the beverage from the first chamber into the second chamber, and the bottom being yieldably piercable to accommodate an outflow of the beverage from the second chamber to the exterior of the cartridge.

30 According to another aspect of the invention there is provided a beverage filter cartridge comprising: an outer container having a bottom and front, back and side walls extending upwardly from the bottom to a peripheral rim surrounding an upper opening, the side walls being contoured to define interior ledges located above the bottom and extending between the front and back walls, the bottom having a
35 central boss projecting upwardly into the interior of the container; a planar filter

5 element having front, back and side edge regions, the filter element having a
generally V-shaped configuration and being positioned to subdivide the interior of
the container into first and second chambers, with the front and back edge regions
secured respectively to the front and back walls, and with the side edge regions
secured to respective interior ledges of the side walls, and with a bottom portion of
10 the filter element secured to the boss; a beverage medium stored in the first
chamber; and a cover joined to the rim and closing the upper opening, the cover
being yieldably piercable to accommodate an inflow of liquid into the first chamber
for combination with the beverage medium to produce a beverage, the filter element
being permeable to accommodate a flow of the beverage from the first chamber into
15 the second chamber, and the bottom being yieldably piercable to accommodate an
outflow of the beverage from the second chamber to the exterior of the cartridge.

BRIEF DESCRIPTION OF THE DRAWINGS

Figure 1 is a perspective view of a beverage filter cartridge in accordance
20 with the present invention;

Figure 2 is a larger scale exploded perspective view of the component parts
of the beverage filter cartridge;

Figure 3 is a front elevational view of the beverage filter cartridge, the rear
view being a mirror image of this view;

25 Figure 4 is a side elevational view of the beverage filter cartridge, the
opposite side being a mirror image of this view;

Figure 5 is a vertical sectional view taken along line 5-5 of Figure 3;

Figure 6 is a vertical sectional view taken along line 6-6 of Figure 4;

Figure 7 is a horizontal sectional view taken along line 7-7 of Figure 6;

30 Figure 8 is an enlarged sectional view taken along line 8-8 of Figure 4; and

Figure 9 is a plan view on a reduced scale of the filter element prior to its
insertion in the cup-shaped container.

DETAILED DESCRIPTION

35 With reference to the drawings, a beverage filter cartridge in accordance with

5 the present invention is generally depicted at 10. The cartridge components are illustrated separately in Figure 2, and include: an outer container 12, a planar filter element 14, and a lid 16.

The container 10 has a bottom wall 18, a front wall 20, a back wall 22, and side walls 24, 26. The front, back and side walls extend upwardly from the bottom wall to a peripheral rim 28 surrounding an upper opening 30.

The side walls 24, 26 are appropriately contoured to define generally V-shaped first ledges 32 extending between the front and back walls 20, 22, with the lower portions of the ledges 32 being spaced above the container bottom 18, and the sides diverging upwardly at an angle α with respect to the vertical, as shown in Figure 8.

As shown in Figures 4 and 6, the front and back walls 20, 22, have upper sections "X", intermediate sections "Y", and lower sections "Z". The intermediate sections Y define second ledges 34 which diverge upwardly at the same angle α to thereby provide continuations of the first ledges 32 extending across the front and back walls 20, 22.

The bottom 18 is preferably contoured to provide an upwardly protruding centrally located boss 36.

The container may be formed from impermeable yieldably piercable and heat sealable materials, a preferred example being polyethylene/ethylene vinyl alcohol (EVOH)/polystyrene supplied by CurwoodTM Flexible Packaging of Oshkosh, Wisconsin, USA.

The filter element 14 may be cut or blanked from any suitably pliable and permeable sheet material, a preferred example being cellulose polypropylene supplied by J.P. Crompton, Ltd. of Bury, Lancashire, England.

As shown in Figure 9, the filter element has front, back and side edge regions 14a, 14b and 14c. The filter element is configured, dimensioned and operatively positioned to subdivide the interior of the container into first and second chambers C_1 , C_2 , with the volume of the first chamber C_1 comprising at least about 80% of the internal volume of the container 12. When thus positioned, it will be understood that the side edge regions 14c of the filter element are secured as by heat sealing to the

5a

5 first ledges 32 of the side walls 24, 26, and the front and back edge regions 14a, 14b are similarly secured to the second ledges 34 of the front and back walls 20, 22. Preferably, the bottom of the filter element is also secured as by heat sealing as at 37 to the upwardly protruding boss 36.

10 A beverage extract 38 (shown only in Figures 6 and 8) is received through the upper opening 30 and stored in the first chamber C_1 . The upper opening is then closed by securing the lid 16, as by heat sealing, to the peripheral container rim 28. The lid may be cut or blanked from any suitable impermeable heat sealable and yieldably piercable material, a preferred example being a metallic/polymer laminate supplied by Heat Seal Winpak, Ltd. of Montreal, Canada (now part of Winpak™ of 15 Winnipeg, Manitoba).

At the onset of a brewing cycle, as shown in Figure 6, the lid 16 and container bottom 18 are pierced, respectively, by tubular inlet and outlet probes 40, 42. The inlet probe admits heated liquid into the first chamber C_1 for infusion with the beverage medium 38. The resulting brewed beverage passes through the filter 20 element 14 into the second chamber C_2 from which it exits via the outlet probe 42.

In light of the foregoing, it will now be appreciated by those skilled in the art that the present invention offers a number of significant advantages over the known beverage filter cartridge described previously. For example, the planar filter element 14 lends itself to being readily blanked from sheet material and easily configures, 25 inserted and secured in place in the container 12. The container ledges 32 and 34 provide relatively wide and readily accessible surfaces onto which edge regions of the filter element can be securely heat sealed. The large volume of the extract storage chamber C_1 maximizes efficient utilization of the container interior. The contoured side walls 24, 26 lend rigidity to the overall structure and in so doing, 30 resist buckling as the lid and container bottom are pierced by inlet and outlet probes.

The cartridge container is designed to maintain a controlled atmosphere of N_2 , CO_2 or other gas introduced during the manufacturing process. Once sealed, the container will withstand an induced vacuum of at least 22"Hg for a prescribed period and will remain serviceable and protect the beverage medium contained in 35 the storage chamber C_1 .

Although the outer container and lid have been described as being formed from impermeable materials, it will be understood by those skilled in the art that, alternatively, permeable materials may be employed for one or both of these components. Where permeable materials are employed, the completed cartridges will 5 preferably be subsequently enclosed, either individually or in batches, with impermeable wrappings. Materials for such wrappings are well known, and include for example EVOH films, aluminum foil, etc.

Although the present invention had been shown and described with respect to a preferred embodiment, various changes and modifications that are obvious to a person 10 skilled in the art to which the invention pertains, even if not shown or specifically described herein, are deemed to lie within the spirit and scope of the present invention. Any numbering of the elements of the following claims is merely for convenience and is not intended to suggest that the ordering of the elements of the claims has particular significance other than as otherwise expressed by the language of the claims.

15 What is claimed is:

5

What is claimed is:

1. A beverage filter cartridge comprising:

an outer container having a bottom and front, back and side walls extending upwardly from said bottom to a peripheral rim surrounding an upper opening, said side walls being contoured to define interior ledges located above said bottom and
10 extending between said front and back walls, said interior ledges being generally V-shaped;

a planar filter element having front, back and side edge regions, said filter element being configured, dimensioned and positioned to subdivide the interior of
15 said container into first and second chambers, with said front and back edge regions secured respectively to said front and back walls, and with said side edge regions secured to respective interior ledges of said side walls;

a beverage medium stored in said first chamber; and

a cover joined to said rim and closing said upper opening, said cover being
20 yieldably piercable to accommodate an inflow of liquid into said first chamber for combination with the beverage medium to produce a beverage, said filter element being permeable to accommodate a flow of said beverage from said first chamber into said second chamber, and said bottom being yieldably piercable to accommodate an outflow of said beverage from said second chamber to the exterior
25 of said cartridge.

2. The beverage filter cartridge of claim 1 wherein said front and back walls have upper sections extending downwardly from said peripheral rim to intermediate sections, and lower sections extending downwardly from said intermediate sections to said bottom.

30 3. The beverage filter cartridge of claim 2 wherein said intermediate sections define second ledges joining said upper and lower sections.

4. The beverage filter cartridge of claim 3 wherein said second ledges taper inwardly from said upper sections to said lower sections.

5 5. The beverage filter cartridge of any of claims 2, 3 or 4 wherein the front and back edge regions of said filter element are joined respectively to the intermediate sections of said front and back walls.

6. The beverage filter cartridge of any one of claims 1 to 5 further comprising a central boss on said bottom, said boss projecting into the interior of said container
10 and into contact with said filter element.

7. The beverage filter cartridge of any one of claims 1 to 6 wherein the volume of said first chamber is at least about 80% of the volume of said container.

8. The beverage filter cartridge of any one of claims 1 to 7 wherein said outer container is impermeable.

15 9. The beverage filter cartridge of any one of claims 1 to 8 wherein said lid is impermeable.

10. A beverage filter cartridge comprising:

an outer container having a bottom and front, back and side walls extending upwardly from said bottom to a peripheral rim surrounding an upper opening, said
20 side walls being contoured to define interior first ledges located above said bottom and extending between said front and back walls, said first ledges being generally V-shaped and having sides diverging upwardly at an angle α , said front and back walls having upper sections extending downwardly from said peripheral rim to intermediate sections, and lower sections extending downwardly from said
25 intermediate sections to said bottom, said intermediate sections diverging upwardly at said angle α to define second ledges;

a planar filter element having front, back and side edge regions, said filter element being configured, dimensioned and positioned to subdivide the interior of said container into first and second chambers, with said front and back edge regions
30 secured respectively to said second ledges, and with said side edge regions secured to respective first ledges of said side walls;

a beverage medium stored in said first chamber; and

a cover joined to said rim and closing said upper opening, said cover being yieldably piercable to accommodate an inflow of liquid into said first chamber for
35 combination with the beverage medium to produce a beverage, said filter element

5 being permeable to accommodate a flow of said beverage from said first chamber into said second chamber, and said bottom being yieldably piercable to accommodate an outflow of said beverage from said second chamber to the exterior of said cartridge.

11. A beverage filter cartridge comprising:

10 an outer container having a bottom and front, back and side walls extending upwardly from said bottom to a peripheral rim surrounding an upper opening, said side walls being contoured to define interior ledges located above said bottom and extending between said front and back walls, said bottom having a central boss projecting upwardly into the interior of said container;

15 a planar filter element having front, back and side edge regions, said filter element having a generally V-shaped configuration and being positioned to subdivide the interior of said container into first and second chambers, with said front and back edge regions secured respectively to said front and back walls, and with said side edge regions secured to respective interior ledges of said side walls,
20 and with a bottom portion of said filter element secured to said boss;

a beverage medium stored in said first chamber; and

a cover joined to said rim and closing said upper opening, said cover being yieldably piercable to accommodate an inflow of liquid into said first chamber for combination with the beverage medium to produce a beverage, said filter element
25 being permeable to accommodate a flow of said beverage from said first chamber into said second chamber, and said bottom being yieldable piercable to accommodate an outflow of said beverage from said second chamber to the exterior of said cartridge.

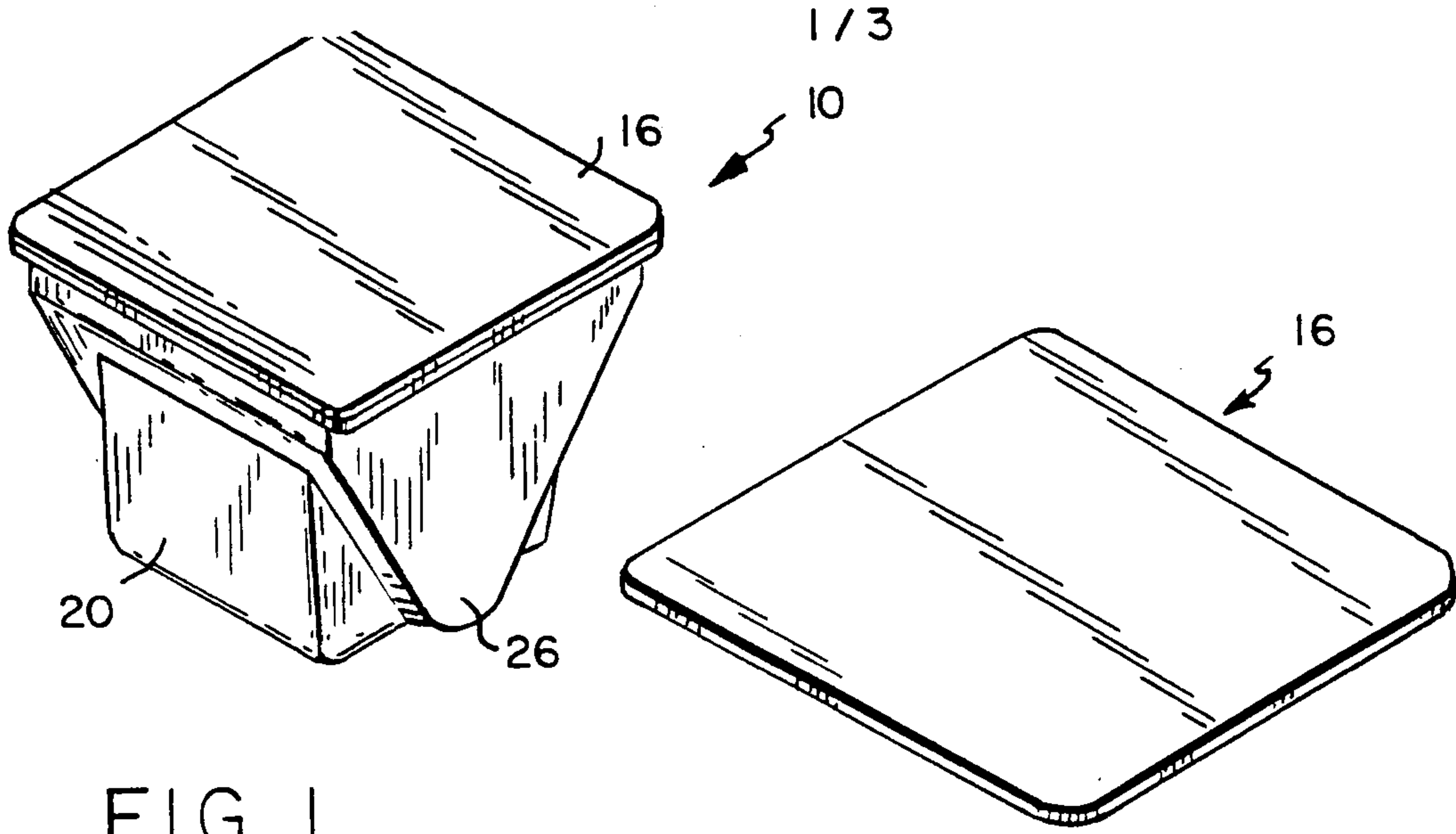


FIG. 1

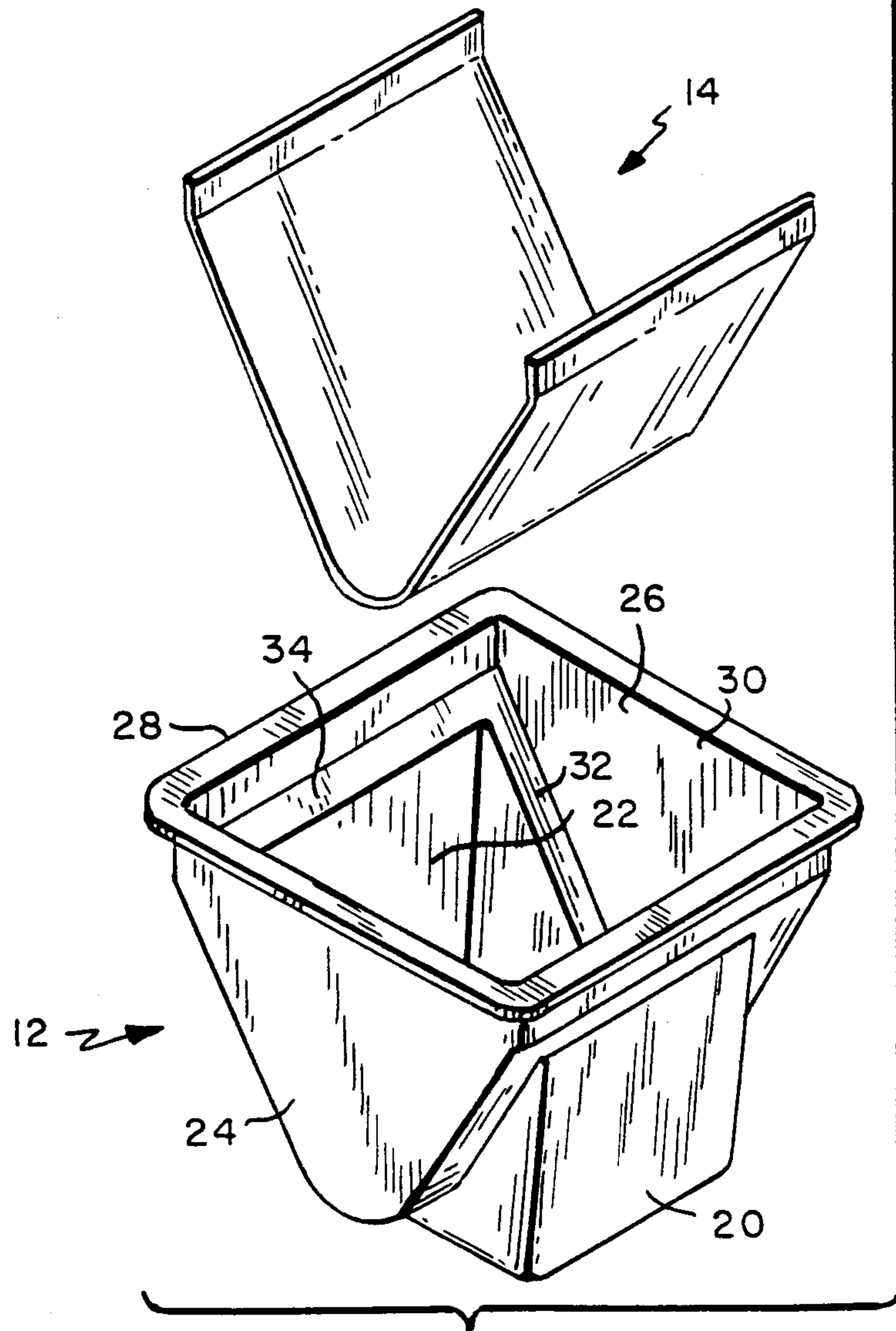


FIG. 2

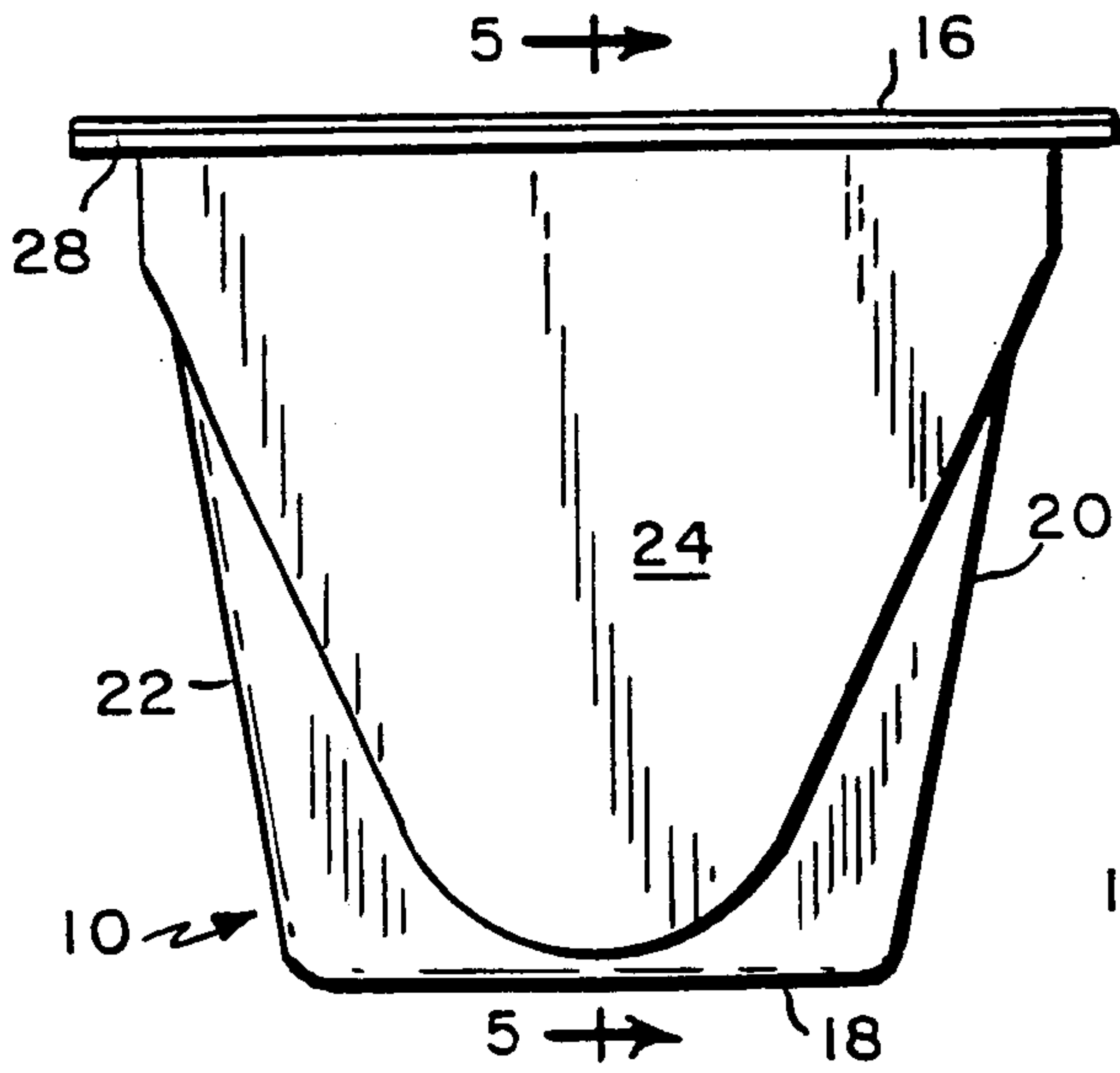


FIG. 3

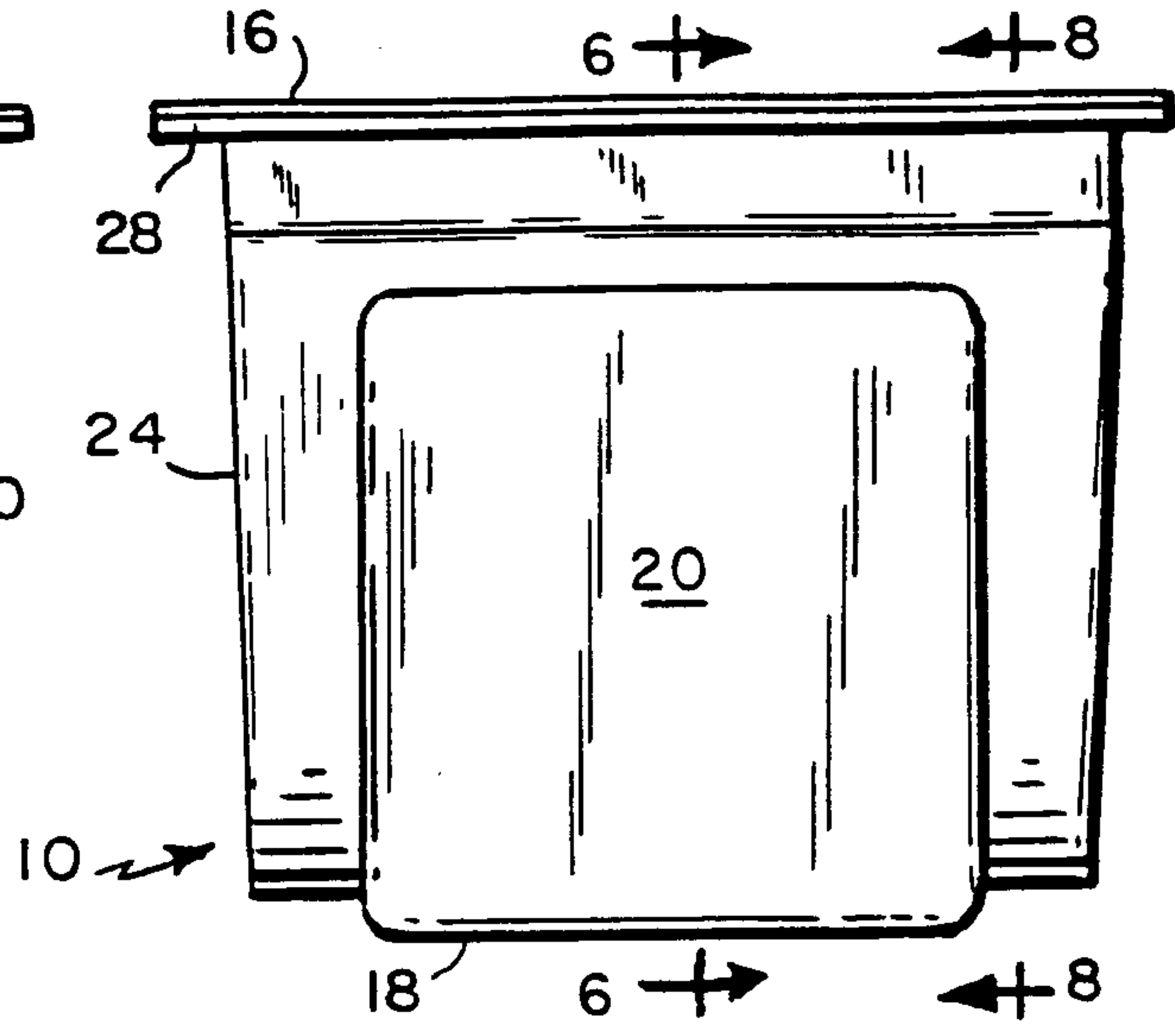


FIG. 4

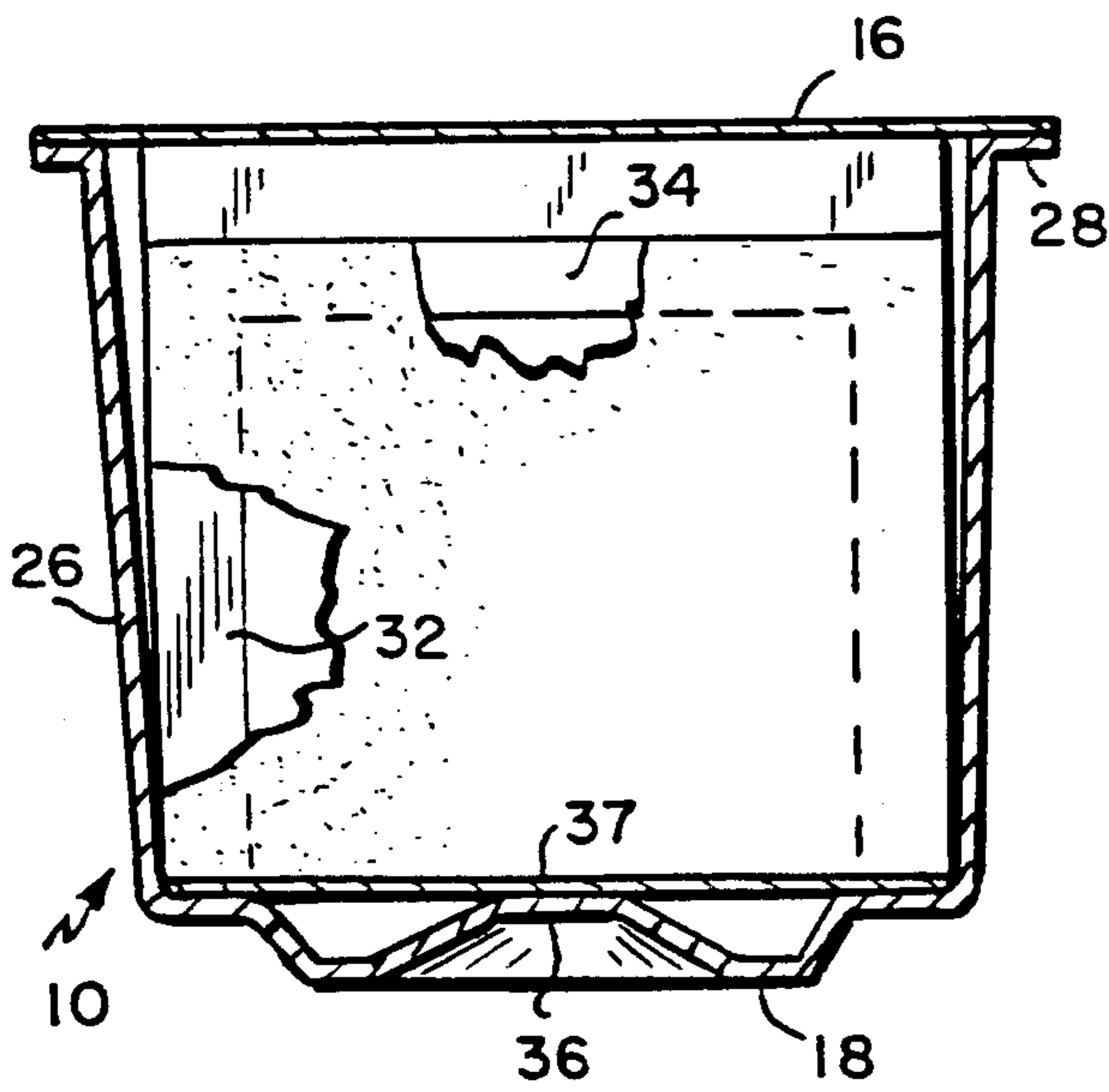


FIG. 5

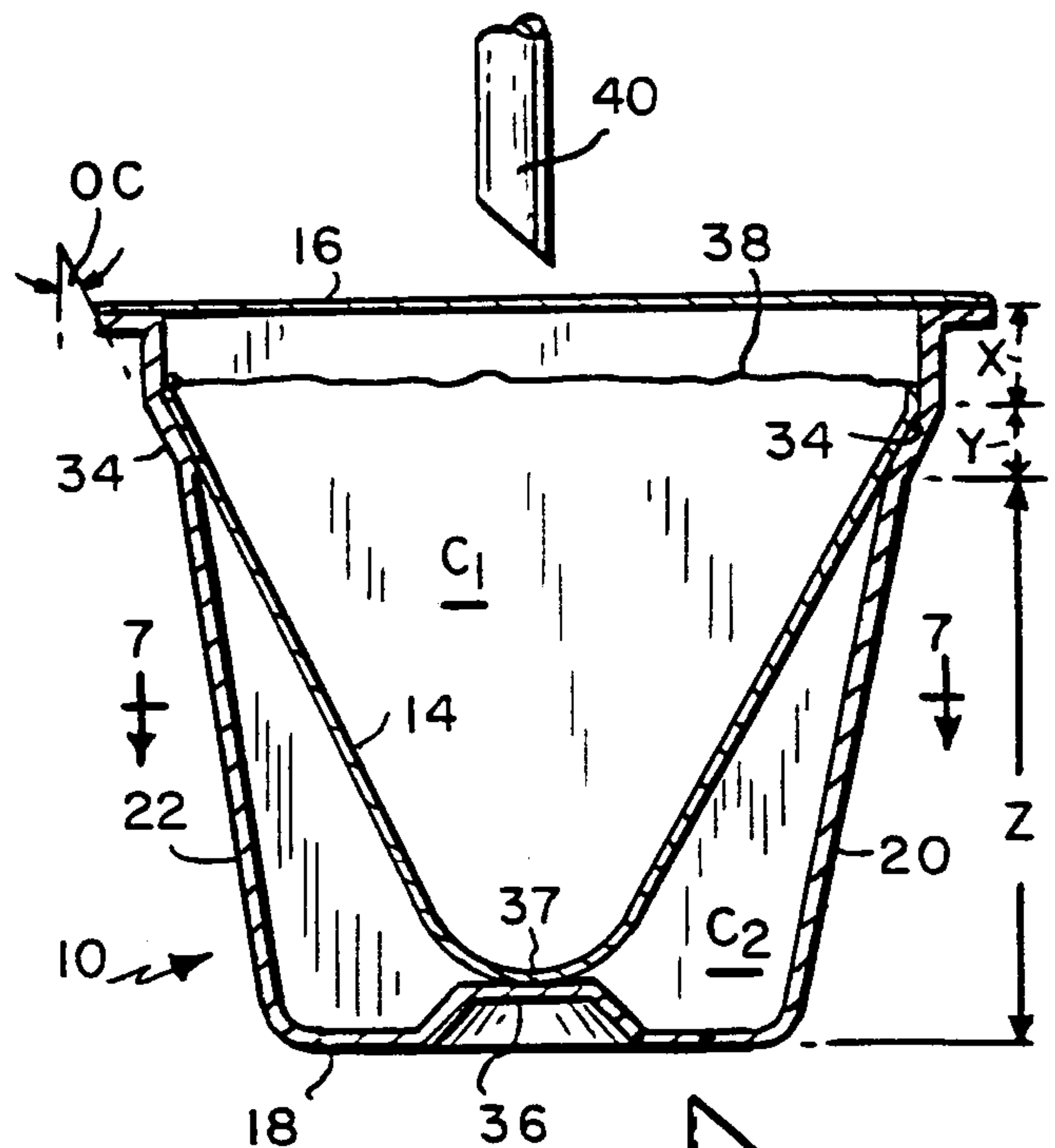


FIG. 6

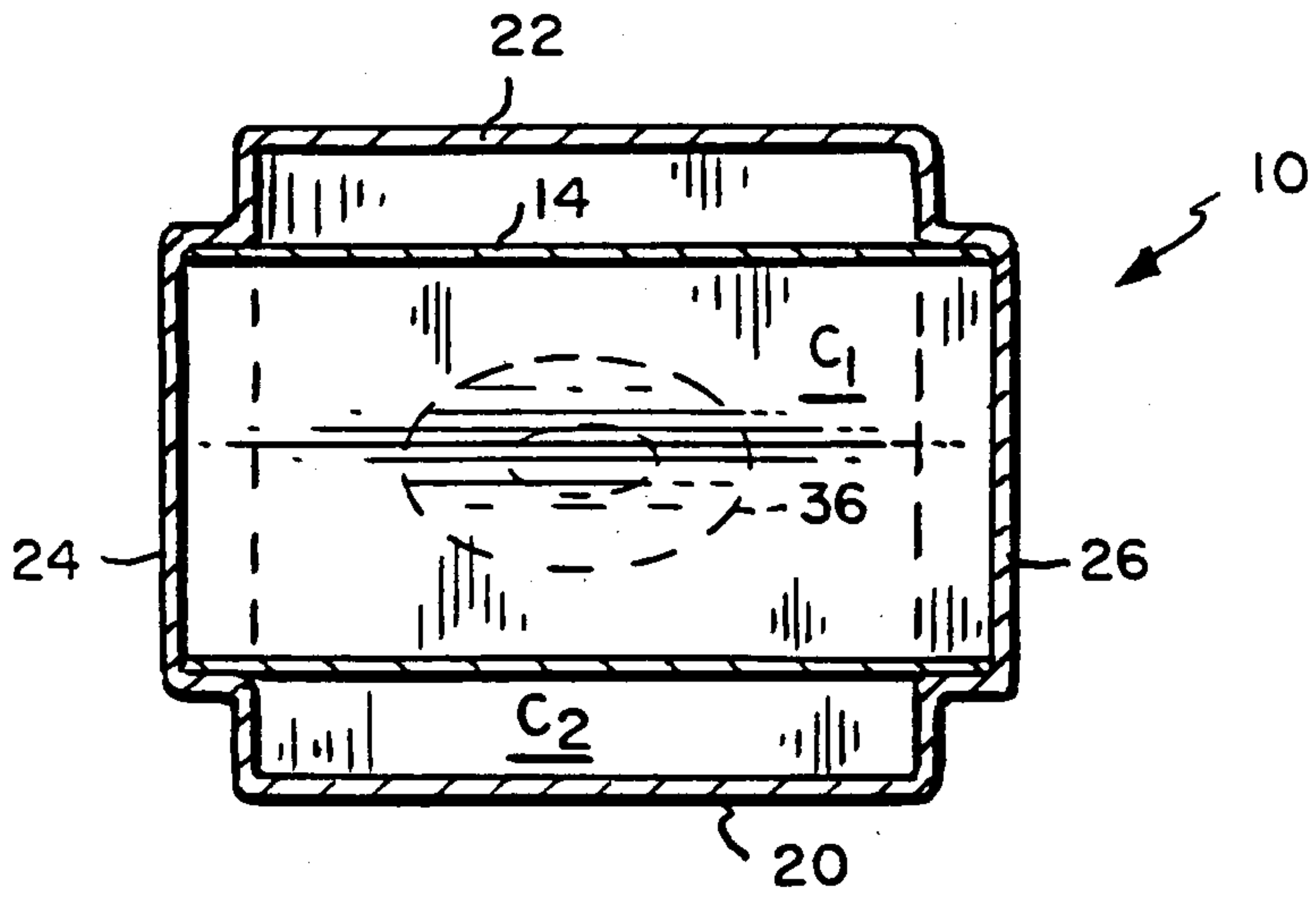


FIG. 7

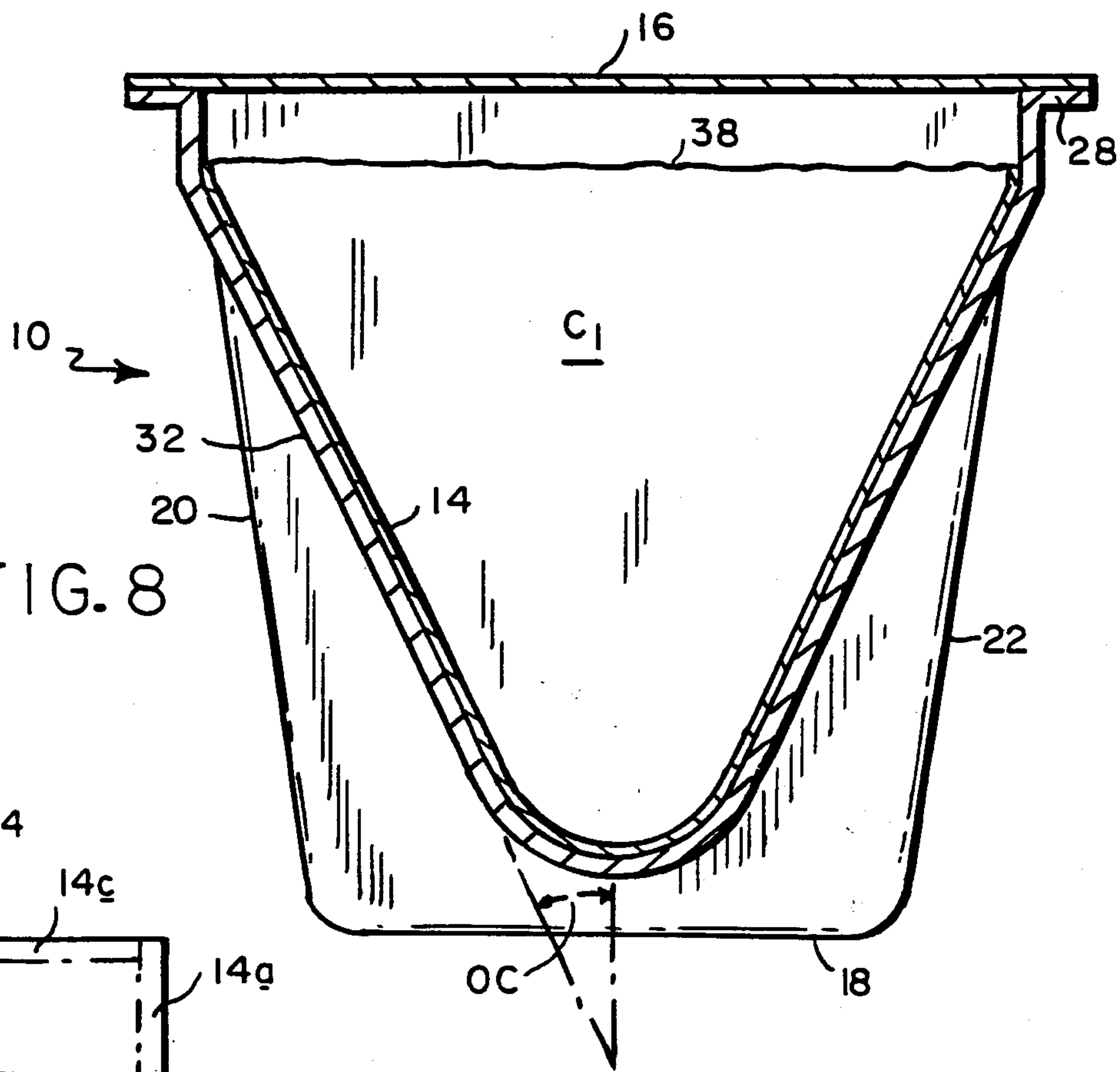


FIG. 8

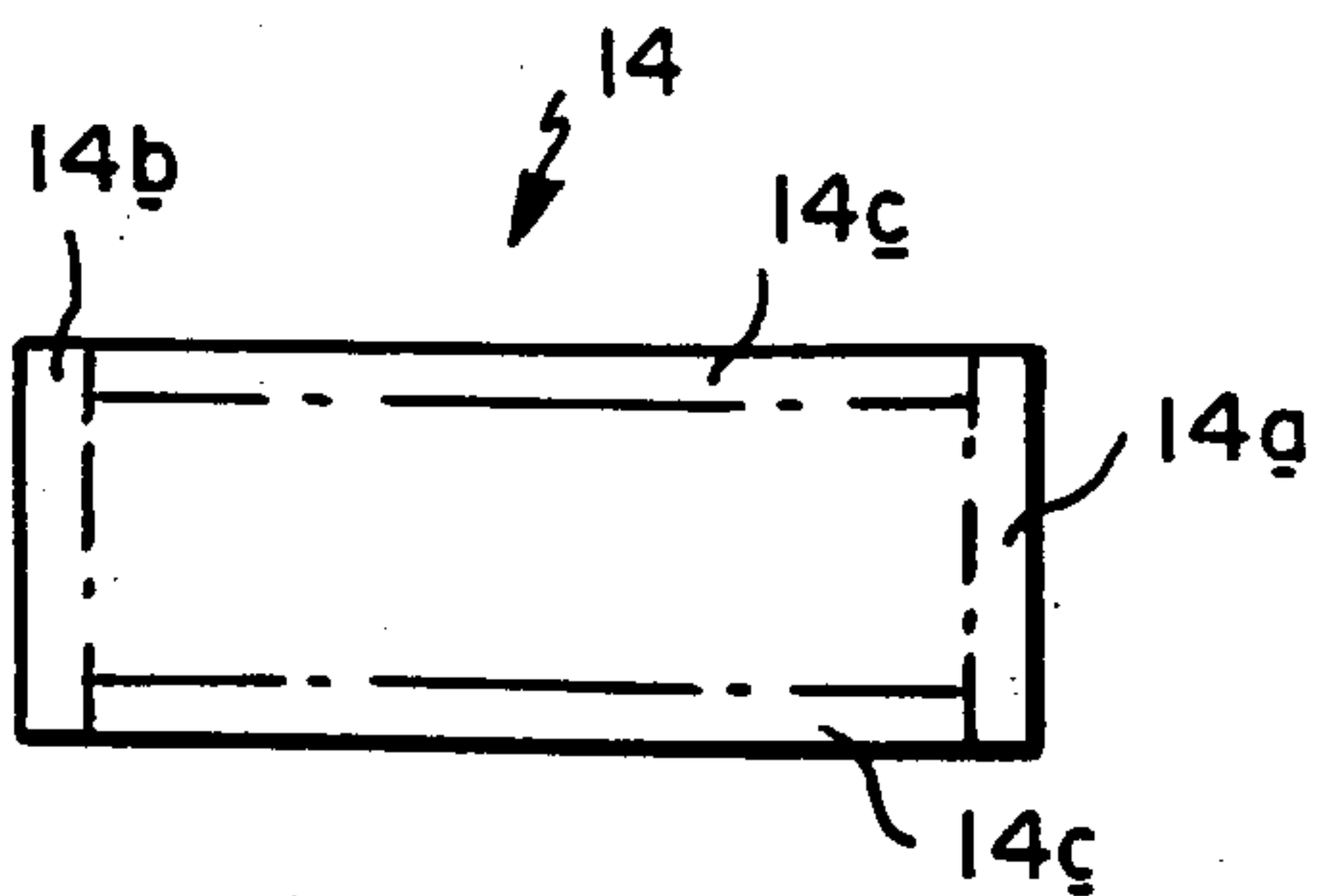


FIG. 9

