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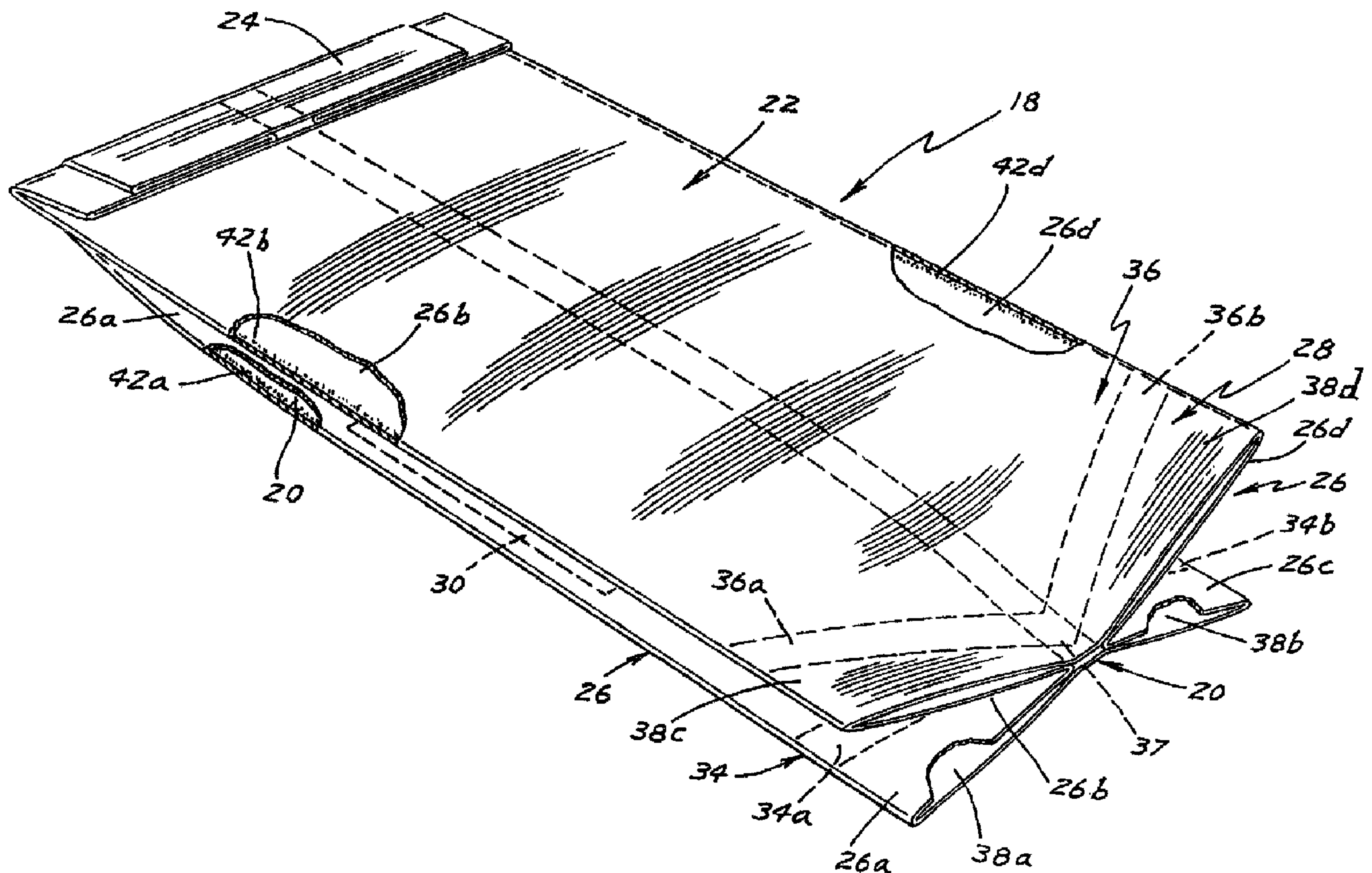
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(54) Titre : PAPIER A EPAISSEUR UNIQUE, INGRAISSABLE ET SOUPLE POUR L'EMBALLAGE DE MAIS ECLATE

(54) Title: SINGLE LAYER, GREASEPROOF, FLEXIBLE PAPER POPCORN PACKAGE



(57) Abrégé/Abstract:

A package for use in microwave ovens is disclosed in its preferred form of a flexible, tubular bag (18) including expandable side walls (26) interconnected between bottom and top walls (20, 22), an openable end (28), and a permanent end wall (24). The side

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

walls (26) include pleats (26a, 26b, 26c, 26d) which are folded in a collapsed condition of the bag (18) and expand due to internal expansion forces generated by the popping of kernels and the creation of water vapor. In a preferred form, the bag (18) is formed from a single layer of flexible, greaseproof paper of highly refined raw fibers of 100% chemical softwood pulp and having a basis weight in the order of 35 lb/ream. The single layer of paper forming the bag (18) provides greaseproof properties in storage, transportation, and cooking throughout the thickness of the paper to prevent wicking and leaking of grease or oil through the single layer. The bag (18) in a preferred form includes grease protectors (42a, 42b, 42c, 42d) located inside of the bag (18) for sealing the bottom and top walls (20, 22) to the pleats (26a, 26b, 26c, 26d) adjacent to their respective connecting edges and in a most preferred form further includes grease protectors (44a, 44b) outside of the bag (18) for sealing the first and second pleats (26a, 26b) together and the third and fourth pleats (26c, 26d) together adjacent to their respective connecting edges. The grease protectors (42a, 42b, 42c, 42d, 44a, 44b) seal the surfaces of the bag (18) just above and adjacent the connecting edges to block the flow of grease to prevent grease wicking or leaking from the bag (18).

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Abstract

A package for use in microwave ovens is disclosed in its preferred form of a flexible, tubular bag (18) including expandable side walls (26) interconnected between bottom and top walls (20, 22), an openable end (28), and a permanent end wall (24). The side walls (26) include pleats (26a, 26b, 26c, 26d) which are folded in a collapsed condition of the bag (18) and expand due to internal expansion forces generated by the popping of kernels and the creation of water vapor. In a preferred form, the bag (18) is formed from a single layer of flexible, greaseproof paper of highly refined raw fibers of 100% chemical softwood pulp and having a basis weight in the order of 35 lb/ream. The single layer of paper forming the bag (18) provides greaseproof properties in storage, transportation, and cooking throughout the thickness of the paper to prevent wicking and leaking of grease or oil through the single layer. The bag (18) in a preferred form includes grease protectors (42a, 42b, 42c, 42d) located inside of the bag (18) for sealing the bottom and top walls (20, 22) to the pleats (26a, 26b, 26c, 26d) adjacent to their respective connecting edges and in a most preferred form further includes grease protectors (44a, 44b) outside of the bag (18) for sealing the first and second pleats (26a, 26b) together and the third and fourth pleats (26c, 26d) together adjacent to their respective connecting edges. The grease protectors (42a, 42b, 42c, 42d, 44a, 44b) seal the surfaces of the bag (18) just above and adjacent the connecting edges to block the flow of grease to prevent grease wicking or leaking from the bag (18).

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SINGLE LAYER, GREASEPROOF, FLEXIBLE PAPER POPCORN PACKAGE

This application is a divisional of Canadian patent application serial No. 2,129,110 filed January 29, 1993.

BACKGROUND

5 The present invention relates generally to packages for use in microwave ovens, and pertains more particularly to an expandable bag having protection from grease leaking and/or wicking from its expansion creases or folds and/or to a flexible popcorn package made from a
10 single layer of greaseproof paper.

The subject-matter of this divisional application is restricted to popcorn packages having means for preventing oil or grease from leaking or wicking from inside the bag through the edges.

15 It should be understood that the expression "the present invention" or the like used in this specification encompasses not only the subject-matter of this divisional application but that of the parent application also.

20 When microwave popcorn packages were first introduced utilizing a microwave susceptor, the packages typically were formed by expandable paperboard containers and often the load of the microwave popcorn popping package was located in a plastic bag positioned inside of the

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1 paperboard container including the microwave susceptor.
The paperboard container in most instances was unfolded
into an expanded size by the consumer prior to popping of
the popcorn kernels in the microwave oven but in some
5 instances was unfolded by the popping of the popcorn
kernels, with the popped popcorn being served in the
expanded paperboard containers. Early packages suffered
from several disadvantages including the bulk of
expandable paperboard containers which increased the
10 amount of material required to make the container and
thus its cost, increased the size of the packaging and
storage requirements, as well as increased the amount of
material which had to be disposed of after the
consumption of the popcorn raising environmental
15 concerns. Further, the dynamics of expanding the
paperboard container and/or plastic bag by the forces
generated while popping the kernels were typically
insufficient to maximize the volume of the package which
in turn prevented the popcorn from popping with greater
20 volume. Also, plastic bags are susceptible to melting
and often are difficult to handle with a hot food product
at least due to the poor insulating qualities of plastic.
To avoid these and other problems and with the development
of microwave susceptors applied in the form of a thin
25 coating such as disclosed in U.S. Patent No. 4,267,420
issued to William A. Brastad, the microwave popcorn
industry has turned to popcorn packages formed from
flexible paper bags.

However, paper microwave popcorn popping bags
30 including microwave susceptors encountered different
types of problems. For example, the load of a microwave
popcorn popping package includes unpopped popcorn
kernels, a cooking oil or grease, salt, and other
ingredients such as colorings, flavorings, or the like.
35 It can be appreciated that during storage or
transportation of the filled microwave popcorn package by

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1 the processor, the marketing agencies, and the consumer,
the oil and/or grease have a tendency to leak from
flexible paper packages, especially at high temperatures,
causing aesthetically unpleasant appearances. Further,
5 during microwave popping, the oil and/or grease have a
tendency to wick from flexible paper packages. Current
flexible paper popcorn bags such as disclosed in United
States Patent No. 5,044,777 typically use a tri-laminate
of a greaseproof paper adhered to an outer fluorocarbon
10 treated, grease resistant paper with a microwave
susceptor sandwiched between. For example, the inner
layer could be formed of bleached greaseproof Kraft paper
of 11.5 kg. (25 lb.)/ream basis weight and the outer layer
could be formed of plain bleached Kraft paper of 13.5 kg.
15 (30 lb.)/ream basis weight. The two paper layers and the
adhesive therebetween together provide the needed grease
barrier in both storage and/or transportation at high
temperatures as well as during microwave cooking.

However, laminated paper popcorn bags suffer from several
20 disadvantages. First, the paper bag has a great deal of
stiffness resulting from the multiple layers themselves
but also their adhesive interconnection. Stiffness
detracts from the ability of the bag to inflate or expand
during microwave popping of the popcorn which may in turn
25 detrimentally affect the volume of the popped kernels.
Also, the lamination of the materials requires extra
assembly costs and the amount of materials used for each
bag adds to the economic and environmental costs.

Thus, there is a need to reduce the amount of
30 material and/or layers utilized in the formation of
flexible paper popcorn packages including a microwave
susceptor. Current efforts in single ply paper bags
which have been unsuccessful prior to the present
invention involve common greaseproof paper in combination
35 with surface coatings of fluorocarbons, such as FC-807
made by 3M, Inc., St. Paul, Minnesota, or equivalent.
However, such efforts have not resulted in commercially

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1 successful packages as they do not provide adequate
greaseproof properties in storage, transportation, or
cooking throughout the paper. Further, when this paper
is creased such as at the corners in the pleats and
5 between the pleats and the top and bottom walls, fibers
in the paper and the coatings applied thereto fracture
and separate and reveal uncoated fiber ends which absorb
grease. Moreover, breaks or fractures might occur and
the oil and/or grease can leak out of the package.

10 Consequently, there is a continuing need for a
flexible paper popcorn package with reduced layers and
particularly formed of a single layer of flexible paper.

Further, as set forth above, the problem of grease
wicking and actual leaking is especially present at folds
15 and creases where the fibers of the paper and coatings
applied thereto for the greaseproofing characteristics
are fractured and/or separated. This problem has been
one of the major factors in limiting the amount that the
material and/or number of layers can be reduced in
20 flexible paper popcorn bags, as the mass and number of
layers of material are relied upon to provide the needed
grease barrier. Thus, a need exists for optionally
providing an added grease barrier at only those locations
especially at folds and creases where grease wicking and
25 leaking are a problem, with the added grease barrier
allowing minimization of the material and/or number of
layers at the remaining locations where grease wicking
and leaking are not such a problem.

Surprisingly, the above needs and other objectives
30 can be satisfied by providing a package in the form of a
bag including grease protectors for sealing the surfaces
of the walls of the bag adjacent to their connecting,
folding edges to prevent the grease or oil from leaking
or wicking from the interior volume of the bag.

35 In a preferred aspect, the package includes pleated,
expandable side walls, with the grease protectors located

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inside of the bag where the inside surfaces of the pleats overlies other inside surfaces of the bag and also located outside of the bag where the outside surfaces of the pleats overlies other outside surfaces of the bag.

5 In yet another preferred aspect of the present invention, the bag holds popcorn kernels and grease or oil for popping in a microwave oven, with the bag formed of a single layer of greaseproof paper having a thickness allowing the single layer to be flexed by the popping of the
10 popcorn kernels and also preventing the wicking and leaking of the grease or oil through the single layer.

 In yet another aspect of the invention, there is provided a package for holding a food product including grease or oil and for heating in a microwave oven
15 comprising, in combination: a flexible bag including a bottom wall, a top wall, and at least a first side wall extending between the top and bottom walls, with the top, bottom and side walls including first and second ends, with the first side wall including first and second pleats with
20 the pleats being connected together at first edges and with the first pleat having a second, opposite edge connected to the bottom wall and the second pleat having a third, opposite edge connected to the top wall, with the bag further including an end wall at the first ends of the top,
25 bottom and side walls; susceptor means for converting microwave energy into heat extending over a portion of the bottom wall spaced from the first and second ends of the bottom wall; means for closing the second ends of the top, bottom, and side walls and for allowing the consumer to open
30 the package after microwave cooking; first means inside of the bag joining the first pleat to the bottom wall adjacent to the second edge; and second means inside of the bag joining the second pleat to the top wall adjacent to the

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third edge, with the first and second joining means preventing the grease or oil from leaking or wicking from inside the bag through the edges.

In yet another aspect of the invention, there is provided a package for holding a food product including grease or oil comprising, in combination: an expandable bag having an interior volume for holding the food product and the grease or oil and including at least first and second walls connected together at first edges, with each of the first and second walls having first and second surfaces, with the bag having a collapsed condition and an expanded condition, with the interior volume of the bag increasing as the bag expands from the collapsed condition to the expanded condition, with the first and second walls being folded about the first edges with the first surfaces overlying each other in the collapsed condition, with the first and second walls extending from the first edges at an angular relation to each with the first surfaces being spaced from each other in the expanded condition; and means joining the first surfaces together adjacent to the first edges to prevent the grease or oil from leaking or wicking from the interior volume of the bag.

In a yet further aspect of the invention, there is provided expandable, paper, popcorn package for holding popcorn kernels and grease or oil for popping in a microwave oven comprising, in combination: a bag having an interior volume and a closed end openable by a consumer after microwave cooking; and susceptor means for converting microwave energy into heat extending over a portion of the bag, with the popcorn kernels and the grease or oil generally overlying the susceptor means during microwave cooking; and wherein the bag is formed of a single layer of greaseproof paper having a thickness allowing the single

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layer to be flexed by the popping of the popcorn kernels and also preventing the wicking and leaking of the grease or oil through the single layer.

The present invention will become clearer in light
5 of the following detailed description of an illustrative embodiment of this invention described in connection with the drawings.

Brief Description of the Drawings

The illustrative embodiment may best be described
10 by reference to the accompanying drawings where:

Figure 1 shows a perspective view of a package fabricated in accordance with the preferred teachings of the present invention in generally its collapsed, storage condition, but illustrated slightly expanded to show
15 constructional details.

Figure 2 shows a top plan view of the package of Figure 1, with portions broken away to show constructional details.

Figure 3 shows a perspective view of the package
20 of Figure 1 in its expanded condition.

Figure 4 shows a cross-sectional view of the package of Figure 1 in a condition slightly prior to its expanded condition of Figure 3.

All figures are drawn for ease of explanation of
25 the basic teachings of the present invention only; the extensions of the Figures with respect to number, position, relationship, and dimensions of the parts to form the preferred embodiment will be explained or will be within

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1 the skill of the art after the following teachings of the
present invention have been read and understood. Further,
the exact dimensions and dimensional proportions to
conform to specific force, weight, strength, and similar
5 requirements will likewise be within the skill of the art
after the following teachings of the present invention
have been read and understood.

Where used in the various figures of the drawings,
the same numerals designate the same or similar parts.
10 Furthermore, when the terms "top", "bottom", "first",
"second", "side", "end", and similar terms are used
herein, it should be understood that these terms have
reference only to the structure shown in the drawings as
it would appear to a person viewing the drawings and are
15 utilized only to facilitate describing the invention.

Description of the Preferred Embodiment

A package for use in microwave ovens according to the
preferred teachings of the present invention is shown as
an expandable, flexible bag in the drawings and generally
20 designated 18. It will facilitate the ensuing
description to consider bag 18 in the horizontal position
when placed in the microwave oven as opposed to a
vertical or upright position when the contents of bag 18
are being consumed by the consumer. Therefore, bag 18
25 includes a bottom wall 20, a top wall 22, an end wall 24,
side walls 26 and a closed end 28. In the preferred
form, the width of bottom wall 20 is less than the width
of top wall 22, although the widths of walls 20 and 22
could be equal.

30 End wall 24 provides a non-opening permanent seal to
the first end of bag 18. Particularly, the cross sectional
makeup of end wall 24 includes a number of folds that are
not important to an understanding of the present invention
so will not be specifically described, although end wall
35 24 should be constructed so as to seal adequately the
vapor created within bag 18 during the heating thereof in
the microwave oven. In the preferred form of the present

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1 invention, end wall 24 is shown as being of the type
shown in U.S. Patent No. 4,973,810 and is formed by
folding the first ends of bottom, top, and side walls 20,
22, and 26 over top wall 22. Alternatively, end wall 24
5 can have a flat rectangular or square configuration, with
such bags being commonly referred to as square bottom
bags in the trade. Further, bag 18 can optionally
include the non-heated flap of the type shown and
described in U.S. Patent No. 4,864,090. However, it
10 should be appreciated that end wall 24 can be a variety
of types and configurations such as but not limited to
the types shown in U.S. Patent Nos. 3,973,045; 4,450,180;
4,691,374; and 5,044,777.

In the most preferred form, side walls 26 include
15 gussets or pleats 26a, 26b, 26c and 26d that enable side
walls 26 to expand during a heating cycle. Particularly,
in the preferred form, pleats 26a and 26b are connected
together at first edges and have second and third,
opposite edges connected to bottom wall 20 and top wall
20 22, respectively. Likewise, pleats 26c and 26d are
connected together at fourth edges and have fifth and
sixth, opposite edges connected to bottom wall 20 and top
wall 22, respectively. In the preferred form, in its
collapsed condition, pleats 26a and 26c have the same
25 width and overlie bottom wall 20, and pleats 26b and 26d
have the same width which is greater than the width of
pleats 26a and 26c and overlie pleats 26a and 26c, with
top wall 22 overlying pleats 26b and 26d. In the
preferred form, bottom and top walls 20 and 22 have a
30 width extending beyond the interconnections of pleats 26a
and 26b and of pleats 26c and 26d when bag 18 is in its
collapsed condition. The second, free ends of pleats
26a, 26b, 26c and 26d forming side walls 26, of bottom
wall 20, and of top wall 22 are co-planar, and have the
35 same extent or length from end wall 24.

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1 End 28 provides a peelable closure seal which fails
during microwave cooking adjacent the second, free ends
of bottom, top and side walls 20, 22, and 26 or in other
words, adjacent the second end of bag 18. This peelable
5 seal failure allows trapped steam to vent from the
package, as well as allowing the consumer to open bag 18
after microwave cooking and prior to eating. In the most
preferred form, end 28 is formed in a manner as shown and
described in U.S. Patent No. 5,189,272, and includes first
10 and second V-shaped adhesive strips 34 and 36. Strip 34 is
located on bottom wall 20 having first and second,
straight legs 34a and 34b interconnected by their first
ends at an angle in the order of 140° and having their
15 second ends extending to the interconnection of pleats
26a and 26c to bottom wall 20, respectively. Strip 36
overlies strip 34 and is located on top wall 22 having
first and second, straight legs 36a and 36b
interconnected by their first ends at an angle in the
20 order of 140° and having their second ends extending to
the interconnection of pleats 26b and 26d to top wall 22,
respectively. The distance or spacing of the second ends
of legs 34a, 34b, 36a, and 36b from the second, free ends
of walls 20, 22, and 26 is greater than the distance or
25 spacing of the first ends and intersections of legs 34a,
34b, 36a, and 36b from the second, free ends of walls 20,
22, and 26. It can then be appreciated that leg 34a
adheres and seals pleat 26a to bottom wall 20, leg 34b
adheres and seals pleat 26c to bottom wall 20, leg 36a
30 adheres and seals pleat 26b to top wall 22, and leg 36b
adheres and seals pleat 26d to top wall 22. Further,
strips 34 and 36 adhere and seal bottom wall 20 to top
wall 22 at their central portions 37 intermediate the
interconnections of pleats 26a and 26b and of pleats 26c
35 and 26d.

Areas 38a, 38b, 38c and 38d are formed and defined by
the material between the free ends of walls 20, 22, and 26

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1 and strips 34 and 36 and located on the opposite side of
strips 34 and 36 forming the peelable seal than end 24,
with areas 38a, 38b, 38c, and 38d being free of adhesive
and unsealed in the preferred form. Due to the angular
5 orientation of legs 34a, 34b, 36a, and 36b, areas 38a,
38b, 38c, and 38d are of a triangular configuration.
Further, since the first ends of legs 34a, 34b, 36a, and
36b are located in the central portions 37 of bottom and
top walls 20 and 22 having widths extending beyond pleats
10 26a, 26b, 26c, and 26d and since legs 34a, 34b, 36a and
36b extend therefrom in a linear manner at an obtuse
angle to the opposite edges of pleats 26a, 26b, 26c, and
26d, areas 38a, 38b, 38c, and 38d are of a large size for
grasping by the consumer and specifically are considerably
15 larger than flaps formed by adhesive extending at small
angles relative to each other and only through the pleats
such as when a box-like shape is desired as disclosed in
U.S. Patent 5,044,777.

However, it should be appreciated that end 28 can be
20 a variety of types and configurations according to
preferred aspects of the present invention such as but
not limited to the types shown in U.S. Patent Nos.
3,973,045; 4,450,180; 4,691,374; 4,864,090; 4,973,810;
and 5,044,777.

25 Attention is now directed to a susceptor pad 30 that
extends over a portion of bottom wall 20 spaced from end
wall 24 and end 28. Susceptor pad 30 can be formed in
any suitable manner known in the art such as a metalized
plastic film adhered to bottom wall 20, as a paper backed
30 susceptor, or as a coating applied or printed to bottom
wall 20. Further, although susceptor pad 30 is shown as
overlying bottom wall 20 and thus located inside of bag
18, susceptor pad 30 can be located outside of bag 18
with bottom wall 20 overlying susceptor pad 30. Further,
35 placement of susceptor pad 30 can occur at the material
convertor or on the manufacturing lines.

It can then be appreciated that bag 18 can be
manufactured as current bags are manufactured for example

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1 of the type shown and described in U.S. Patent Nos.
4,450,180; 4,735,513; 4,878,765; 4,691,374; or 5,044,777.
In this regard, bag 18 can be formed by cutting a web of
material to length, folding that length of material to
5 form the tubular bag stock including bottom, top, and
side walls 20, 22, and 26, and then forming end wall 24
by folding and adhering bottom, top and side walls 20, 22,
and 26. It should be noted that the overlapping edges of
the web of material forming the tubular bag stock has
10 been omitted in Figures 1-3 for ease of illustration.
It should also be noted that the free, second ends of
bottom, top, and side walls 20, 22, and 26 are all of the
same length and specifically do not require any special
cuts and/or do not require extra components to form tabs
15 or flaps.

It can further be appreciated that bag 18 can be
filled with the desired food product as current bags are
filled for example of the type shown and described in
U.S. Patent 4,450,180. After filling, strips 34 and 36
20 can be adhered to walls 20, 22, and 26 utilizing standard
equipment presently utilized to form the peelable seal of
current bags. It of course should be appreciated that
the particular manner of manufacture and filling of bag
18 can be done in a variety of ways and manners such as
25 but not limited to the example set forth above.

For the sake of completeness, it will be assumed
that the contents of bag 18 are popcorn kernels and the
popped kernels have been generally indicated by the
reference numeral 40, having been popped when in the
30 microwave oven. Particularly, as with current bags, bag
18 in a collapsed condition is placed in a microwave oven
with bottom wall 20 resting upon the bottom surface of
the oven cavity. When subjected to microwave energy,
susceptor pad 30 converts microwave energy into heat,
35 with the heat and remaining microwave energy causing the
popping of the kernels and the creation of water vapor.
The water vapor and heated air cause side walls 26 to

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1 expand to extend from their connecting edges at an
angular relation to each other and the inside surfaces of
pleats 26a, 26b, 26c, and 26d being spaced from the inside
surfaces of bottom and top walls 20 and 22, expanding bag
5 18 and increasing the interior volume inside of bag 18
for popped kernels 40. It can then be appreciated that
due to its flexible nature, bag 18 will expand to a
football like shape, including separating pleats 26a and
26b and pleats 26c and 26d adjacent to the second ends of
10 bottom, top and side walls 20, 22, and 26.

According to the most preferred teachings of the
present invention, bag 18 is formed of a single layer of
greaseproof paper having a thickness allowing the single
layer to be flexed by the popping of the popcorn kernels
15 and also providing adequate greaseproof properties in
storage, transportation, or cooking throughout the thick-
ness of the paper to prevent wicking and leaking of grease
or oil through the single layer. It has been discovered
that by the selection of raw fibers as well as highly
20 refining the raw fibers in the process of making the
paper, the fibers themselves in the paper are resistant
to grease staining and gives the paper greaseproof
properties even when folded or creased. Particularly,
the highly refined fibers have less tendency to fracture
25 revealing uncoated fiber ends which absorb grease, but
rather the bonds between the fibers tend to stretch, bend,
or fracture and thus not revealing fractured fiber ends.
Specifically raw fibers selected from the group of 100%
chemical softwood pulp such as 100% bleached Kraft
30 softwoods and which are highly refined to a freeness
level in the order of 150 to 250 cubic centimeters have
been found to provide adequate greaseproof properties
when formed into paper having a basis weight of 11.5 kg.
(25 lb.)/ream to 20.5 kg. (45 lb.)/ream and in the most
35 preferred form in the order of 16 kg. (35 lb.)/ream.
In the most preferred form, bag 18 is formed of a single
layer of paper, Code No. 220-3510 produced by Rhineland
Paper Company, 515 W. Davenport Street, Rhineland,
Wisconsin 54501.

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1 Consequently, with the foregoing description in mind,
it should now be apparent that bag 18 according to the
teachings of the present invention is much more flexible
than current conventional popcorn bags because of its
5 single layer and elimination of the laminating adhesive.
Further, benefits of the single layer of paper softening
during microwave cooking due to heat and steam give bag
18 more flexibility and less stiffness. Due to this
increased flexibility, bag 18 according to the preferred
10 teachings of the present invention inflates or expands
from its collapsed, storage condition to an inflated or
expanded condition having a larger interior volume than
the same size current conventional popcorn bags, with bag
18 of the present invention allowing the popped kernels
15 to pop with greater volume.

It can further be appreciated that the single
layer forming bag 18 according to the teachings of the
present invention provides economic advantages over
current multilaminate popcorn bags by reducing the amount
20 of paper material used for each bag 18 and also by
eliminating the adhesive and the laminating steps
required in multilaminate popcorn bags. Additionally,
with the reduction in the amount of paper material used
for each bag 18 and the elimination of the laminating
25 adhesive, less package material in the form of garbage
after the consumption of the popcorn is required to be
disposed of resulting in environmental advantages over
multilaminate popcorn bags.

When the amount of paper material utilized in the
30 formation of bags 18 is minimized, whether of a
multilaminate and especially of a single-ply construction,
the consistent prevention of grease wicking and actual
leaking in the fold or creased areas is a problem. Bag
18 according to the most preferred teachings of the
35 present invention provides an added option of provisions
for built-in grease leak protection at the creases.
Particularly, in the most preferred form, grease
protectors 42a, 42b, 42c, and 42d are provided located

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1 inside of bag 18 for sealing bottom wall 20 to pleat 26a,
top wall 22 to pleat 26b, bottom wall 20 to pleat 26c,
and top wall 22 to pleat 26d, respectively, adjacent to
their respective connecting edges, with grease protectors
5 42a, 42b, 42c, and 42d sticking or joining the inside
surfaces of bottom wall 20 to pleat 26a, top wall 22 to
pleat 26b, bottom wall 20 to pleat 26c, and top wall 22
to pleat 26d, respectively, together adjacent to their
respective connecting edges. Further, in the most
10 preferred form, grease protectors 44a and 44b are
provided located outside of bag 18 for sealing pleat 26a
to pleat 26b and pleat 26c to pleat 26d, respectively,
adjacent to their respective connecting edges, with
grease protectors 44a and 44b sticking or joining the
15 outside surfaces of pleat 26a to pleat 26b and pleat 26c
to pleat 26d, respectively, together adjacent to their
respective connecting edges. In the most preferred form,
grease protectors 42a, 42b, 42c, 42d, 44a and 44b are
applied during the printing process in the form of strips
20 of preapplied heat seal adhesive on one or both sides of
the connecting edges or of strips of preapplied cohesive
on both sides of the connecting edges, such as Duraset 12,
or equivalent.

Grease protectors 42a, 42b, 42c, 42d, 44a and 44b
25 are selected to actually seal the paper forming bag 18
together just above and adjacent the connecting edges.
Grease protectors 42a, 42b, 42c, and 42d actually block
the flow of grease to the folded or creased areas of the
connecting edges, and grease protectors 44a and 44b block
30 the flow of grease away from the folded or creased areas
of the connecting edges, thus preventing grease wicking
or leaking. Further, in the preferred form, the adhesive
or cohesive forming grease protectors 42a, 42b, 42c, 42d,
44a and 44b is selected to release or peel during
35 expansion or inflation of bag 18 during microwave cooking
such that the expanded or inflated volume of bag 18 will

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1 not be reduced utilizing grease protectors 42a, 42b, 42c,
42d, 44a and 44b from the expanded or inflated volume of
bag 18 not utilizing grease protectors 42a, 42b, 42c,
42d, 44a and 44b.

5 It can then be appreciated that grease protectors
42a, 42b, 42c, 42d, 44a and 44b according to the
teachings of the present invention provide an added
grease barrier at the folded and creased areas where
grease wicking and leaking are especially a problem,
10 with grease protectors 42a, 42b, 42c, 42d, 44a, and 44b
allowing minimization of the material and/or number of
layers forming bag 18 where grease wicking and leaking
are not such a problem.

Thus since the invention disclosed herein may be
15 embodied in other specific forms without departing from
the spirit or general characteristics thereof, some of
which forms have been indicated, the embodiments
described herein are to be considered in all respects
illustrative and not restrictive. The scope of the
20 invention is to be indicated by the appended claims,
rather than by the foregoing description, and all changes
which come within the meaning and range of equivalency of
the claims are intended to be embraced therein.

What is claimed is:

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CLAIMS:

1. Package for holding a food product including grease or oil and for heating in a microwave oven comprising, in combination: a flexible bag including a
5 bottom wall, a top wall, and at least a first side wall extending between the top and bottom walls, with the top, bottom and side walls including first and second ends, with the first side wall including first and second pleats with the pleats being connected together at first edges and with
10 the first pleat having a second, opposite edge connected to the bottom wall and the second pleat having a third, opposite edge connected to the top wall, with the bag further including an end wall at the first ends of the top, bottom and side walls; susceptor means for converting
15 microwave energy into heat extending over a portion of the bottom wall spaced from the first and second ends of the bottom wall; means for closing the second ends of the top, bottom, and side walls and for allowing the consumer to open the package after microwave cooking; first means inside of
20 the bag joining the first pleat to the bottom wall adjacent to the second edge; and second means inside of the bag joining the second pleat to the top wall adjacent to the third edge, with the first and second joining means preventing the grease or oil from leaking or wicking from
25 inside the bag through the edges.

2. The package of claim 1 wherein the joining means are peelable during microwave cooking.

3. The package of claim 2 wherein the joining means comprise adhesive or cohesive applied adjacent to the edges.

30 4. The package of claim 3 wherein the bottom, top, and side walls are of paper having a thickness allowing the

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paper to be flexed by the microwave cooking of the food product.

5. The package of claim 1 further comprising, in combination: means outside of the bag joining the first
5 pleat to the second pleat adjacent to the first edges.

6. Package for holding a food product including grease or oil comprising, in combination: an expandable bag having an interior volume for holding the food product and the grease or oil and including at least first and second
10 walls connected together at first edges, with each of the first and second walls having first and second surfaces, with the bag having a collapsed condition and an expanded condition, with the interior volume of the bag increasing as the bag expands from the collapsed condition to the expanded
15 condition, with the first and second walls being folded about the first edges with the first surfaces overlying each other in the collapsed condition, with the first and second walls extending from the first edges at an angular relation to each with the first surfaces being spaced from each other
20 in the expanded condition; and means joining the first surfaces together adjacent to the first edges to prevent the grease or oil from leaking or wicking from the interior volume of the bag.

7. The package of claim 6 wherein the joining means
25 is peelable as the bag expands from the collapsed condition to the expanded condition.

8. The package of claim 7 wherein the joining means comprise adhesive or cohesive applied to one or both of the first surfaces of the first and second walls adjacent to the
30 first edges.

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9. The package of claim 7 wherein the first surfaces are inside of the bag.

10. The package of claim 7 wherein the first surfaces are outside of the bag.

5 11. The package of claim 7 wherein the bag is sealed, wherein the bag expands from the collapsed condition to the expanded condition during cooking of the food product including the grease or oil.

10 12. The package of claim 6 wherein the first and second walls have a flexibility allowing flexing of the first and second walls by the microwave cooking of the food product.

15 13. The package of claim 12 wherein the first and second walls are formed of a single layer of greaseproof paper which prevents wicking and leaking of the grease or oil through the single layer.

20 14. The package of claim 13 wherein the greaseproof paper is formed of raw fibers selected from the group of 100% chemical softwood pulp and which are highly refined, and having a basis weight in a range of about 25 lb./ream to 45 lb./ream.

FETHERSTONHAUGH & CO.

OTTAWA, CANADA

PATENT AGENTS

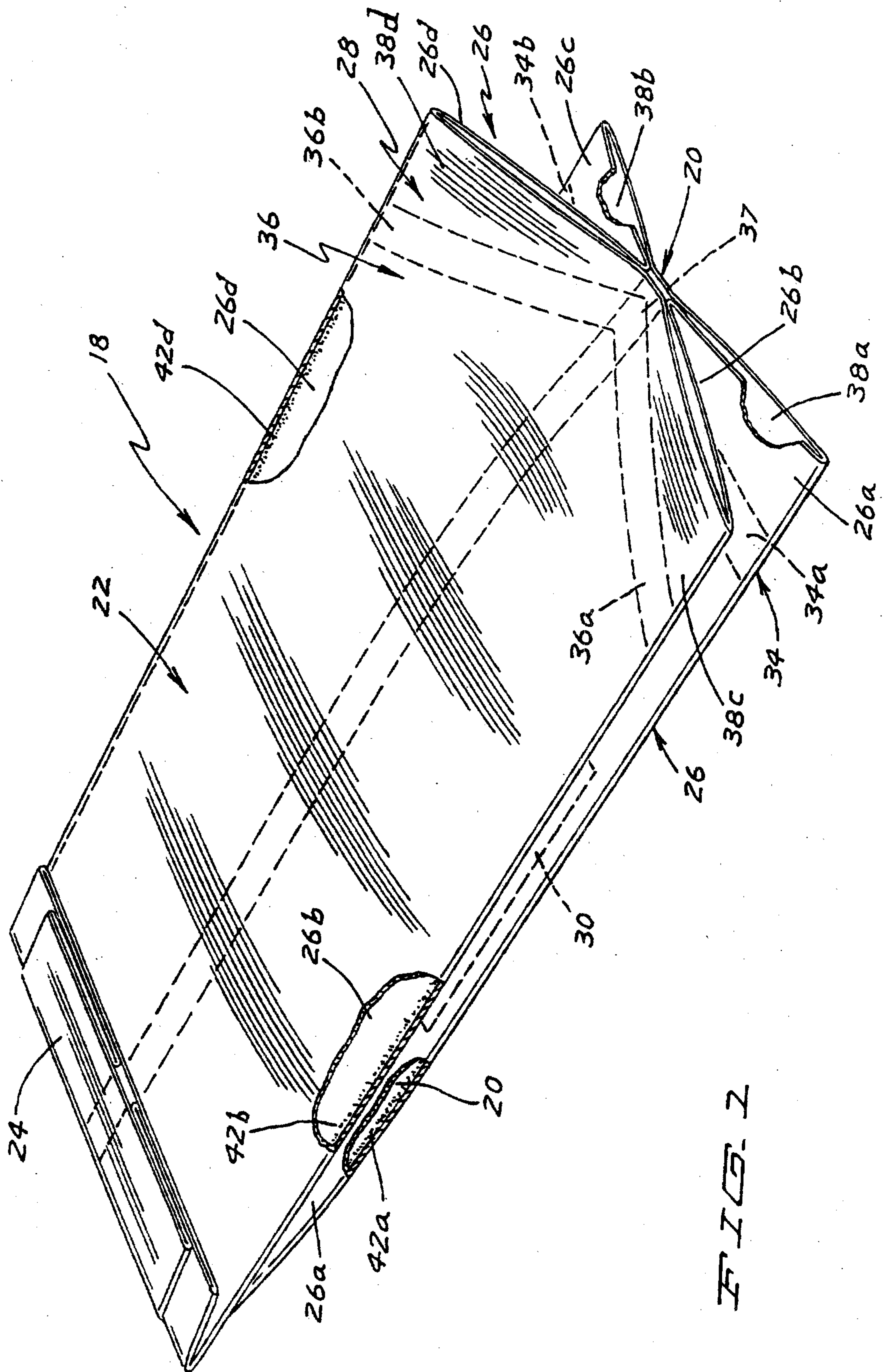


FIG. 1

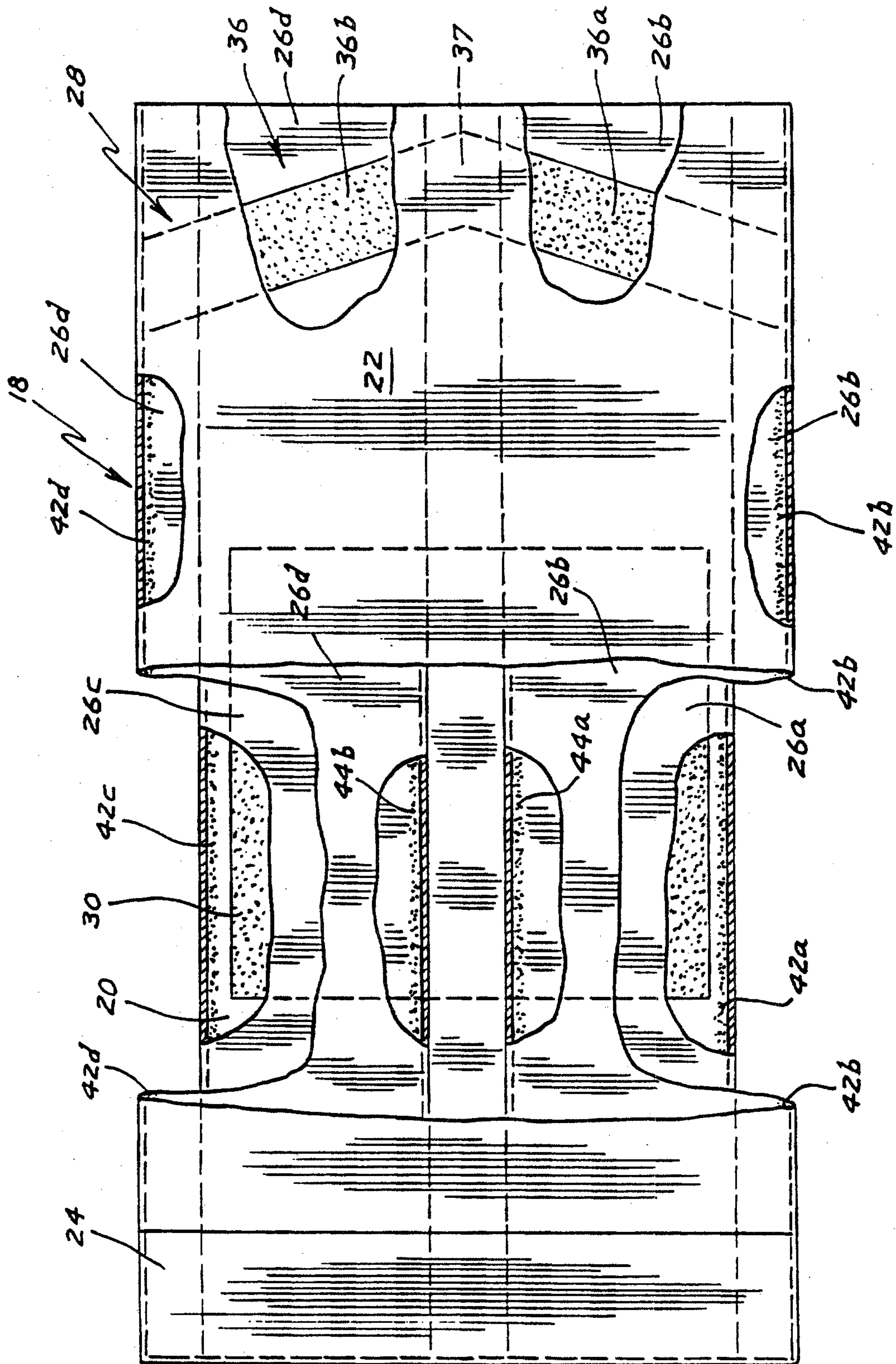
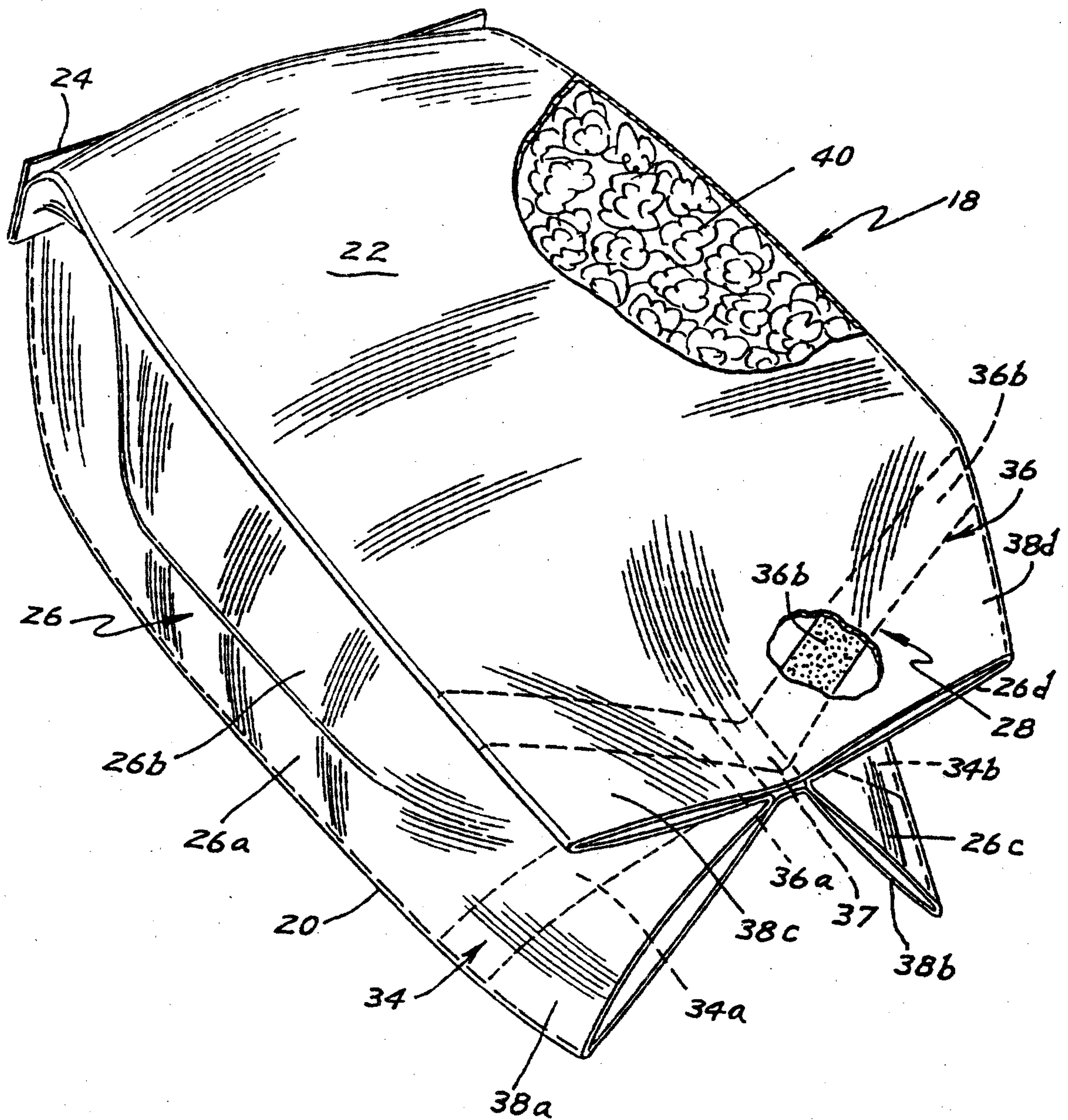
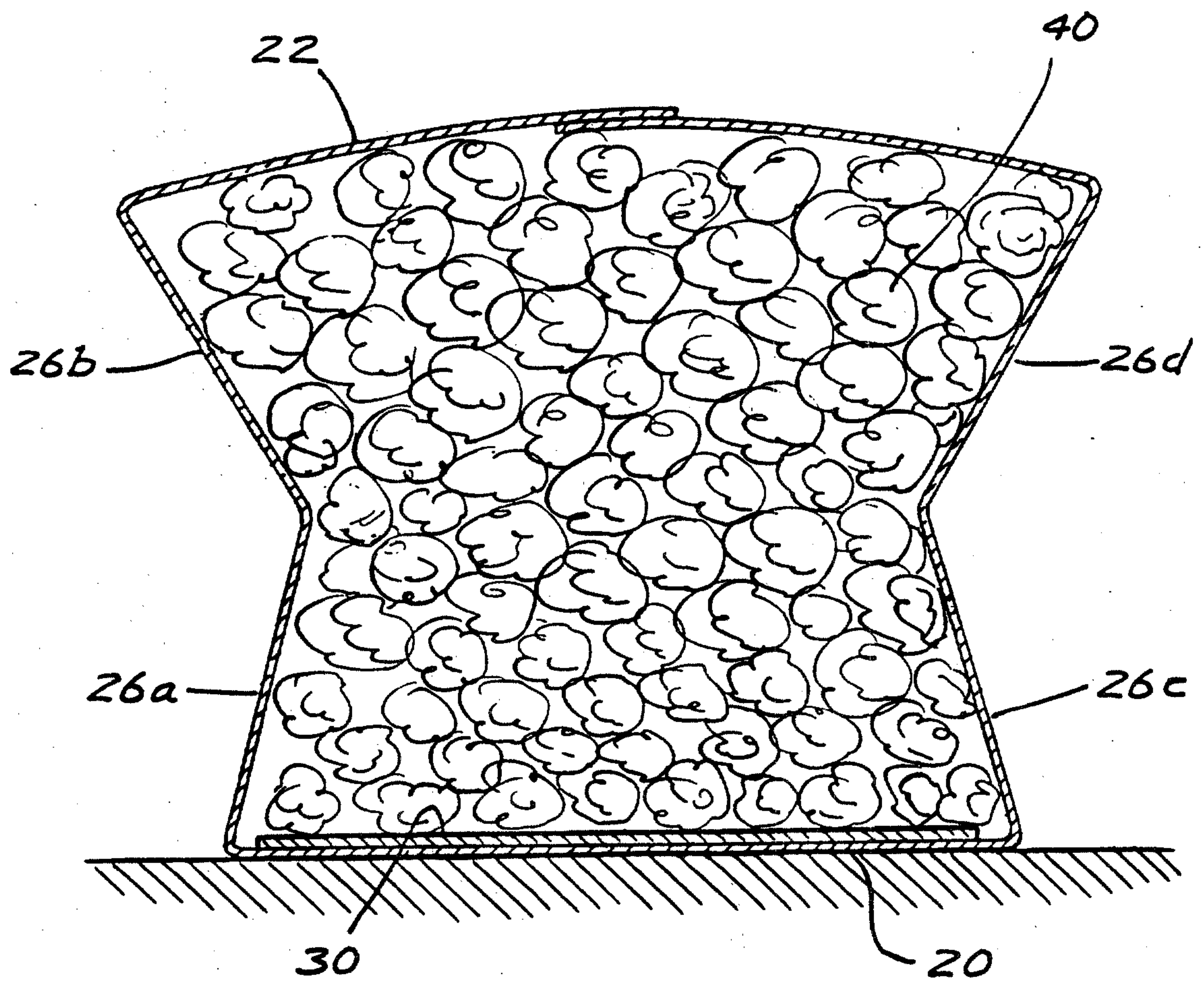


FIG. 2

**FIG. 3**

**FIG. 4**

