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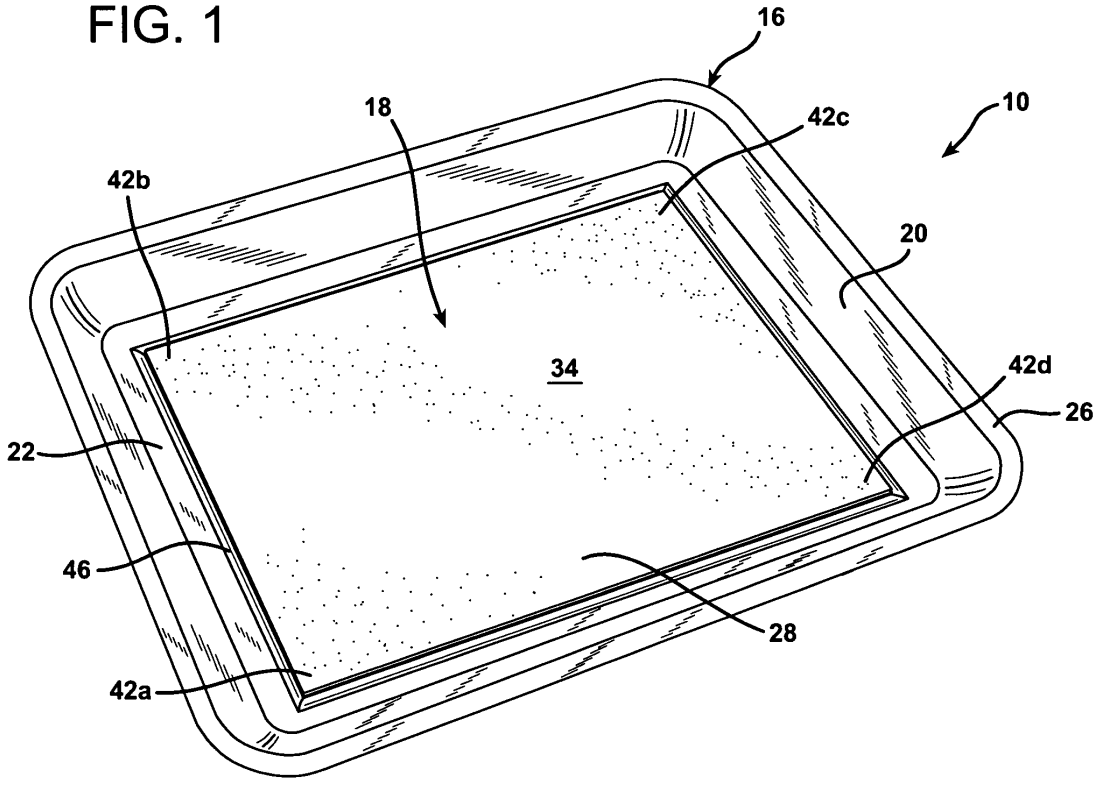
(54) Product support assembly adapted to absorb liquids exuded from a product

(57) A product support assembly (18) adapted to absorb liquids (14) exuded from a product (12) generally includes:
a. a substantially rigid support member (28) having:
1) an upper surface (34) upon which a product may be placed, and
2) an opposing lower surface (36);
b. a fluid transport layer (30) attached to the lower surface of the support member; and
c. absorbent material (32) positioned between the support member and the fluid transport layer, the absorbent material being in fluid communication with the fluid transport layer.

FIG. 1



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Description

BACKGROUND OF THE INVENTION

[0001] The present invention relates generally to the field of packaging, particularly food packaging. More particularly, the invention pertains to the packaging of food products that exude liquids, such as meat products, wherein the package contains an absorbent material for soaking up the exuded liquid. The invention is particularly directed to a product support assembly that absorbs such liquids while also providing a substantially rigid support member upon which a product may rest.

[0002] It is common practice in retail stores to display certain types of foods, such as meat, poultry and some vegetables, in individually wrapped containers. Examples of such containers are trays overwrapped or lidded by a transparent plastic film or transparent bag. The use of these types of packages offers the advantage to the consumer of seeing and inspecting the packaged product. However, in the case of liquid containing products, such as meat or poultry, the liquids exuded from the food can create a negative visual impression on the consumer. Furthermore, the presence of these liquids in direct contact with the food product may promote the growth of bacteria inside the package. These problems have been generally overcome by the use of absorbent pads, which are introduced in the package between the product and the bottom of the container.

[0003] Such absorbent pads are well-known, and generally include a mat of an absorbent material enclosed within an envelope comprising two sheets of plastic material, which are sealed along their edges. Typically, at least one of the sheets are perforated to allow exuded liquid to enter the envelop for absorption by the absorbent material.

[0004] However, these types of absorbent pads have some disadvantages. In the case of meat products, the absorbed liquid generally has a red or pink hue, which is visible through the plastic sheets of the pad because such sheets are insufficiently opaque to prevent observation of the absorbed liquid within the pad. This is primarily due to the fact that the plastic sheets from which the pads are constructed tend to be quite thin, generally on the order of about 1 mil in thickness. Also because the sheets are so thin, the pads tend to be highly flexible. As a result, the pads conform closely to the packaged food product, and thereby adhere to the food product even when the food product is removed from its container. The customer, therefore, is generally required to physically peel the pad from the surface of the food product. Both of the foregoing factors create a negative impression on many consumers.

[0005] In addition, it is often desired to automate the insertion of the pads into the trays, i.e., prior to loading the food product into the trays. Due to the high degree of flexibility of the pads, however, such automated insertion is difficult, requiring complex and expensive pad-insertion machinery to correctly position the pads in the bottom of the tray. Even with relatively sophisticated pad-insertion machinery, the edges of the pads still tend to fold under or over the rest of the pad because of their flexibility, which reduces the efficacy of the pad.

[0006] Accordingly, there is a need in the art for an improved absorbent pad, which will resist adherence to the packaged food product, enable easier and cheaper automated insertion of the pad into food trays, and more effectively hide the absorbed liquid exudate from the consumer.

SUMMARY OF THE INVENTION

[0007] That need is met by the present invention which provides a product support assembly adapted to absorb liquids exuded from a product, comprising:

a. a substantially rigid support member having

1) an upper surface upon which a product may be placed, and
2) an opposing lower surface;

b. a fluid transport layer attached to the lower surface of the support member; and
c. absorbent material positioned between the support member and the fluid transport layer, the absorbent material being in fluid communication with the fluid transport layer.

[0008] The product support assembly may be positioned in or on a tray to form a package base, which is also disclosed.

BRIEF DESCRIPTION OF THE DRAWINGS

[0009]

FIG. 1 is a perspective view of a package base in accordance with the present invention, including a tray and a

product support assembly positioned within the tray;

FIG. 2 is an exploded perspective view of the package base shown in FIG. 1, showing the optional inclusion of reinforcement structures in the bottom of the tray;

FIG. 3 is an exploded, cross-sectional view of a package base as shown in FIGS. 1-2, without reinforcement structures in the bottom of the tray;

FIG. 4 is a partial cross-sectional view of the package base shown in FIG. 3, further including a food product that exudes liquids; and

FIG. 5 is a partial cross-sectional view of a package base similar to that shown in FIG. 4, except that the tray includes reinforcement structures.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

[0010] A package base 10 in accordance with the present invention is illustrated in the drawings. Package base 10 may advantageously be used to package a product 12 that exudes liquids 14 (FIGS. 4-5). Such products may include various foods such as, e.g., fresh red meat products (e.g., beef, veal, lamb, pork, etc.), poultry (chicken, turkey, etc.), fish, produce (fruits and vegetables), etc.

[0011] As shown, package base 10 generally includes a tray 16 and a product support assembly 18. As will be explained in further detail below, product support assembly 18 is adapted to absorb exuded liquids 14 from product 12.

[0012] Tray 16 may include side walls 20 and a bottom 22 as shown. Side walls 20 and bottom 22 define a cavity 24 in which product 12 may be contained. Tray 16 may further include a peripheral flange 26 extending outwardly from the side walls 20, which provides a surface to which a lidding film may be attached, e.g., by heat-sealing the film to the flange, in order to enclose the product within the tray cavity 24. Alternatively, the tray may be over-wrapped by a film, in which case the film is secured at the underside of the tray-bottom, or placed in an over-wrap bag. In the latter two instances, flange 26 may be unnecessary. Tray 16 can have any desired configuration or shape, e.g., rectangular, round, oval, etc. Similarly, flange 26 may have any desired shape or design.

[0013] As a further alternative, tray 16 may simply be a flat sheet. In this embodiment, a lidding film may be attached, e.g., heat-sealed, to the edges of the sheet-like tray to enclose the product, or the tray/product may be over-wrapped.

[0014] In FIGS. 2 and 5, an alternative form of tray 16 is illustrated, which contains reinforcement structures in the bottom 22. This alternative tray is designated by the reference numeral 16' and is described in further detail below. For convenience, trays 16 and 16' will be collectively referred to as "tray 16," except as otherwise noted.

[0015] Suitable materials from which tray 16 can be formed include, without limitation, polyvinyl chloride, polyethylene terephthalate, polystyrene, polyolefins such as high density polyethylene or polypropylene, paper pulp, nylon, polyurethane, etc. The tray may be foamed or non-foamed as desired.

[0016] When product 12 is an oxygen-sensitive food product, both the tray 16 and lidding or over-wrap film preferably provide a barrier to the passage of oxygen therethrough. In this case, a material that provides a barrier to the passage of oxygen would preferably be included in both the tray and lidding or over-wrap film, e.g., vinylidene chloride copolymer, nylon, polyethylene terephthalate, ethylene/vinyl alcohol copolymer, etc. In the case of a foam tray, oxygen-barrier functionality may be provided in the form of a film, which may be laminated to the inner or outer surface of the tray, and which includes an oxygen barrier material. Suitable films in this regard are described in U.S. Patent Nos. 4,847,148 and 4,935,089, and in EP 0 707 955 A1.

[0017] If package base 10 is to be used to form a vacuum-skin package, substantially no gasses will be present in cavity 24 because substantially all gas will be evacuated prior to the application of a lidding film. Alternatively, when package base 10 is used to form a modified-atmosphere package, a gas that extends the shelf-life of product 12 will be present in cavity 24, generally following the removal of air therefrom. Such gases, which replace the evacuated air, include, e.g., carbon dioxide, nitrogen, argon, carbon monoxide, etc., and mixtures of such gases, such as a mixture of carbon dioxide and nitrogen.

[0018] As shown most clearly in FIGS. 2-5, product support assembly 18 includes a substantially rigid support member 28, a fluid transport layer 30, and absorbent material 32. Support member 28 has an upper surface 34 and an opposing lower surface 36. The terms "upper" and "lower" are used merely to provide a frame of reference. That is, the upper surface does not necessarily have to be positioned at a higher elevation than the lower surface. For example, in some retail display cases, the package base 10 will be positioned at an angle relative to horizontal. Moreover, upper and lower surfaces 34, 36 to not necessarily have to be parallel to one another, as shown in the drawings.

[0019] In accordance with the present invention, product 12 is placed on upper surface 34 while fluid transport layer 30 is attached to lower surface 36. Absorbent material 32 is positioned between support member 28 and fluid transport layer 30, with the absorbent material 32 being in fluid communication with fluid transport layer 30.

[0020] By being substantially rigid, support member 28 preferably is capable of supporting a product without significant deformation. An example of significant deformation would be if the support member 28 conformed so closely to product 12 that it attached itself to the product such that, upon removal of the product from the package, the entire product

support assembly 18 is pulled from tray 16 due to the adherence of support member 28 with the product. A substantially rigid support member 28 is also beneficial because it provides dimensional stability to the entire product support assembly 18, which greatly facilitates automated insertion of the assembly 18 into trays. Relatively simple insertion machinery may thus be employed. For example, such machinery needs no mechanism to prevent the edges of the product support assembly 18 from folding or curling under or over the rest of the assembly, as is required when conventional, highly-flexible absorbent pads are automatically inserted into trays.

[0021] A useful measurement to quantify the rigidity of the support member 28 is the "effective stiffness factor," which is calculated in accordance with equation (I) below:

$$(I) \qquad S = Fh^3,$$

wherein,
"S" is the effective stiffness factor of the support member 28;
"F" is the flexural modulus of the material from which the support member 28 is constructed, as determined in accordance with ASTM D790;and
"h" is the thickness of the material from which the support member 28 is constructed.

[0022] When the support member 28 comprises a foam sheet, the flexural modulus "F" is determined in accordance with the following equation (II):

$$(II) \qquad F = (D_r)^2 F_p,$$

wherein,
"Dr" is the relative density of the foam, calculated in accordance with equation (III) below; and
"Fp" is the flexural modulus of the polymer from which the foam is made.

$$(III) \qquad D_r = D_f / D_p,$$

wherein,
"D_f" is the density of the foam; and
"Dp" is the density of the polymer from which the foam is made.

[0023] The effective stiffness factor for three different materials were calculated; the results are set forth in Table 1.

TABLE 1

Support Member	**H** (in)	**h^3** (in^3; $x10^{-6}$)	**D_f** (g/cc)	**D_p** (g/cc)	**D_r**	**D_r^2**	**Fp** (psi; $x10^3$)	**F** (psi; $x10^3$)	**S** (in-lb; $x10^{-3}$)
PP Foam; 16 mils	.016	4.1	.3	.905	.33	.11	200	22	90.2
PS Foam; 30 mils	.03	27	.1	1.04	.1	.01	400	4	108
HDPE Film; 3 mils	.003	.027	--	--	--	--	--	150	4

[0024] In Table 1, the flexural modulus values were obtained from "Modern Plastics' Encyclopedia '99," using approximate mid-point values from the range of values listed, as representative of typical flexural modulus values for the polymers set forth in Table 1.

[0025] Each of the support members described in Table 1 are suitably rigid for purposes of the present invention as discussed hereinabove. In contrast, films made from LDPE having a thickness of 1 mil (0.001 inch) and HDPE having a thickness of 2 mils (0.002 inch) are insufficiently rigid to provide the present invention with all of the desired beneficial features when employed as a support member 28. Using the formulae above, the 1 mil LDPE film was determined to

have an effective stiffness factor of 0.075 x 10^{-3} in-lb.; the 2 mil HDPE film had an effective stiffness factor of 1.2 x 10^{-3} in-1b. However, as noted above, an HDPE film having a thickness of 3 mils and an effective stiffness factor of 4 x 10^{-3} in-1b is sufficiently rigid. Accordingly, many embodiments of the present invention will advantageously employ a support member 28 having an effective stiffness factor of at least 4 x 10^{-3} in-lb.

[0026] Moreover, most embodiments of the present invention will include a support member 28 constructed from foam sheets and/or films having a thickness of at least 3 mils. Suitable resins for such foams and/or films include various thermoplastic polymers, e.g., polyethylene homopolymer or copolymer, polypropylene homopolymer or copolymer, etc. Non-limiting examples of suitable thermoplastic polymers include polyethylene homopolymers, such as low density polyethylene (LDPE) and high density polyethylene (HDPE), and polyethylene copolymers such as, e.g., ionomers, EVA, EMA, heterogeneous (Zeigler-Natta catalyzed) ethylene/alpha-olefin copolymers, and homogeneous (metallocene, single-cite catalyzed) ethylene/alpha-olefin copolymers. Ethylene/alpha-olefin copolymers are copolymers of ethylene with one or more comonomers selected from C_3 to C_{20} alpha-olefins, such as 1-butene, 1-pentene, 1-hexene, 1-octene, methyl pentene and the like, in which the polymer molecules comprise long chains with relatively few side chain branches, including linear low density polyethylene (LLDPE), linear medium density polyethylene (LMDPE), very low density polyethylene (VLDPE), and ultra-low density polyethylene (ULDPE). Various other polymeric materials may also be used such as, e.g., polypropylene homopolymer (PP) or polypropylene copolymer (e.g., propylene/ethylene copolymer), polyesters, polystyrenes (PS), polyamides, polycarbonates, polyurethanes, etc.

[0027] Suitable films may be monolayer or multilayer and can be made by any known extrusion process by melting the component polymer(s) and extruding, coextruding, or extrusion-coating them through one or more flat or annular dies. If desired, physical and/or chemical blowing agents may be included with the component polymers to produce a foamed sheet.

[0028] When the support member 28 comprises a foam sheet, such sheet preferably has a thickness of at least about 5 mils.

[0029] Advantageously, support member 28 may be made sufficiently opaque to substantially prevent observation, when looking through the support member, of liquid contained within the absorbent material 32. This may be accomplished by employing sufficient thickness and/or pigmentation to achieve the desired level of opacity to hide the absorbed liquid from view. In this manner, when the product support assembly 18 remains in tray 16 upon removal of product 12, as is intended (and as facilitated by the rigidity of support member 28 as discussed above), the consumer will never have to look at, handle, or otherwise deal with the absorbed liquid in absorbent material 32.

[0030] Together, the support member 28 and fluid transport layer 30 'envelop' the absorbent material 32, and thereby keep it in a position where it is hidden from view by the support member 28. At the same time, the fluid transport layer 30 provides a means to take up exuded liquids 14 from the bottom surface 38 of tray 16, and transport such liquids to the absorbent material 32, so that the absorbent material can absorb and retain the exuded liquids. Product support assembly 18, therefore, may thus be positioned in tray 16 as shown, i.e., with fluid transport layer 30 closer than support member 28 to bottom surface 38.

[0031] Fluid transport layer 30 may be formed of any material capable of taking up and transporting the liquid exuded from the product intended to be packaged. For example, fluid transport layer 30 may comprise a material that is capable of wicking the exuded liquid, i.e., conveying the liquid by capillary action, towards the absorbent material 32. Examples of suitable materials from which the fluid transport layer 30 may be formed include woven and non-woven materials. Suitable non-woven materials include spun-bonded polyester, spun-bonded polyolefin, e.g., non-woven polypropylene or non-woven polyethylene, paper, etc. Examples of such materials include Reemay® spun-bonded polyester (polyethylene terephthalate) and Typar® non-woven spun-bonded polypropylene (also known as Tekton® non-woven spun-bonded polypropylene), both of which are available from Reemay, Inc. of Old Hickory, Tenn. Other non-woven webs include Avgol® non-woven polypropylene, obtainable from John Cleaver Associates of Aaoli, Pa., and BBA® non-woven polypropylene, obtainable from BBA, of Simpsonville, S.C. Non-woven materials are also available from Kimberly Clark.

[0032] When product 12 is a food product, the liquids will generally be water-based. Accordingly, when product support assembly 18 is used to package foods, it will generally be advantageous for the fluid transport layer 30, or at least a portion thereof, to be hydrophilic, as this will facilitate the ability of such layer to take up and convey water-based liquids. Hydrophilicity may be inherent in the material used for fluid transport layer 30 or, alternatively, it may be imparted, e.g., by treating such material with a surfactant or other substance that will increase the hydrophilicity of the material used for fluid transport layer 30. In this regard, suitable surfactants include non-ionic lubricants, anti-static agents, wetting agents, and blends thereof. Commercially-available examples include Cirracol™ PE1100 and Cirracol™ PP842 hydrophilic fiber finish, obtainable from Uniqema (see, www.uniqema.com).

[0033] Fluid transport layer 30 may be coextensive with support member 28 as shown. Furthermore, the area encompassed by product support assembly 18 preferably encompasses a majority of the bottom surface 38 of tray 16. In this manner, the fluid transport layer 30 may provide liquid take-up for exuded liquid 14 over the majority of the bottom surface 38 of tray 16. This minimizes the amount of non-absorbed liquid 14, and ensures that the fluid transport layer 30 can provide liquid take-up if the package base 10 is displayed in an angled, i.e., non-horizontal, configuration, e.g., by taking

up exuded liquid that gathers at the low corners or edges of the tray 16, which occurs when the package base is displayed at an angle.

[0034] Support member 28 and fluid transport layer 30 may be attached via any suitable means, including thermal bonding, adhesive bonding, ultrasonic bonding, and combinations thereof, to 'envelop' the absorbent material 32. Hot-melt, liquid, or pressure-sensitive adhesives may be employed. A suitable adhesive is a semi-pressure-sensitive adhesive blend based on polymeric components mixed with tackifier and a wax. A preferred primary polymeric component is an aromatically-modified C_5 petroleum hydrocarbon resin, e.g., Wingtack® 86 polymer, made by Goodyear Tire and Rubber Co, which may comprise from about 30 to about 65 percent of the total weight of the adhesive. A secondary polymeric component of the adhesive is preferably an amorphous polymerized alpha-olefin such as a propylene polymer, e.g., RT2304 1-propene polymer with ethene (present in an amount, e.g., of from about 15 to about 25 percent), made by Huntsman Corp of Salt Lake City, Utah. Alternatively, the secondary polymeric component can be RT2315 (present in an amount of from about 25 to about 35 percent), also from Huntsman. Indopol® H300 isobutylene/butene copolymer, obtained from Amoco Corporation, is a preferred tackifier, which may be present in the blend at a level of from about 1 to 5 percent. Irganox® 1010, obtained from Ciba-Geigy, of McIntosh, Ala., is a preferred antioxidant, and may be present in the blend at a level of from about 0.01 to about 0.5 percent. Irgaphos® 168 is a free radical stabilizer, obtained from Ciba-Geigy, of McIntosh, Ala., and may be present in the blend at a level of from about 0.01 to about 0.5 percent. A blend of the above polymeric components, tackifier, and antioxidant was obtained from Henkel Adhesives of Lewisville, Tex., as well as from National Starch and Chemical of Bridgewater N.J.

[0035] When adhesives are used to attach fluid transport layer 30 to support member 28, the coating weight may range from about 0.05 to about 0.5 grams/ 100 in^2. This has been found sufficient to provide bonding while not impeding the ability of the fluid transport layer 30 to wick or otherwise convey fluid in the areas where adhesive is applied.

[0036] Absorbent material 32 may comprise any material capable of absorbing and retaining exuded liquid in an amount that is at least about twice the weight of the absorbent material. For example, the absorbent material 32 may comprise at least one member selected from absorbent fibers, absorbent paper, and absorbent polymers. Thus, the absorbent material 32 may include one or more layers of tissue paper and/or wood fluff fibers. Further, the absorbent material 32 may be in the form of a mat as shown, which may be constructed from man made or natural fibers or a combination thereof, either woven or non-woven, which are secured or attached to one another. The fibers may be cellulosic and/or thermoplastic (e.g., polyolefin) fibers that are non-woven and attached to one another. Such fibers may be arranged in a juxtaposed and overlapping configuration, and secured to one another as a plurality of interacting, structurally supported fibers having spaced interstices therebetween. Such interstices not only allow the fibrous mat to absorb exuded liquids, but they may also be capable of supporting absorbent particles, e.g., absorbent polymers. Such absorbent polymeric particles may advantageously be distributed throughout the fibrous mat.

[0037] Suitable absorbent polymers may include a class of absorbent polymers known as "superabsorbent" polymers, which are generally understood to mean chemical compounds that have a liquid superabsorption capability. Some chemical compounds that have been found particularly effective as superabsorbents include carboxy-methylcellulose superabsorbent compounds and acrylic superabsorbent (acrylic acid and sodium acrylate copolymer) compounds.

[0038] An example of a suitable, commercially-available superabsorbent granule is FAVOR® -PAC 100 superabsorbent polymer, obtained from Stockhausen, Inc., of Greensboro, N.C. These granules have a particle size of 100 to 850 microns, and may be combined with a fibrous mat as described above in an amount of from about 0.1 to 50 weight percent, e.g., from about 1 to 30 weight percent.

[0039] As an alternative to superabsorbent granules, superabsorbent fibers are available. For example, polyacrylate superabsorbent fibers, each having a length of about 3 mm, are available from Technical Absorbents Ltd., under the tradename OASIS. Such fibers are disclosed in UK Patent Application 2 325 195, published Nov. 18, 1998, entitled "Absorbent Pad".

[0040] Further details regarding the absorbent material 32 which may be employed in accordance with the present invention are disclosed in U.S. Pat. No. 5,055,332, the disclosure of which is hereby incorporated herein by reference.

[0041] If desired, one or more additional layers may be included in the product support assembly 18. For example, the absorbent material 32 may be enveloped between an additional thermoplastic and/or non-woven layer and fluid transport layer 30, with the additional thermoplastic and/or non-woven layer being attached to support member 28.

[0042] Product support assembly 18 may be adhered to bottom surface 38 of tray 16. This may be achieved by applying discrete quantities of adhesive to the lower surface 40 of fluid transport layer 30. Discrete quantities, e.g., individual drops, are preferred to a continuous band of adhesive because the discrete quantities allow exuded liquid 14 to flow around the adhesive and under the fluid transport layer 30 so that layer 30 can absorb the liquid. For example, when product support assembly 18 has a square or rectangular shape as shown, a drop of adhesive, e.g., hot-melt, liquid, or pressure-sensitive adhesive, may be applied to each of the four corners 42a-d at lower surface 40 of fluid transport layer 30 (FIG. 1; adhesive not shown).

[0043] In accordance with an advantageous feature of the present invention, tray 16 may have a depression 44 in the bottom surface 38 as shown. Although not required, a depression in the bottom surface of the tray may be advantageous

by providing a low point or reservoir in which exuded liquids 14 may be collected prior to being absorbed by product support assembly 18. Such a depression 44 may also facilitate the stable placement of product support assembly 18 in the bottom 38 of tray 16, whereby, the absorbent material is accommodated within such depression.

[0044] Thus, the support member 28 of product support assembly 18 may be positioned above depression 44, with the fluid transport layer 30 and absorbent material 32 extending at least partially into the depression. Moreover, the product support assembly 18 may be adhered to bottom surface 38 outboard of depression 44, e.g., at corners 42a-d as shown. For this purpose, a step-down or shelf 46 may be provided in bottom surface 38 as shown, i.e., to provide a slightly lower surface to which the product support assembly 18 may be adhered to the tray 16.

[0045] With the foregoing configuration, support member 28 appears to the consumer as the bottom of the tray, since product 12 rests on the support member and no other components of product support assembly 18 are visible. However, unseen by the consumer, the fluid transport layer 30 and absorbent material 32 are at work absorbing exuded fluid 14 in depression 44.

[0046] The appearance of the support member 28 as the bottom of the tray may be further facilitated by constructing the support member from the same material as tray 16. Alternatively, the tray and support member may be constructed from materials that are similar in appearance, e.g., two different foams that have the same or similar color.

[0047] If desired, tray 16 may further include reinforcement structures 48 in depression 44. A tray containing such reinforcement structures is illustrated in FIGS. 2 and 5, and designated by the reference numeral 16'. Reinforcement structures 48 may take the form of 'dimples' as shown in FIGS. 2 and 5 or, alternatively, may be formed as ribs, pyramids, mesas, etc. Such reinforcement structures may be useful in supporting the product support assembly 18 when swollen with absorbed liquid, as shown in FIG. 5.

EXAMPLES

Example 1

[0048] Polystyrene (PS) foam was extruded to a density of about 0.08 g/cc and 15 mil thickness, to serve as the support member. A laminated product support assembly was then made by the following steps:

1. Sprayed the bottom surface of foam with thin layer of hot melt adhesive (same composition as described hereinabove).
2. Placed a mat of absorbent material (cellulose fibers and superabsorbent polymer particles) onto glued surface of foam, leaving exposed areas of adhesive around the perimeter of the absorbent material.
3. Applied a surfactant-treated non-woven material (from BBA) to the underside of the foam.
4. Ran the above combination between two nip rollers, while the hot melt was still molten, to compress the non-woven material and the foam support member together to cause them to adhere to each other at the exposed adhesive areas outside the perimeter of the absorbent material.
5. Trimmed the non-woven material so the edges thereof were coextensive with the foamed support member.

Example 2

[0049] Product support assemblies made per the above process were saturated with a 0.9% saline solution. The following data was obtained:

	Dry weight	Weight Absorbed
Sample 1	23 g	162 g
Sample 2	6.4 g	51.6 g
Sample 3	13.7	184.2 g

[0050] Sample 1 had outside dimensions of 11 3/4 x 7 inches. On this assembly, the absorbent mat composite had dimensions of 10 ¼ x 5 inches.

[0051] Samples 2 and 3 had outside dimensions of 5 1/4 x 7 3/8 inches. The absorbent mat composite had dimensions of 4 3/8 x 6 ¼ inches. The absorbent mat composite for Sample 3 had 7.3 more grams of superabsorbent polymer particles than the absorbent mat for Sample 2.

Example 3

[0052] Trays were made from 0.08 g/cc PS foam, about 1.8 inch thick, using a mold that had geometry to produce a

depression in the bottom of the tray. Product support assemblies as described in Example 1 were then adhered to the bottom of the trays using a drop of hot melt adhesive at each corner of the assembly to thereby make a package base.

[0053] Package bases made by the above procedure were made using "No. 3" and "No. 6" trays, which are standard-sized trays used in the meat packaging industry, with appropriately-sized product support assemblies. These were tested by inserting a 0.2% saline solution into the package bases. The package base with the No. 3 tray absorbed 76 grams of the 0.2% saline solution while the package base using the No. 6 tray absorbed 136 grams of the 0.2% solution.

Example 4

[0054] Package bases as described in Example 3 were evaluated by placing cut up chicken parts on the support member, and allowing them to sit for 24 hours. The chicken parts were then removed so that the package bases could be evaluated. No standing liquid from the chicken was present in the package bases, which means that all of the exuded liquid was absorbed by the product support assembly. Further, the absorbed liquid was not visible, except for a slight pink hue around the edges of the product support assembly. The product support assembly did not adhere to the chicken.

[0055] The foregoing description of preferred embodiments of the invention has been presented for purposes of illustration and description. It is not intended to be exhaustive or to limit the invention to the precise form disclosed, and modifications and variations are possible in light of the above teachings, or may be acquired from practice of the invention, without departing from the scope of the claims which follow.

Claims

1. A product support assembly adapted to absorb liquids exuded from a product, comprising:

   a. a substantially rigid support member having

      1) an upper surface upon which a product may be placed, and
      2) an opposing lower surface;

   b. a fluid transport layer attached to the lower surface of said support member; and
   c. absorbent material positioned between said support member and said fluid transport layer, said absorbent material being in fluid communication with said fluid transport layer.

2. The product support assembly of claim 1, wherein said support member has an effective stiffness factor of at least 4×10^{-3} in-1b.

3. The product support assembly of claim 1 or 2, wherein said support member comprises at least one member selected from foam sheets and films having a thickness of at least 3 mils.

4. The product support assembly of claim 3, wherein said support member comprises a foam sheet having a thickness of at least 5 mils.

5. The product support assembly of any one of the preceding claims, wherein said support member is sufficiently opaque to substantially prevent observation, through said support member, of liquid contained within said absorbent material.

6. The product support assembly of any one of the preceding claims, wherein said fluid transport layer comprises a non-woven material.

7. The product support assembly of any one of the preceding claims, wherein said fluid transport layer is coextensive with said product support member.

8. The product support assembly of any one of the preceding claims, wherein said absorbent material comprises at least one member selected from absorbent fibers, absorbent paper, and absorbent polymers.

9. A package base for a product that exudes liquids, comprising a tray and a product support assembly according to any one of the preceding claims positioned in or on the tray.

10. The package base of claim 9, wherein:

said tray comprises a bottom surface; and
said product support assembly is adhered to said bottom surface.

11. The package base of claim 9, wherein:

said tray comprises a bottom surface having a depression therein; and
the support member of said product support assembly is positioned above said depression.

12. The package base of claim 11, wherein said tray further comprises reinforcement structures in said depression.

13. The package base of claim 11 or 12, wherein said product support assembly is adhered to said bottom surface outboard of said depression.

14. The package base of any one of claims 9-13, wherein said tray and said support member are constructed from materials that are the same or similar in appearance.

15. A method of making a product support assembly, which is adapted to absorb liquids exuded from a product, comprising:

a. providing a substantially rigid support member having

1) an upper surface upon which a product may be placed, and
2) an opposing lower surface;

b. attaching a fluid transport layer to the lower surface of said support member; and
c. positioning absorbent material between said support member and said fluid transport layer such that said absorbent material is in fluid communication with said fluid transport layer.

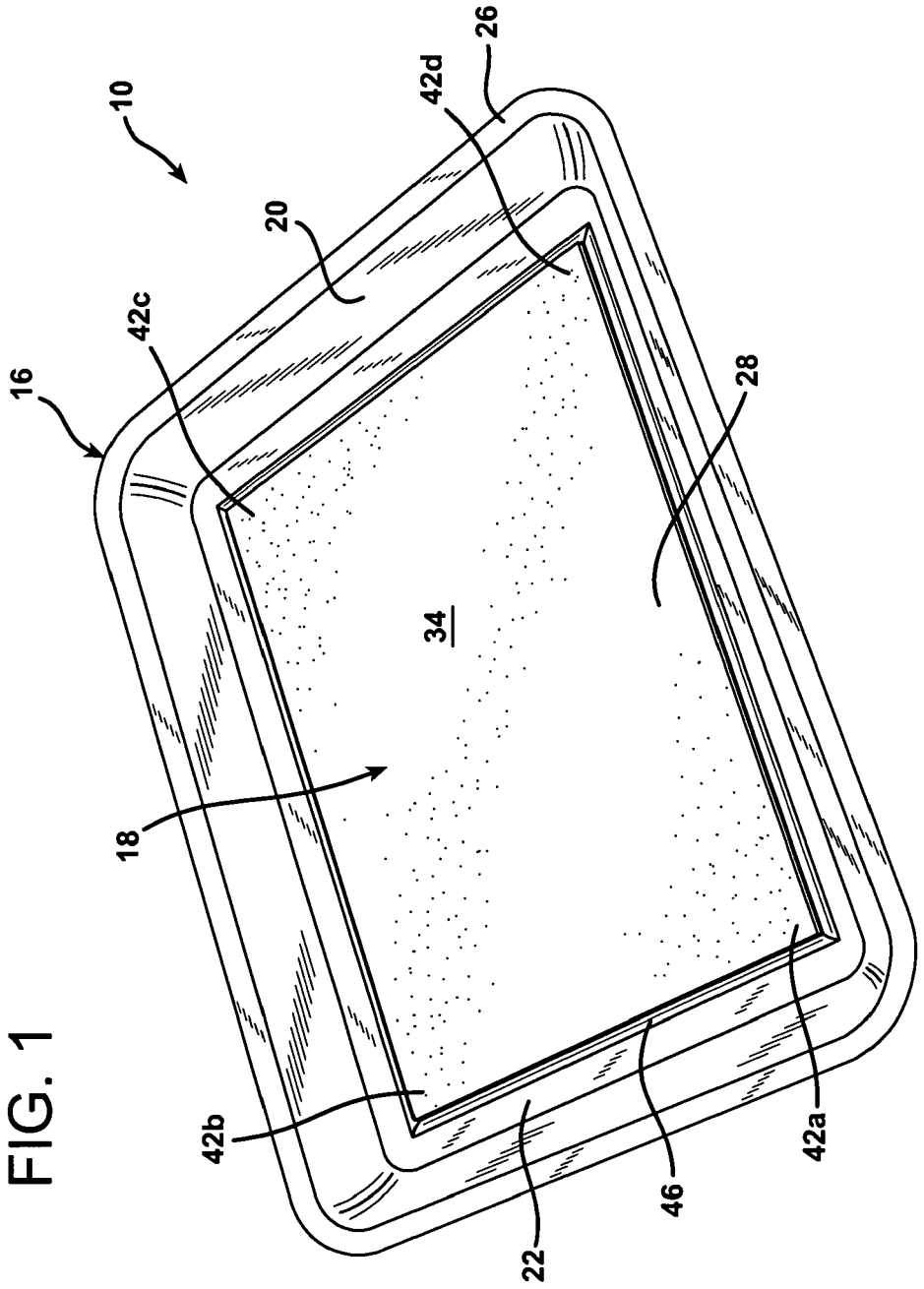


FIG. 1

FIG. 2

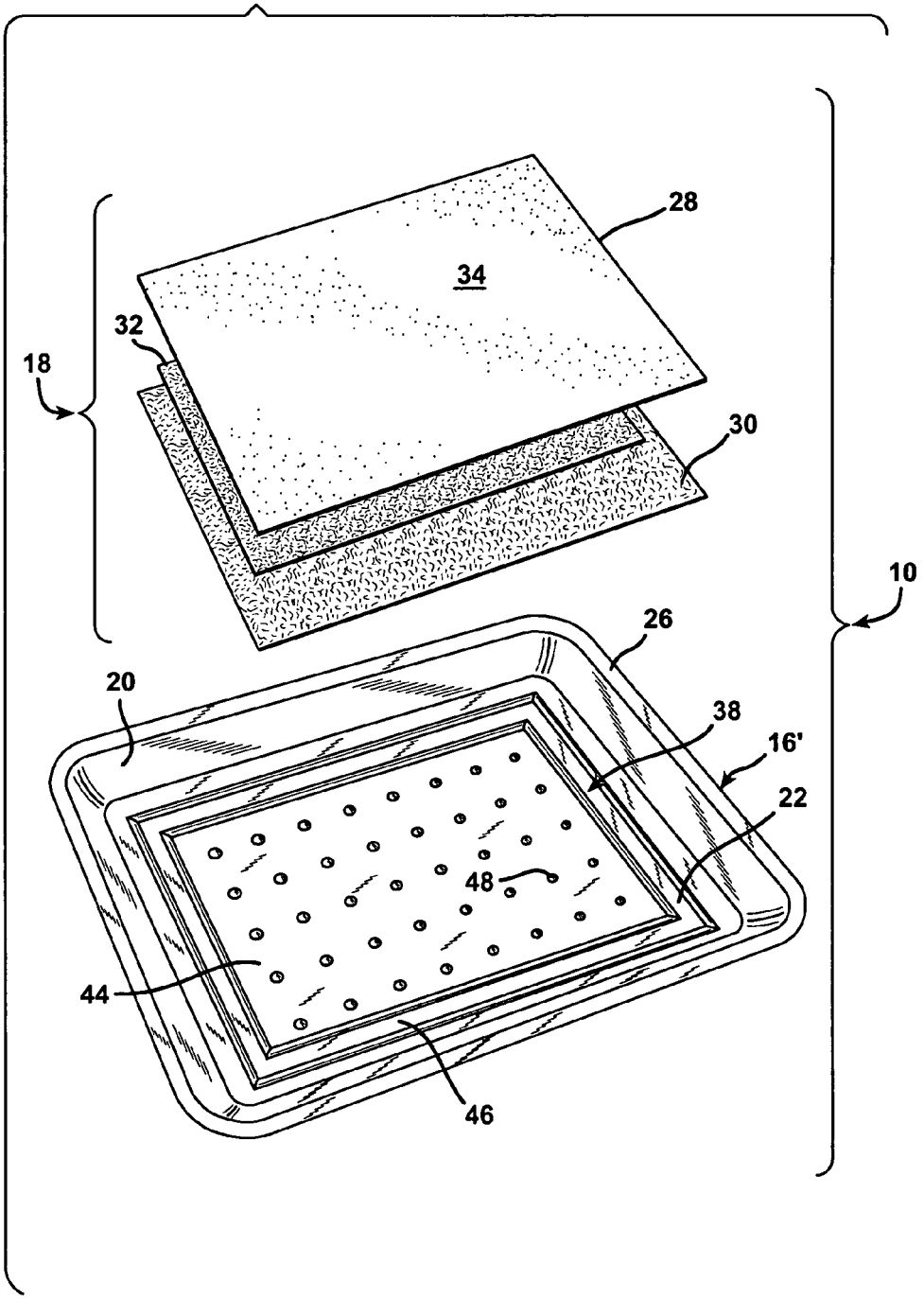


FIG. 3

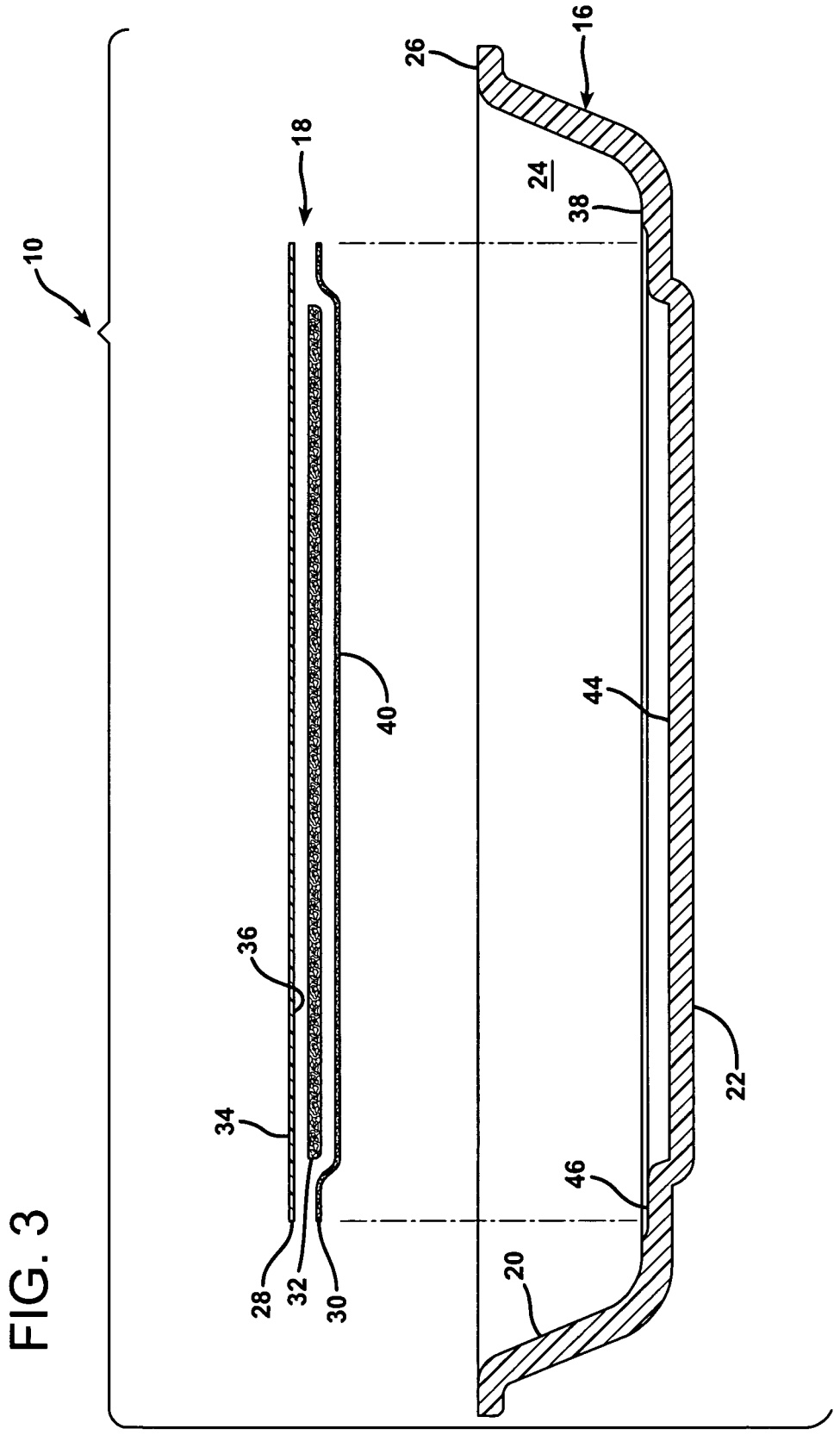


FIG. 4

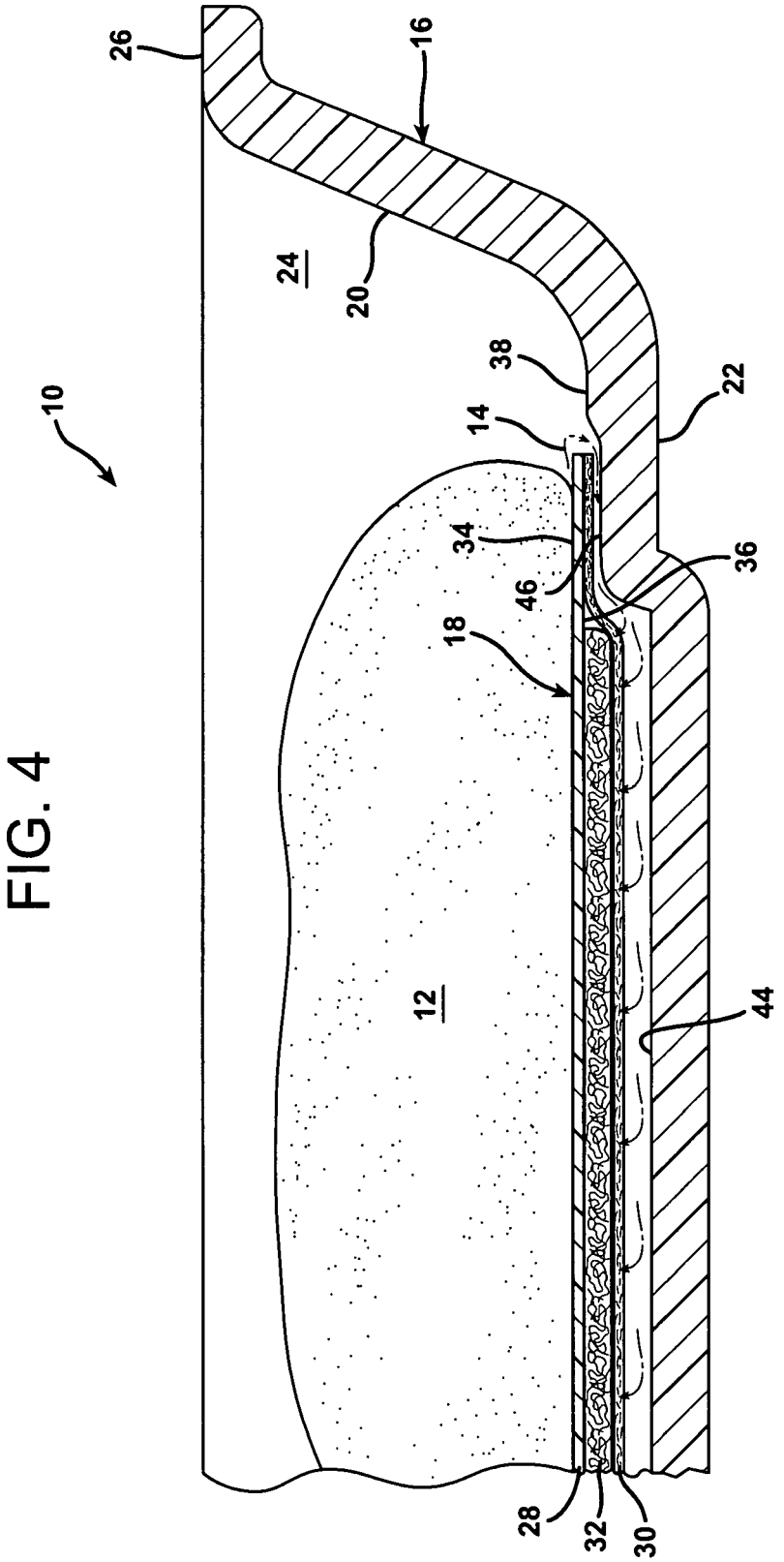
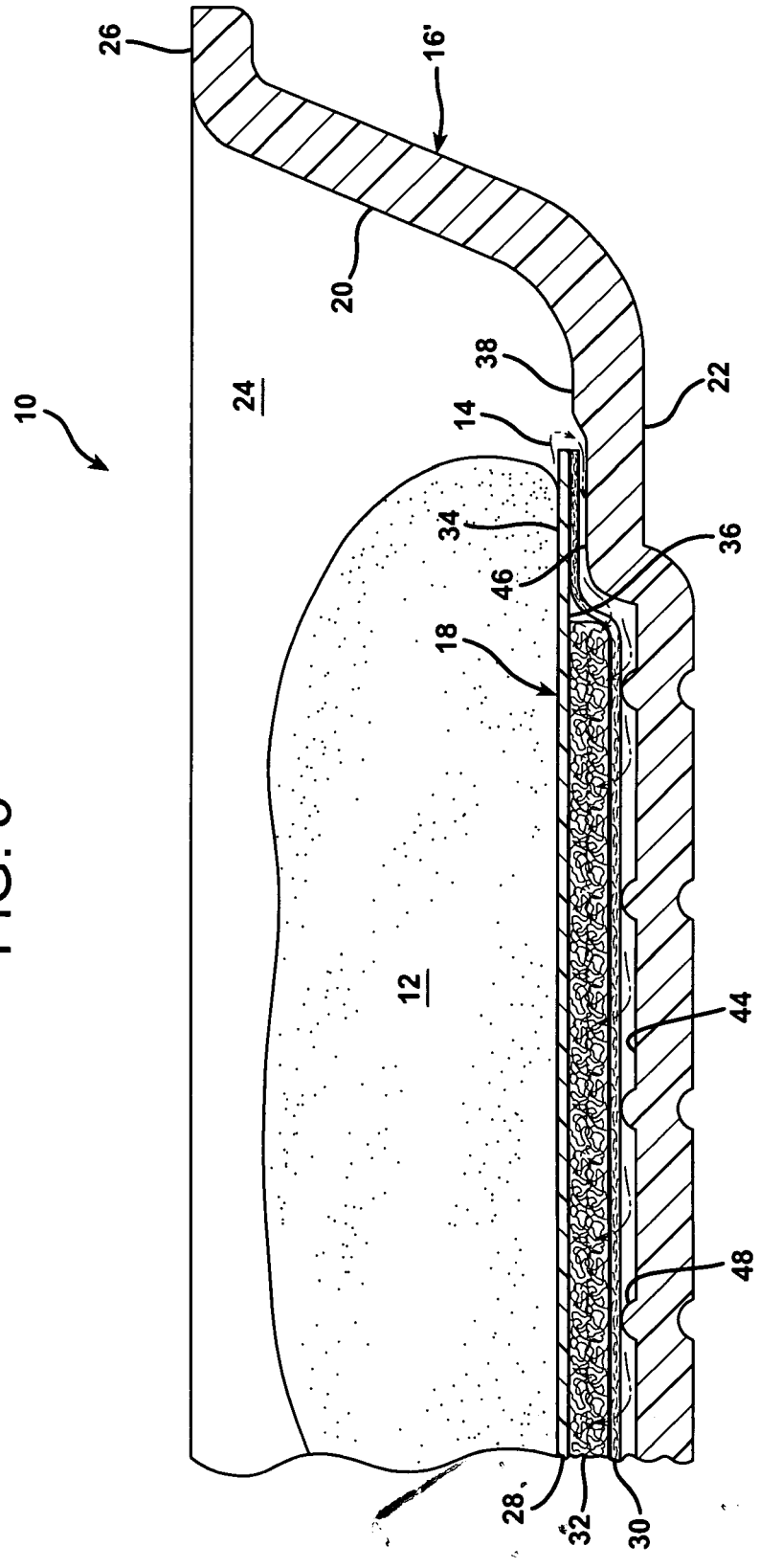


FIG. 5



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