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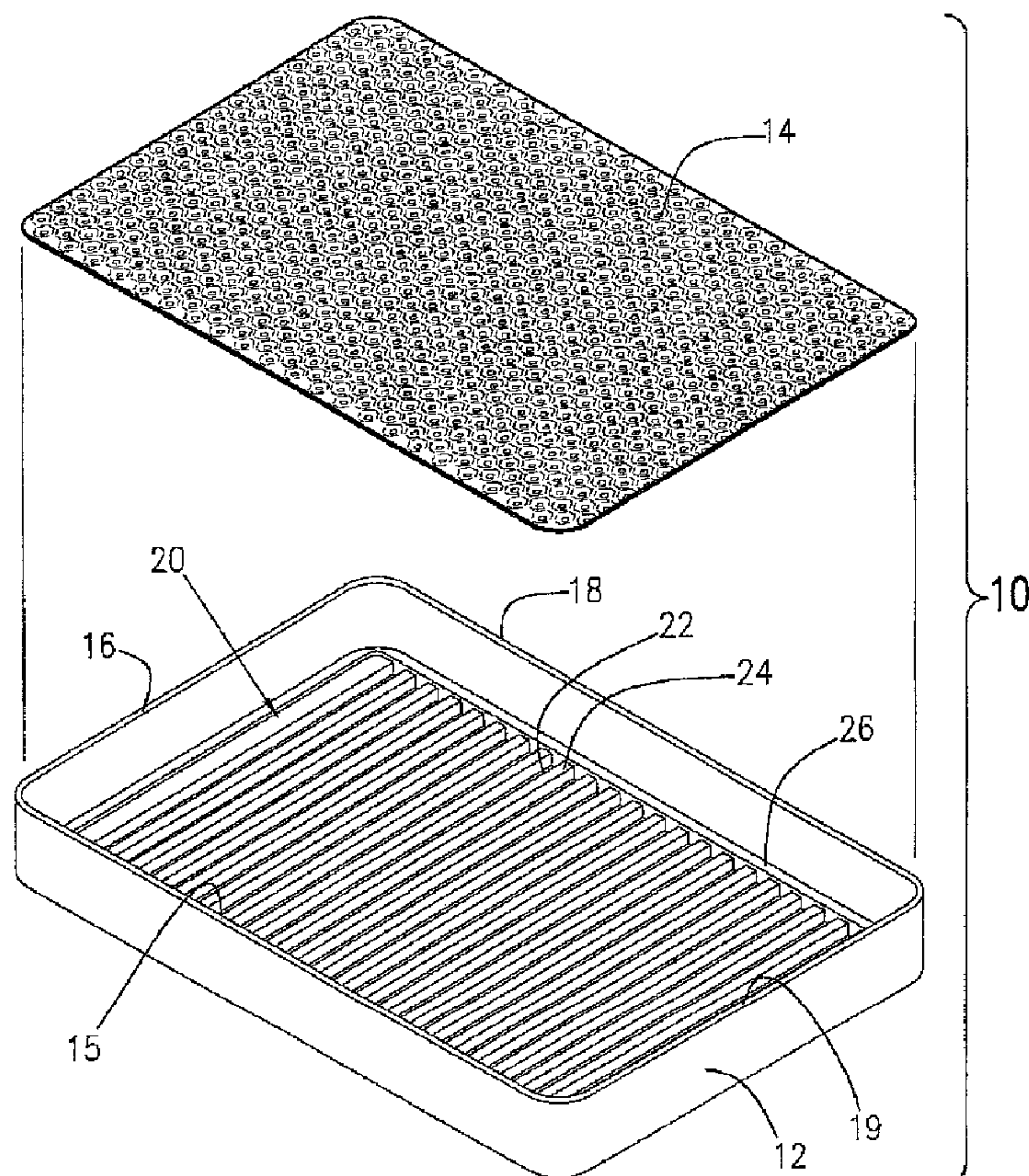
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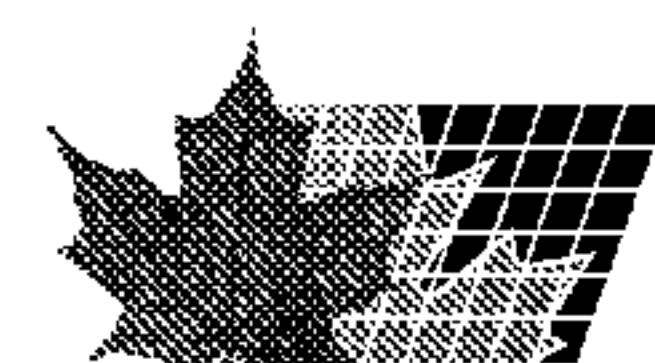
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(54) Title: FOOD PACKAGING SYSTEM FOR EXTENDED SHELF LIFE



(57) Abrégé/Abstract:

A packaging system for perishable food products, especially for meat products discharging residual blood and other natural fluids, comprising a tray and an outer tray closure film spanning the perimeter of the tray, wherein the tray possesses structural features



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

for transmission of draining fluids away from the meat product extending the shelf-life of the packaged meat while avoiding the usual "browning" appearance. Instead, the natural redness and appetizing appearance or "bloom" properties of the meat product are maintained for enhanced customer acceptance. The outer film preferably incorporates at least a sufficient amount of a biostatic and/or biocidal agent. The tray includes an elevated meat supporting porous film, and a reservoir below the porous film for collecting descending fluids. The descending fluids are managed by a series of elevations and lower channels for collection/retaining the fluids in supporting relationship with the porous film.

ABSTRACT

A packaging system for perishable food products, especially for meat products discharging residual blood and other natural fluids, comprising a tray and an outer tray closure film spanning the perimeter of the tray, wherein the tray possesses structural features for transmission of draining fluids away from the meat product extending the shelf-life of the packaged meat while avoiding the usual “browning” appearance. Instead, the natural redness and appetizing appearance or “bloom” properties of the meat product are maintained for enhanced customer acceptance. The outer film preferably incorporates at least a sufficient amount of a biostatic and/or biocidal agent. The tray includes an elevated meat supporting porous film, and a reservoir below the porous film for collecting descending fluids. The descending fluids are managed by a series of elevations and lower channels for collection/retaining the fluids in supporting relationship with the porous film.

FOOD PACKAGING SYSTEM FOR EXTENDED SHELF LIFE

FIELD OF THE INVENTION

[0001] This invention relates generally to food trays and packaging systems often used by retailers in displaying perishable foodstuffs. More specifically, the invention relates to food packaging trays and packaging systems which can incorporate biocidal/biostatic agents to extend the shelf life of perishable food items, such as meat, fish and poultry, and which comprise structural features for enhanced drainage and separation of natural fluids away from such foods to extend both shelf-life and appetizing appearance for better customer acceptance.

BACKGROUND OF THE INVENTION

[0002] Packaging systems are known in the art for displaying foodstuff by retailers, such as fresh meat, fish and poultry, all of which continue to drain residual natural fluids, such as blood, water and other fluids after being packaged. These packaging systems are often intended for maintaining the freshness and appetizing appearance of uncooked and cooked meat, fish, poultry and other perishable items.

[0003] Packaging systems are known in the art which include a base tray and an outer wrapper, for example. Meat, fish and poultry products often packaged in such disposable trays, however, usually continue to exude natural fluids and juices after being placed in display cases by retailers. Customer acceptance of such products is usually dependent on maintaining an appetizing appearance of the packaged food products. Fresh meat products, for example, packaged in such trays are often in direct contact with fluid absorbent pads. Consequently, such packaging methods provide more limited shelf lives and reduced customer acceptance because of the unsightly appearance of the meat product disposed in the residual fluids and the browning effect due to bacteria acting on proteins. Also, a build-up of liquid in the package can spill when the meat product is unpacked or if the package is damaged in transit. To remedy such problems, packaging systems have been developed, such as disclosed in patent applications: EP-A-0 182 139, GB-A-1 168925 and EP-A-0 544 562; in patents: FR 2 688 474 and JP 06239351 A; in utility model DE 9013898.8; and US 5,833,894.

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1 [0004] Other perishable food packaging systems relating to managing drainage fluids have
2 been disclosed in US Pats. 4,576,278; 4,949,897; US 5,655,708; and, in FR 2 782 985 – A1.
3 Such methods have proven to be somewhat effective in maintaining a temporary separation of
4 drainage fluids from meat products, but are often ineffective in preventing fluids from
5 recontacting the packaged meat product during transport after purchase or during shipping.

6 [0005] Such methods have failed to provide a substantial increase in the shelf-life of meat
7 products. Microorganisms on the surface of the meat tend to discolor fresh meat products
8 resulting in a loss of appetizing redness or “bloom”. As the drainage fluid is removed from the
9 meat product by an absorbent pad, for example, potentially harmful microorganisms may
10 develop. As the package is moved on product shelves or at the checkout counter drainage fluids
11 containing microorganisms can be returned back to the surface of the meat product. Further,
12 packaged meat products may reabsorb drainage fluids, causing recontamination of the packaged
13 meat product. In sum, many of the earlier packaging systems failed to effectively manage liquid
14 drainage from fresh meat products for extending shelf-life and maintaining the desired appetizing
15 appearance often critical for customer acceptance.

16 [0006] Accordingly, there is a need for an improved packaging system for extending the
17 shelf life of fresh and cooked perishable foodstuff, e.g., meat, fish, pork and poultry products,
18 and the like, and which allows natural fluids to freely drain away from the foodstuff while
19 minimizing recontamination, inhibiting the development of microorganisms, resist meat
20 discoloration (browning) while maintaining product “bloom” for extended shelf-life and
21 customer acceptance.

22 SUMMARY OF THE INVENTION

23 [0007] It is therefore a principal object of the invention to provide food packaging trays
24 comprising novel structural features, such as a porous film elevated from the floor of the tray and
25 a lower liquid reservoir positioned below the elevated film which performs as a sump or
26 reservoir for collecting drainage fluid away from packaged perishable foodstuff while providing
27 support for the packaged product suspended on the porous film.
28

1 **[0008]** The present invention broadly comprises a packaging system, including a tray
2 having a reservoir or sump, a reservoir floor; and a porous film elevated from the reservoir floor,
3 wherein the porous film optionally incorporates a first biocidal and/or biostatic agent, and is
4 arranged to suspend a food product above the reservoir floor. In yet a further embodiment, the
5 invention contemplates food packaging trays, as previously disclosed, in combination with
6 package closure system, including a non-porous outer film preferably adapted to engage with and
7 cover the food product positioned on the elevated porous film. The outer film preferably includes
8 therein a second biocide/biostatic agent. When the outer closure film engages the packaged meat
9 product the biocidal agent therein operates to extend shelf-life of the packaged meat product by
10 minimizing browning due to microorganisms while maintaining natural redness and bloom for a
11 more appetizing appearance and customer acceptance.

12 **[0009]** The porous film supporting the foodstuff above the floor of the sump can be
13 virtually any type of porous film, such as a one-way porous film restricting the transmission of
14 liquid mainly in one direction into the lower fluid sump/reservoir, or alternatively, a two-way
15 porous film allowing the transmission of fluid across in either direction.

16 **[0010]** In yet a further aspect of the invention, the reservoir floor includes a plurality of
17 ridges or elevations of any appropriate geometrical design together with a plurality of lower
18 channels or grooves at the base of the elevations forming the floor of the tray, for receiving
19 natural juices and fluids. The elevations between the channels or grooves are of suitable height to
20 assist in the support of the food product suspended on the porous film, especially when
21 supporting heavier foodstuff products, including meat products.

22 **[0011]** The packaging systems of the invention may include one or more biocidal and/or
23 biostatic agent(s) imbibed onto the films, especially food grade agents for killing and/or
24 inhibiting microorganism, such as bacteria, viruses, fungi, and the like. This may include known
25 biocidal and/or biostatic agents, such as triclosan, or other food grade biocides or biostatic agents
26 capable inhibiting the development of microorganisms that discolor the food product due to a
27 “browning” effect and loss of “bloom”, wherein the appetizing natural red color of the packaged

1 meat product is diminished, shortening product shelf-life and resulting in loss of appetizing
2 appearance and concomitant diminished customer acceptance.

3 **[0012]** The present invention further comprises a packaged meat product including a
4 tray, a meat product arranged within said tray, and an outer film incorporating a first biocide
5 and/or biostatic agent(s) arranged to cover the meat product, and more particularly, have at least a
6 portion of a surface of the outer film in contact with a top surface of the meat product. The tray
7 further includes a sump or reservoir formed from the floor and tray sidewalls engaged thereto,
8 and a porous film elevated from the floor of the tray to suspend the meat product above the
9 reservoir floor. Optionally, the porous film may have a biocidal and/or biostatic agent imbibed
10 thereon.

11 **[0013]** Therefore, it is a principal object of the invention to provide a packaging system
12 for perishable foodstuff, such as meat, fish, poultry, pork, and the like, wherein the shelf-life of
13 the foodstuff is extended.

14 **[0014]** It is yet a further principal object of the invention to provide a packaging system
15 for perishable foodstuff that prolongs the "bloom" characteristics of meat products, especially
16 red meat products, like beef.

17 **[0015]** It is still another principal object of the invention to provide a packaging system
18 that traps natural drainage fluids from perishable foodstuff in a sump or reservoir preferably by
19 means of a one-way porous film allowing the transmission and storage of natural liquids away
20 from the foodstuff while also limiting the recontamination by restricting the back flow of liquid
21 to the foodstuff from the sump. Optionally, the one-way porous film may have imbibed thereon a
22 biocidal or biostatic agent.

23 **[0016]** It is yet another object of the present invention to provide a packaging system
24 utilizing support elements in the form of elevations, so as to engage the bottom or lower side of
25 the porous film to assist in the support the foodstuff positioned on the opposite side, so the
26 foodstuff is maintained in an elevated position, at all times, from the floor of the reservoir
27 avoiding contact and recontamination of the foodstuff with the drainage fluid retained in the
28 sump.

1 [0017] These and other objects, features and advantages will become readily apparent
2 from the following description of embodiments of the invention and from the accompanying
3 drawings.

5 BRIEF DESCRIPTION OF THE DRAWINGS

6 [0018] The nature and mode of operation of the present invention will now be more fully
7 described in the following detailed description of the invention taken with the accompanying
8 drawing figures, in which:

9 Figure 1 is a perspective view of one embodiment of the invention comprising a
10 packaging system, showing a tray and a porous film;

11 Figure 2 is an exploded perspective view of the packaging system shown in Fig. 1,
12 showing the tray, porous film and a reservoir along the tray floor having spaced parallel elevated
13 rectangular ridges between lower spaced parallel grooves;

14 Figure 3 is a perspective view of a present invention packaging system, showing a
15 tray, porous film, and a meat product covered by an outer film;

16 Figure 4 is a top plan view of the packaging system shown in Fig. 3;

17 Figure 5 is a side sectional view of the packaging system shown in Fig. 4 taken
18 along line 5-5 of Fig. 4;

19 Figure 6 is a magnified sectional view of the tray reservoir illustrating the
20 structural features of the encircled region labeled FIG. 6 of Fig. 5, wherein the porous film is a
21 one-way porous film;

22 Figure 7 is a magnified sectional view of the tray reservoir illustrating an
23 alternative embodiment of the structural features of the encircled region labeled FIG. 6 of Fig. 5,
24 wherein the porous film is a two-way porous film;

25 Figure 8 is an exploded perspective view of an alternative embodiment of a
26 packaging system as shown in Fig. 1, showing triangular ridges along the reservoir floor;

27 Figure 9 is a magnified exploded perspective view of the tray reservoir illustrating
28 the structural features of the encircled region FIG. 9 of Fig. 8;

1 Figure 10 is an exploded perspective view of an alternative embodiment of a
2 packaging system as shown in Fig. 1, showing pyramidal support elements along the reservoir
3 floor; and,

4 Figure 11 is a magnified exploded perspective view of the tray reservoir
5 illustrating the structural features of the encircled region FIG. 11 of Fig. 10.

6 7 **DETAILED DESCRIPTION OF THE INVENTION**

8 **[0019]** At the outset, it should be appreciated that like drawing numbers on different
9 drawing views identify identical, or functionally similar, structural elements of the invention.
10 While the present invention is described with respect to what is presently considered to be the
11 preferred aspects, it is to be understood that the invention as claimed is not limited to the
12 disclosed aspects.

13 **[0020]** Furthermore, it is understood that this invention is not limited to the particular
14 methodology, materials and modifications described and as such may, of course, vary. It is also
15 understood that the terminology used herein is for the purpose of describing particular aspects
16 only, and is not intended to limit the scope of the present invention, which is limited only by the
17 appended claims.

18 **[0021]** Unless defined otherwise, all technical and scientific terms used herein have the
19 same meaning as commonly understood to one of ordinary skill in the art to which this invention
20 belongs. Although any methods, devices or materials similar or equivalent to those described
21 herein can be used in the practice or testing of the invention, the preferred methods, devices, and
22 materials are now described.

23 **[0022]** For purposes of the invention, the term “meat” as appearing in the specification
24 and claims is intended to mean generally animal flesh and is not meant to limit meat to describe
25 the flesh of any specific animal. “Meat” products or foodstuff are intended to include, more
26 specifically uncooked or cooked beef, pork, poultry, lamb, seafood, fish products, and
27 combinations thereof, such as sausage products. “Meat” products can also include the flesh of

1 other edible animals, such as ostrich, bison, bear, moose, deer/venison, fowl, and combinations
2 thereof.

3 **[0023]** Fig. 1 is a perspective view of one embodiment of the invention comprising
4 packaging system **10**. Packaging system **10** comprises tray **12**, which comprises a rectangular
5 base. It should be appreciated, however, that the invention is in no way limited to any specific
6 shape, including a rectangular base as is shown in the figures, and that any shape suitable for
7 food products could be used. This includes circular, ovular, square, and triangular shaped trays.
8 The type of food product or more specifically, the shape of the cut of meat will determine the
9 shape of tray necessary. Tray **12** further comprises a continuous, substantially vertical sidewall
10 made up of four sides, sides **15**, **16**, **18** and **19**. It should also be appreciated that a continuous,
11 substantially vertical sidewall with exactly four sides **15**, **16**, **18** and **19** is a critical element only
12 to the extent that it provides for an elevated arrangement of porous film **14**, as is shown below.
13 Thus, it should be appreciated that functionally similar elements, such as a discontinuous
14 sidewall, a sidewall of a different number of sides, or any other support structure known in the art
15 can be used lieu of the continuous substantially vertical sidewall with four sides **15**, **16**, **18** and
16 **19** to elevate porous film **14**.

17 **[0024]** As is more clearly shown in Fig. 2, an exploded perspective view of packaging
18 system **10** shown in Fig. 1, tray **12** further comprises porous film **14** affixed along its peripheral
19 edge to a continuous intermediate interior ledge **26**, and reservoir **20** which comprises grooves **22**
20 and ridges **24** holding discharged liquid away from food items, specifically meat products. Ledge
21 **26** is not a critical element of the present invention, but is a preferred means for affixing porous
22 film **14** to the interior edge of the sidewalls of tray **12**. Alternatively, porous film **14** can be
23 affixed directly to the upper edges of the sidewalls of tray **12**. Porous film **14** is preferably
24 affixed to ledge **26** by virtually any means, including heat sealing, the application of contact
25 adhesives, ultrasound welding methods, or any other convenient means known in the art. Ridges
26 **24** are rectangular shaped floor elevations that form at the floor of the reservoir with appropriate
27 channels or grooves **22** there between for holding liquids discharged by the package foodstuff,

1 wherein the ridges and channels together form the reservoir floor, or alternatively stated, the tray
2 floor.

3 **[0025]** The particular configuration of the ridges is not critical, and the elevations need
4 not be parallel as shown, but in some embodiments, ridges **24** preferably rise substantially to the
5 level of ledge **26** to aid in supporting porous film **14**. That is, in some preferred embodiments,
6 ridges **24** provide structural support for porous film **14**, particularly when the weight of a food
7 item placed atop porous film **14** causes porous film **14** to flex, or bow downwardly. The elevated
8 ridges thus provide desired support for the meat positioned on the porous film, but also serves to
9 elevate and maintain the meat product well above the liquid drained into the reservoir below.

10 **[0026]** Tray **12** is preferably made by conventional molding methods, but any appropriate
11 manufacturing process known in the art may be used, such as injection molding. Reservoir **20**,
12 grooves **22**, ridges **24**, and ledge **26** can be formed by adding the structural features to the mold
13 of tray **12** during manufacturing. Alternatively, reservoir **20**, grooves **22**, ridges **24**, and ledge **26**
14 can be added after tray **12** has been molded or otherwise formed.

15 **[0027]** Porous film **14** can be a one-way porous material, or a two-way porous material.
16 Preferably, porous film **14** is a polymeric film or a polymer liner. Most preferable, is a one-way
17 porous polymer liner available under the registered trademark Vispore® from Tredegar
18 Industries of Richmond, VA, the details of which are disclosed in US Pat. 5,614,283. Porous film
19 **14** is adhered to the inner edge of tray **12** at ledge **26** by means of heat sealing, adhesive, as
20 previously mentioned. However, as previously discussed, it should be appreciated that porous
21 film **14** need not be adhered to the inner edge of tray **12** at ledge **26**, but that porous film **14** can
22 be adhered directly to the edge of tray **12** along the inner sidewall or upper edge of tray **12**. That
23 is, porous film **14** need not be adhered to ledge **26**, but instead, and ledge **26** can be removed
24 from tray **12**.

25 **[0028]** In a preferred embodiment, porous film **14** has pores of adequate diameter and
26 density to allow a fluid to flow through the film. For example, there can be between 40 and 1400
27 pores per square inch. It should be appreciated that the pore density and pore diameters are in no

1 way limited to a specific range or size, but that any pore density and pore diameter can be used
2 without detracting from the scope of the invention.

3 [0029] Optionally, porous film 14 may comprise a food approved biocidal and/or
4 biostatic agent(s). Preferably, this biocidal agent is at least biostatic agent, i.e. capable of slowing
5 or inhibiting the growth or reproduction of microorganism, e.g., triclosan, including bacteria,
6 molds, fungi, viruses, and the like. However, it is most preferable that the biocide i.e., life
7 destroying, which may be a bactericide and fungicide, i.e. inhibiting the growth and destroying
8 microorganisms. In some embodiments, the biocide may also be antiviral. It is preferable that the
9 biocide is a broad spectrum biocide, and generally, a wide ranging antimicrobial effect,
10 inhibiting a broad range of microorganisms. Preferably, the biocide is effective at controlling or
11 killing bacteria, such as gram positive, gram negative, aerobic, and anaerobic types, viruses,
12 fungi, etc. Any biocide that is compatible with the porous film before fabrication and will retain
13 its activity after film fabrication may be used in the present invention. A preferred representative
14 biostatic agents include *inter-alia* triclosan, which is a common name for 2,4,4'-trichloro-2'-
15 hydroxydiphenyl ether or 5-chloro-2-(2,4,-dichlorophenoxy) phenol. It should be appreciated,
16 however, that any biostatic or biocidal agent known in the art and considered to be safe for food
17 applications may be used. Triclosan is available under the trademark Microban®, a registered
18 trademark of Microban International, Ltd. of New York, NY.

19 [0030] Films of the invention containing biocidal and biostatic agents imbibed or
20 impregnated therein, include such members as zinc and silver which may also be employed
21 either alone or in combination with other biostatic and/or biocidal agents. Such films may be
22 prepared by methods known among those skilled in the art, including the steps of mixing the
23 agents with the polymeric material prior to film fabrication. For example, the agents may be
24 directly incorporated throughout the molecular structure of the polymeric film, and essentially
25 will not wash off or wear off. After film fabrication, the agents will slowly diffuse through the
26 polymer to the surface of the film once the biocide and/or biostatic agents on the surface have
27 been depleted, providing continued protection as described in US 6,168,800 (Dobos et al.).

1 [0031] Generally, a biocidally or biostatically effective amount of the biocide or biostatic
2 agent is introduced into the film to extend the shelf-life of the food product, including
3 maintaining the red appearance or “bloom” of the meat product, such as beef. More specifically,
4 the biocide is introduced into porous film in an amount from about 0.01% to about 25% by
5 weight of the film, but is more preferably present in an amount between about 1% and about 10%
6 by weight.

7 [0032] In production, the porous film material and biocide are mixed together uniformly
8 and homogenously at a desired ratio, preferably between about 1% and about 10% by weight.
9 Porous film 14 can then be formed by film making procedures known in the art, such as solvent
10 casting, film injection molding and extrusion techniques, such as film blowing. Porous film 14
11 can then be perforated to a desired pore density and pore diameter. The pores can be formed by
12 mechanical means, embossing means, or any other means known in the art.

13 [0033] Fig. 3 is a perspective view of packaging system 30, an embodiment of the present
14 invention, comprising tray 32, porous film 34, and meat product 36 covered by outer film 38.
15 Packaging system 30 is arranged such that porous film 34 is elevated from the tray floor in
16 support of meat product 36 positioned on porous film 34 having non-porous outer film 38 as the
17 closure, preferably engaged with the meat product. Tray 32, as previously stated, may be
18 fabricated from virtually any food approved plastic/polymer material, foamed or non-foamed
19 type, using processes known in the art.

20 [0034] Optionally, porous film 34 can include a biocide or biostatic agent, as previously
21 discussed. Any biocide or biostatic agent known in the art and generally recognized as safe
22 (GRAS) for food use can be used, such a biostatic agent is that available under the trademark
23 Microban®.

24 [0035] Meat product 36 may be a steak or any other uncooked or cooked perishable
25 foodstuff, but it should be appreciated that the present invention is in no way limited to meat
26 products *per se*. However, the invention is intended to include the packaging trays and packaging
27 systems, as herein described together in combination with the foodstuff packaged therein. The
28 term “meat” as appearing in the specification and claims is intended to include both fresh and

1 cooked products selected from the group consisting of beef, pork, poultry, lamb, seafood, fish
2 products, and combinations thereof. The term “meat” is also intended to be inclusive flesh of
3 other animals, such as ostrich, bison, bear, moose, deer, fowl, and combinations thereof.

4 **[0036]** Meat product 36 is disposed atop porous film 34. Thus, porous film 34 will allow
5 any drainage fluids to pass through, below porous film 34. If porous film 34 comprises a biocide,
6 it can substantially suppress any microorganisms present in the drainage fluids from meat
7 product 36, as will be more fully described below.

8 **[0037]** Outer non-porous film 38 fully covers/wraps tray 32, and preferably engages the
9 entire surface of meat product 36. Outer film 38 further preferably comprises a biocide or
10 combination of biocides, or at least a biostatic agent. It will be understood, the biocides and
11 biostatic agents alone or in combination may be used and methods employed for incorporating
12 into the outer film 38 may be the same as the biocides and biostatic agents used in the methods
13 employed in making the porous film 34, and as previously discussed for porous film 14 of
14 Figures 1-2. That is, the outer film material and biocide or biostatic agent(s) alone or in
15 combination can be mixed together uniformly and homogenously at a desired ratio. Outer film 38
16 can then be formed by film making procedures known in the art, such as solvent casting, film
17 injection molding and extrusion techniques such as film blowing.

18 **[0038]** If outer film 38 is impregnated with a biocide, the top surface of meat product 36,
19 or alternatively, the surface in contact with outer film 38 is subjected to the biocide impregnated
20 in outer film 38. This diminishes the tendency of meat product 36 to lose its bloom
21 characteristics, that is, diminishes the tendency of the meat to discolor and/or spoil. Stated
22 alternatively, a red meat, such as beef has a natural red color, or bloom, after it has been
23 butchered. After a period of time, the surface of the beef will begin to lose the natural red color,
24 or bloom. The color will begin to fade and become a gray or brownish color. This may be due to
25 microorganisms present in the meat and/or the environment. Outer film 38 preserves the bloom
26 of fresh meat for a longer time than is experienced by packaging systems known in the art,
27 thereby increasing the shelf life and customer acceptance of meat product 36. Optionally, the

1 methods as disclosed herein may be practiced using other methods known in the art, such as gas
2 flushing with inert gases, e.g., nitrogen.

3 **[0039]** Fig. 4 is a top plan view of packaging system **30** shown in Fig. 3. Fig. 5 is a cross-
4 sectional view of packaging system **30** shown in Fig. 4 taken along line 5-5. Packaging system **30**
5 is shown comprising reservoir **50** collecting drainage **51** from meat product **36**. Drainage **51** is
6 collecting in channels **56** formed by grooves **52** and ridges **54**. As previously discussed in Figures
7 1-2, grooves **52** and ridges **54** can be of any shape, but that in the present embodiment, they are
8 rectangular shaped. Also, in some embodiments, ridges **54** provide structural support for porous
9 film **34**, especially if the weight of meat product **36** causes porous film **34** to flex, or bow
10 downwardly toward the tray floor.

11 **[0040]** In a preferred embodiment, meat product **36** is elevated above channels **56**, so as
12 to prevent meat product from soaking in the liquid and becoming contaminated, prolonging the
13 shelf life of the package meat. In those embodiments where porous film **34** comprises a biocide,
14 porous film **34** will enhance the shelf-life of meat product **36** by eliminating substantially all
15 microorganisms from drainage **51**.

16 **[0041]** Fig. 6, a magnified sectional view of tray **32** and reservoir **50**, illustrates the
17 structural features of the encircled region labeled Fig. 6 of Fig. 5, wherein the porous film is a
18 one-way porous film. Fig. 6 shows drainage **51** flowing through pores **62** of one-way porous film
19 **60**. In some aspects, the drainage evaporates and is trapped in cavity **64**, restricting backflow out
20 of reservoir **50**. As previously discussed, one-way porous film **60** may optionally include a
21 biocide or biostatic agent. Alternatively, in another embodiment of the invention, one-way
22 porous film **60** can be replaced by more conventional two-way porous film for greater economy,
23 as shown in Fig. 7.

24 **[0042]** Two-way porous film **70** of Fig. 7 is shown with pores **72**, by which drainage **51**
25 and evaporate **61** can traverse. This embodiment though satisfactory is somewhat less preferred.
26 As previously discussed, in some aspects, porous film **70** may optionally includes a biocide or
27 biostatic agent.

1 **[0043]** Fig. 8, an exploded perspective view of an alternative embodiment of a packaging
2 system as shown in Fig. 1. Packaging system **80** comprises a tray **89** having a reservoir **81**,
3 grooves **82**, ridges **84**, ledge **86** and porous film **88**. Grooves **82** and ridges **84** form triangular
4 channels for drainage, as pointed out below. Porous film **88** is supported by ledge **86**, and may be
5 supported by ridges **84**. Reservoir **81**, grooves **82**, ridges **84**, and ledge **86** are formed by adding
6 the structural features to the mold of tray **89** during manufacturing. Alternatively, reservoir **81**,
7 grooves **82**, ridges **84**, and ledge **86** may be added after tray **89** has been molded or otherwise
8 formed.

9 **[0044]** Fig. 9, a magnified exploded perspective view of tray **89** comprising reservoir **81**
10 with a floor comprising grooves **82**, elevated ridges **84** and ledge **86** running on the interior
11 sidewall of the tray all shown in the encircled region FIG. 9 taken from FIG. 8.

12 **[0045]** Figures 10 and 11 represent an alternative embodiment of a packaging system as
13 shown in Fig. 1. Packaging system **100** comprises a tray **120** with substantially vertical sidewalls,
14 a reservoir **110** having a floor with a grid of elevated pyramidal support elements **112**, ledge **114**,
15 porous film **118** affixed thereto. Pyramidal support elements **112** form a grid **122** of drainage
16 channels for fluid management transmitted through porous film **118**. Details of grid **122** are more
17 clearly shown below in Fig. 11. Porous film **118** is supported by ledge **114** in conjunction with
18 support elements **112**. Like other embodiments of the invention, porous film **118** may optionally
19 comprise a biocide, as previously discussed. Reservoir **110**, pyramidal support elements **112**, and
20 ledge **114** may be formed by adding the structural features to the tray **120** during manufacturing.
21 Alternatively, reservoir **110**, support elements **112**, and ledge **114** are structural features that may
22 be added after tray **120** has been molded or otherwise formed.

23 **[0046]** Preferably, pyramidal support elements **112** are in substantial contact with porous
24 film **118** at tips **124**. Tips **124** support the weight of porous film **118** as well as the weight of a
25 food product placed atop porous film **118**. As with previous embodiments, porous film **118** is
26 preferably a perforated polymeric film with flexible properties to support the foodstuff placed
27 atop film **118**.

1 **[0047]** Alternatively, pyramidal support elements **112** may not be in substantial contact
2 with porous film **118** at tips **124**, until a food item is placed atop porous film **118** (not shown). It
3 should also be appreciated that pyramidal support elements **112** are in no way restricted to
4 pyramidal shapes, but other geometrical elevations are contemplated.

5 **[0048]** It should be appreciated that in the embodiments recited *supra*, a biocide is a
6 chemical composition having the ability to inhibit or kill microorganisms such as bacteria,
7 viruses, fungi, and mold, and the like. It should also be appreciated that such a biocide is limited
8 to those safe for food applications, i.e., GRAS. Such a biocide is available under the registered
9 trademark Microban®, but the invention is no way limited to just this exemplary biocide. It
10 should further be appreciated that a biocide may comprise more than one specific chemical
11 composition that is biocidal and/or biostatic.

12 **[0049]** It should further be appreciated that the invention is intended for perishable
13 foodstuff, such as fresh meats, such as those prepared by a butcher or machine. Fresh meats
14 include timely slaughtered animals, with no restrictions as to origin or species. Thus, most farm
15 animals, for example, are intended within this definition. Examples of common butchered meats
16 include beef, poultry, pork, turkey, duck, lamb, sheep, fowl, seafood, fish, lobster, and
17 combinations thereof. The invention relates generally to both prepared/cooked/smoked/processed
18 and raw variants of meat and meat/sausage products.

19 **[0050]** Thus, it is seen that the objects of the present invention are efficiently obtained,
20 although modifications and changes to the invention should be readily apparent to those having
21 ordinary skill in the art, which modifications are intended to be within the spirit and scope of the
22 invention as claimed. It also is understood that the foregoing description is illustrative of the
23 present invention and should not be considered as limiting. Therefore, other embodiments of the
24 present invention are possible without departing from the spirit and scope of the present
25 invention.

What is claimed is:

1. A food packaging system comprising:
a tray having peripheral sidewalls and a floor panel together forming a tray interior, said floor panel comprising a plurality of at least one of spaced elevations, ridges, channels and grooves suitably arranged to form a fluid reservoir or sump for deflecting descending fluids and/or juices discharged by a food product packaged therein away from the food product, and
a food product supporting porous film in said tray interior positioned adjacent to said at least one of spaced elevations, ridges, channels and grooves, and arranged to maintain said food product above said discharged fluid and separated therefrom during the storage period;
wherein each of said plurality of at least one of spaced channels and grooves are separated by said plurality of at least one of spaced elevations and ridges.
2. The food packaging system according to Claim 1, further comprising a non-porous outer film wrap positioned above said food product on said porous film in said tray interior.
3. The food packaging system according to Claim 2, wherein said non-porous outer film wrap is adapted for making contact with said food product which is in contact with said porous film in said tray interior.
4. The food packaging system according to Claim 1, wherein said food product supporting porous film comprises a biocidal agent, a biostatic agent, or a combination of a biocidal agent and a biostatic agent.
5. The food packaging system according to Claim 2, wherein at least one of said food product supporting porous film and said non-porous outer film wrap comprise a biocidal agent, a biostatic agent, or a combination of a biocidal agent and a biostatic agent.
6. The food packaging system according to Claim 3, wherein at least one of said food product supporting porous film and said non-porous outer film wrap comprise a biocidal agent, a biostatic agent, or a combination of a biocidal agent and a biostatic agent.
7. The food packaging system according to Claim 1, wherein said porous film is a one-way porous film.

8. The food packaging system according to Claim 1, wherein said porous film is a two-way porous film.
9. The food packaging system according to Claim 7, wherein said one-way porous film comprises a biocidal agent, a biostatic agent, or a combination of a biocidal agent and a biostatic agent.
10. The food packaging system according to Claim 8, wherein said two-way porous film comprises a biocidal agent, a biostatic agent, or a combination of a biocidal agent and a biostatic agent.
11. The food packaging system according to Claim 1, wherein said spaced elevations or ridges are adapted to engage the porous film to assist in supporting the food product.
12. A disposable meat tray comprising peripheral sidewalls and a floor panel together forming a tray interior, said floor panel comprising a plurality of at least one of spaced elevations, ridges, channels and grooves suitably arranged to form a fluid reservoir or sump for deflecting descending fluids discharged by meat packaged therein away from the meat, and,
a meat supporting porous film in said tray interior positioned adjacent to said at least one of said spaced elevations, ridges, channels and grooves, and arranged to maintain said meat product above said discharged fluids and separated therefrom during storage;
wherein each of said plurality of at least one of spaced channels and grooves are separated by said plurality of at least one of spaced elevations and ridges.
13. The disposable meat tray according to Claim 12, wherein the meat supporting porous film is a member selected from the group consisting of one-way porous film and two-way porous film.
14. The disposable meat tray according to Claim 12, wherein the meat supporting porous film comprises a biocidal agent, a biostatic agent, or a combination of a biocidal agent and a biostatic agent.

15. The disposable meat tray according to Claim 12, including a non-porous outer film for enclosing and sealing a meat product in said tray positioned on said meat supporting porous film.
16. The disposable meat tray according to Claim 15, wherein the non-porous outer film comprises a biocidal agent, a biostatic agent, or a combination of a biocidal agent and a biostatic agent suitable for enhancing bloom and limiting discoloration of the meat product packaged therein.
17. A meat product packaged in the disposable meat tray of Claim 12.
18. A meat product packaged in the disposable meat tray of Claim 13.
19. A meat product packaged in the disposable meat tray of Claim 14.
20. A meat product packaged in the disposable meat tray of Claim 15.
21. A meat product packaged in the disposable meat tray of Claim 16.
22. A disposable meat tray comprising peripheral sidewalls and a floor panel together forming a tray interior, said floor panel comprising:
 - a plurality of spaced elevations, suitably arranged on said floor panel, said floor panel forming a single fluid reservoir or sump for receiving descending fluids discharged by meat packaged therein away from the meat, and
 - a meat supporting porous film in said tray interior positioned adjacent to said plurality of spaced elevations and arranged to maintain said meat product above said discharged fluids and separated therefrom during storage.

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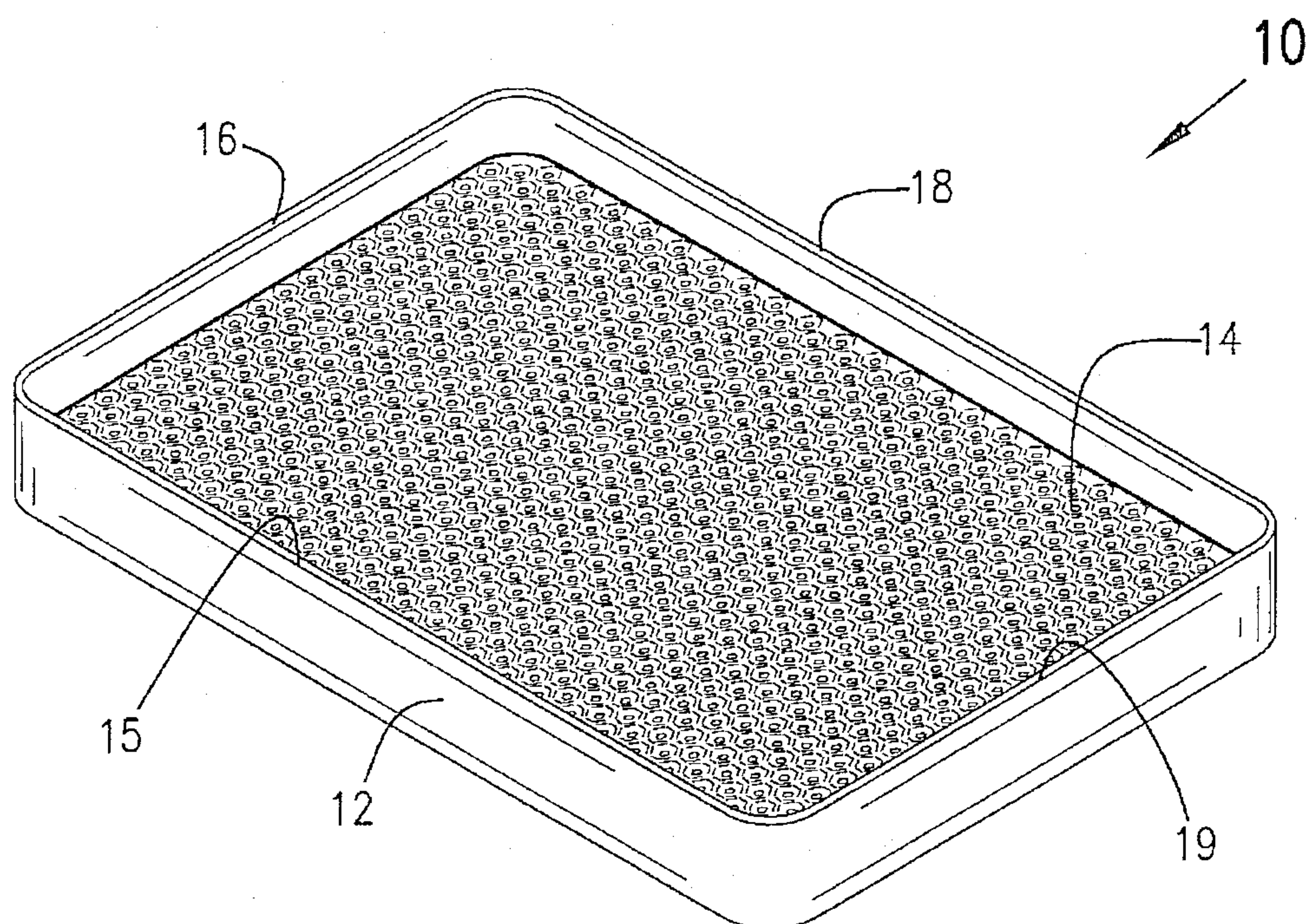


FIG. 1

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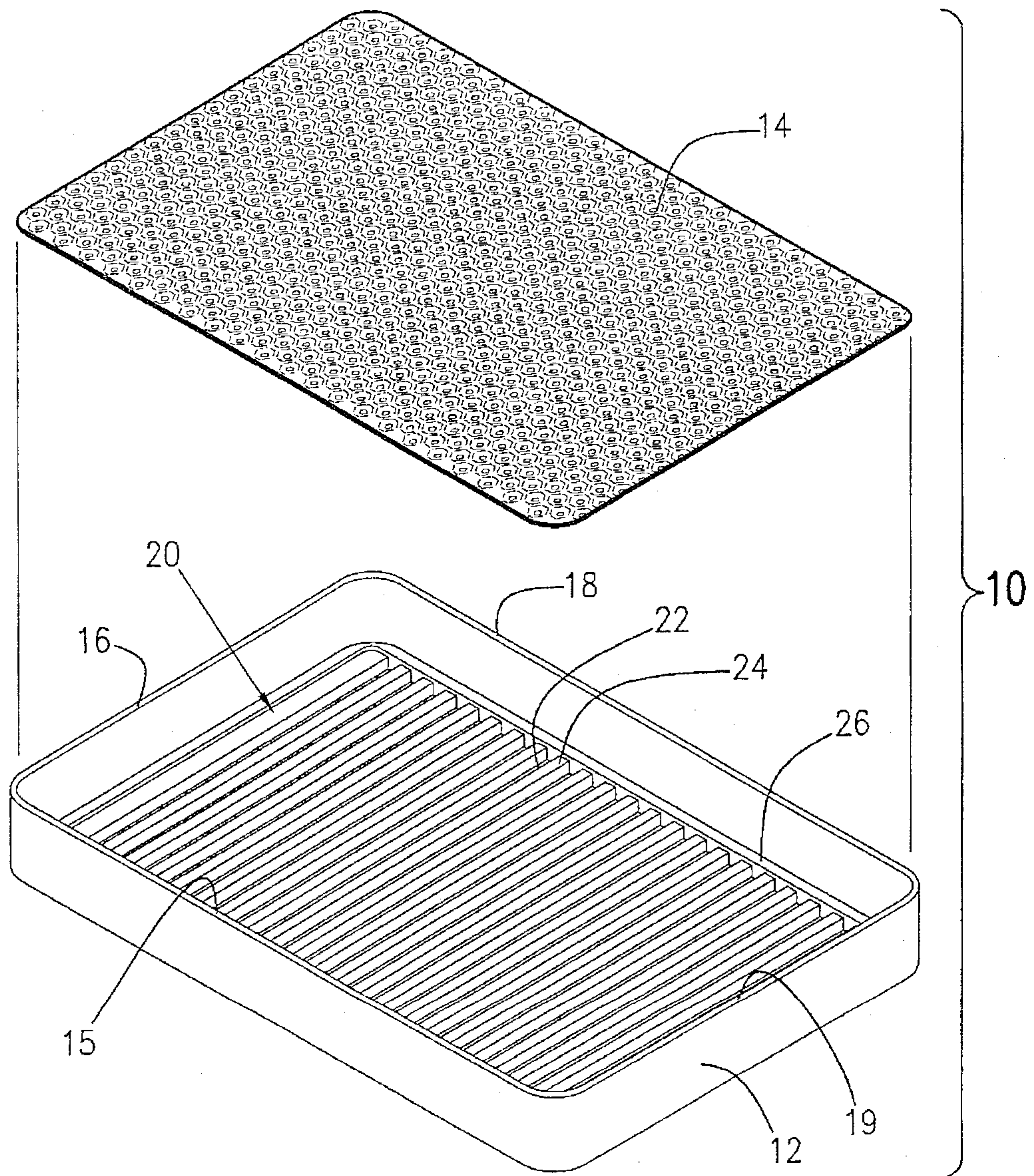


FIG. 2

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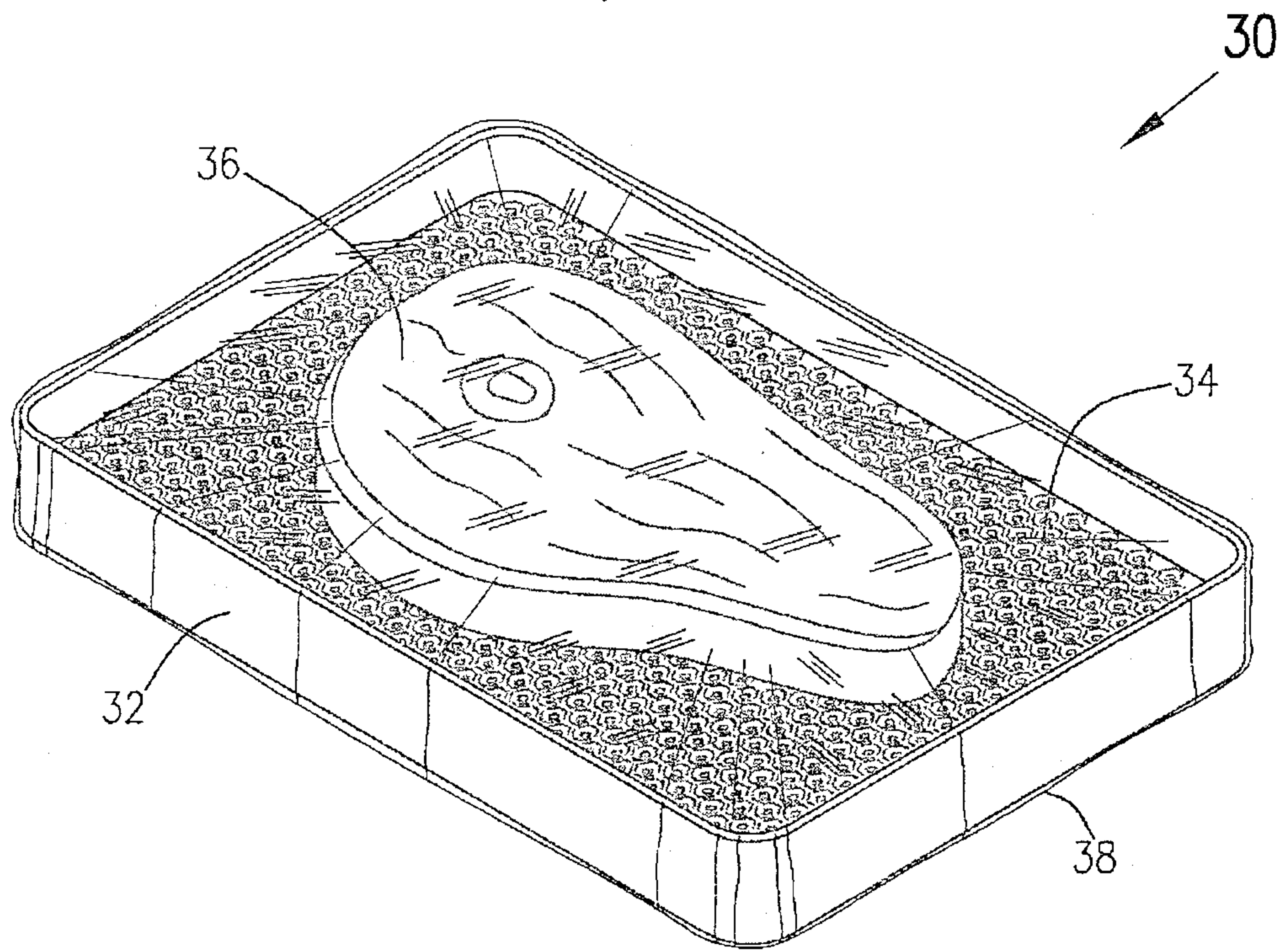


FIG. 3

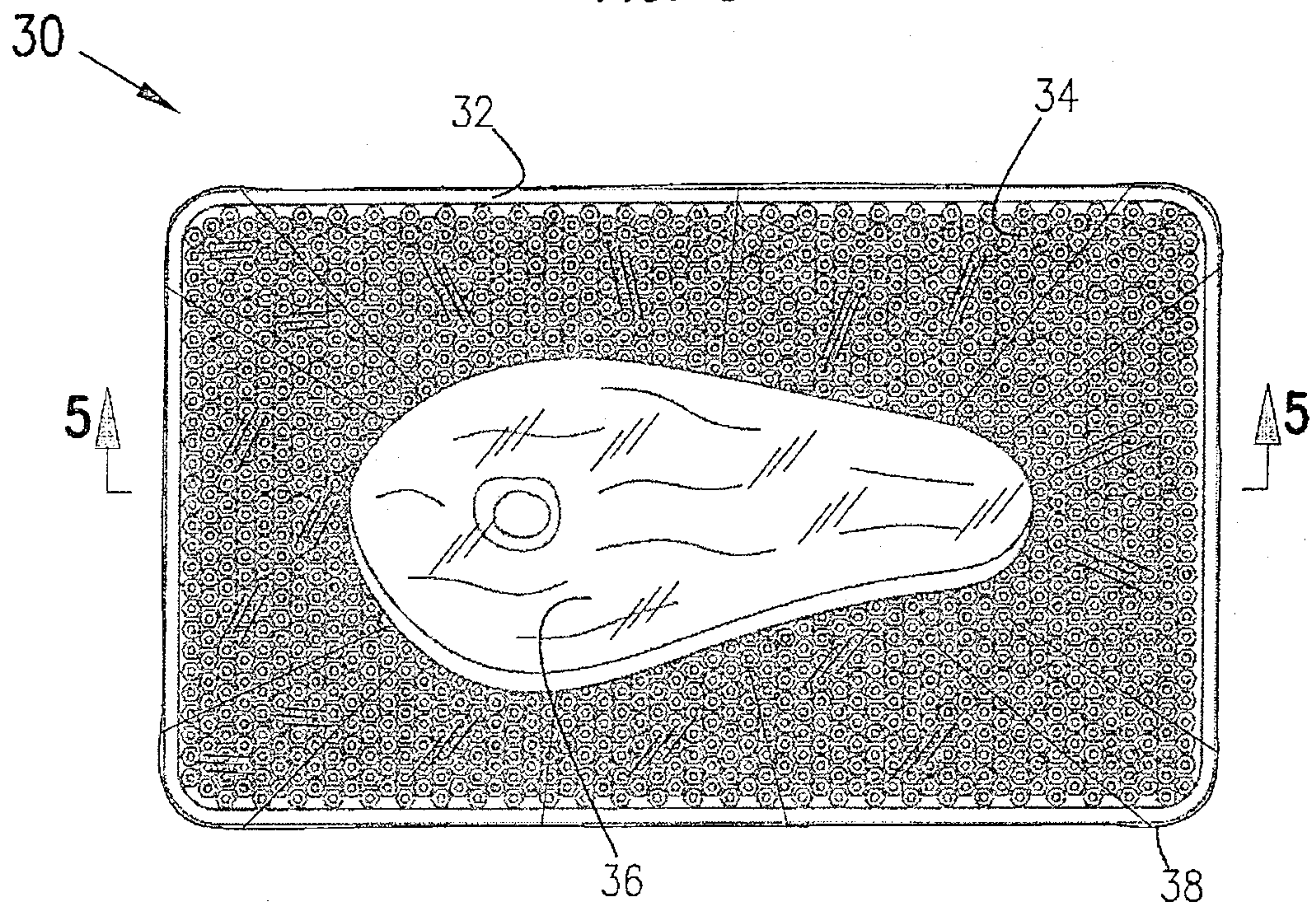
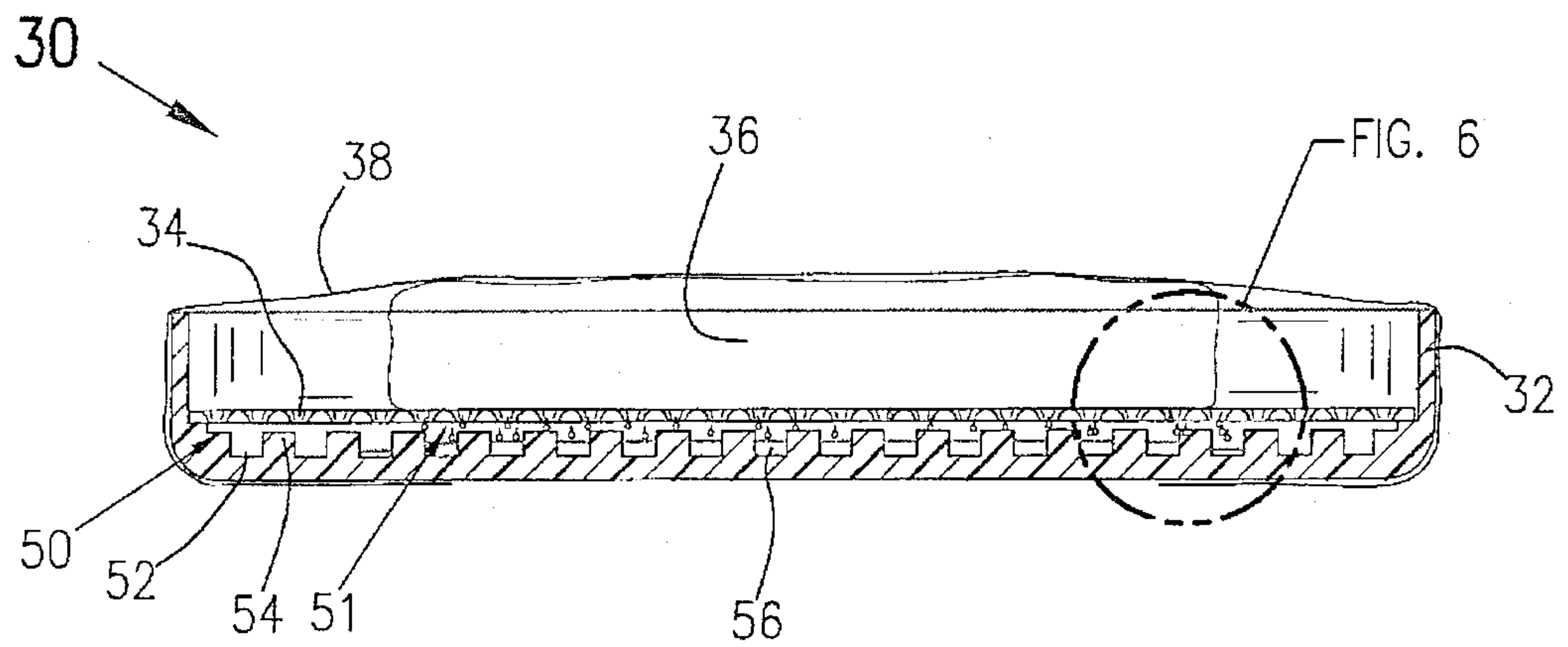
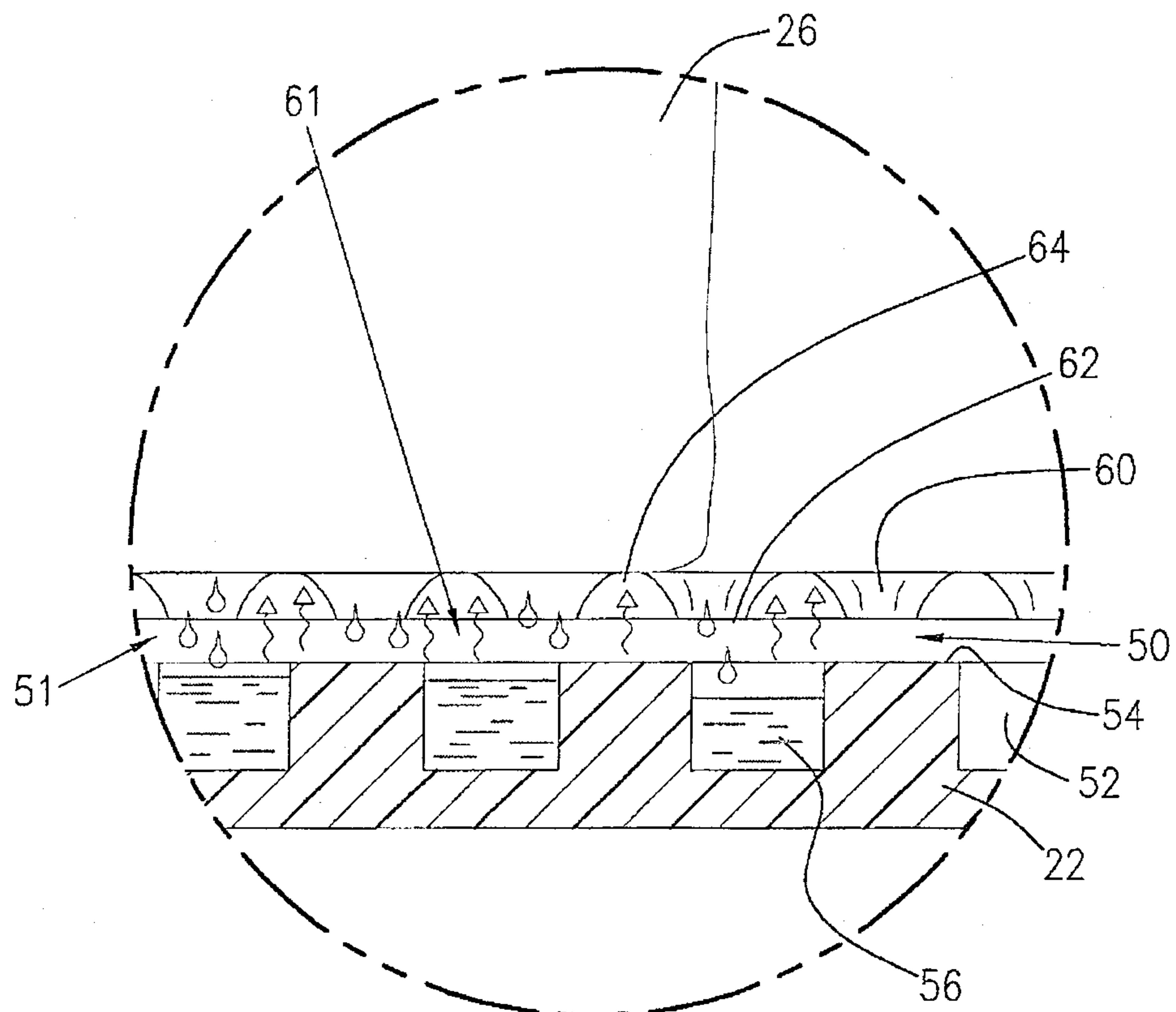


FIG. 4

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**FIG. 5****FIG. 6**

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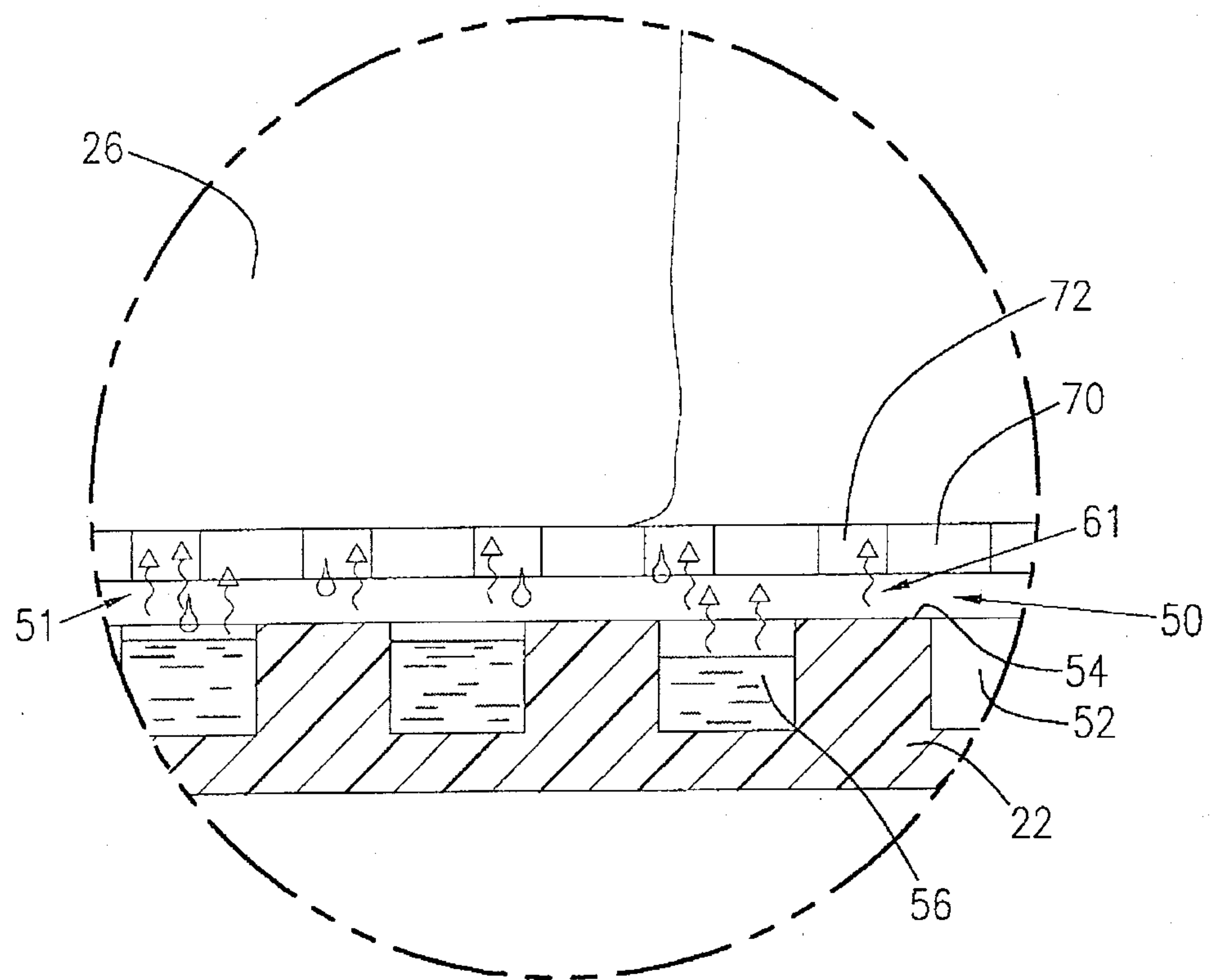
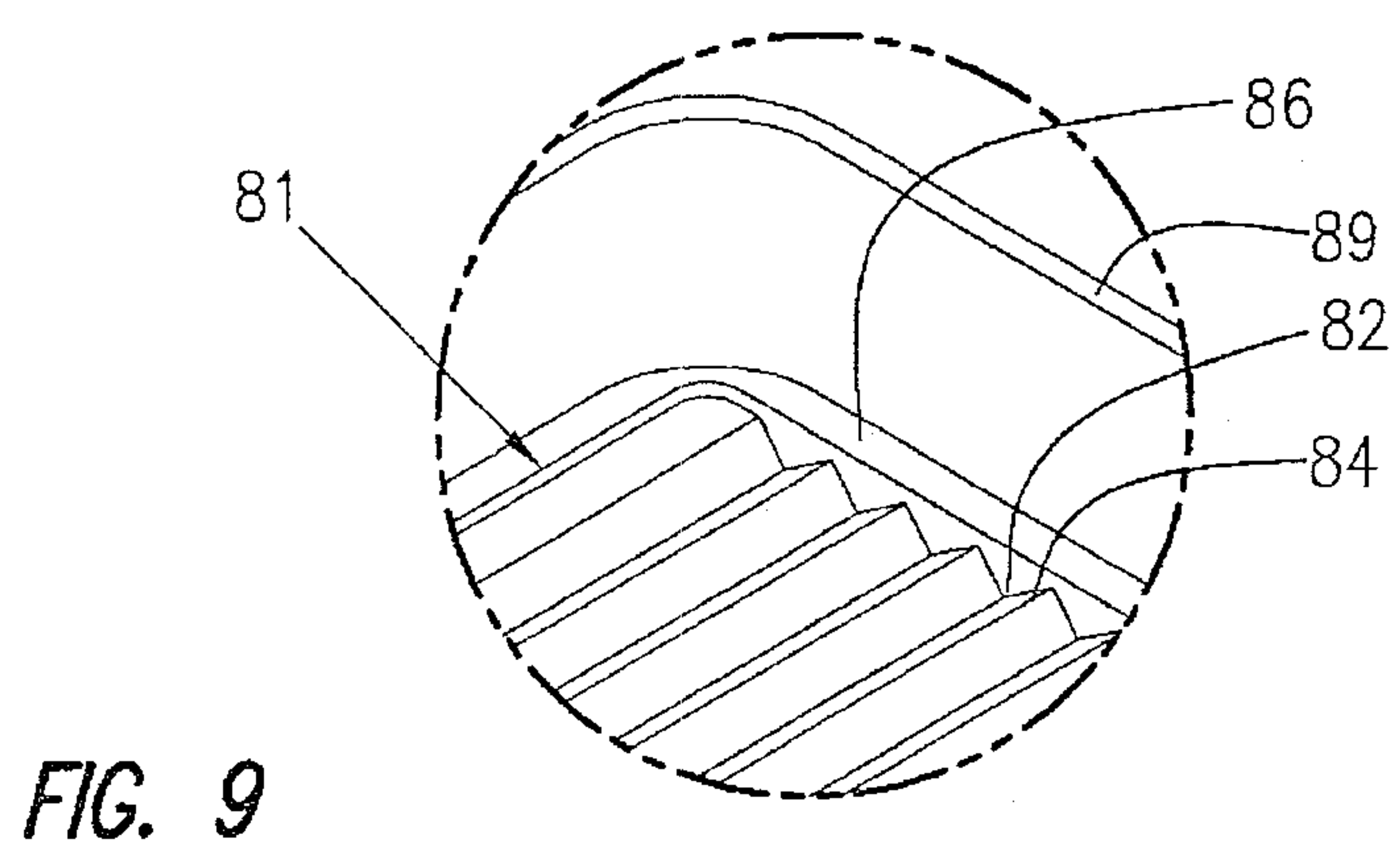
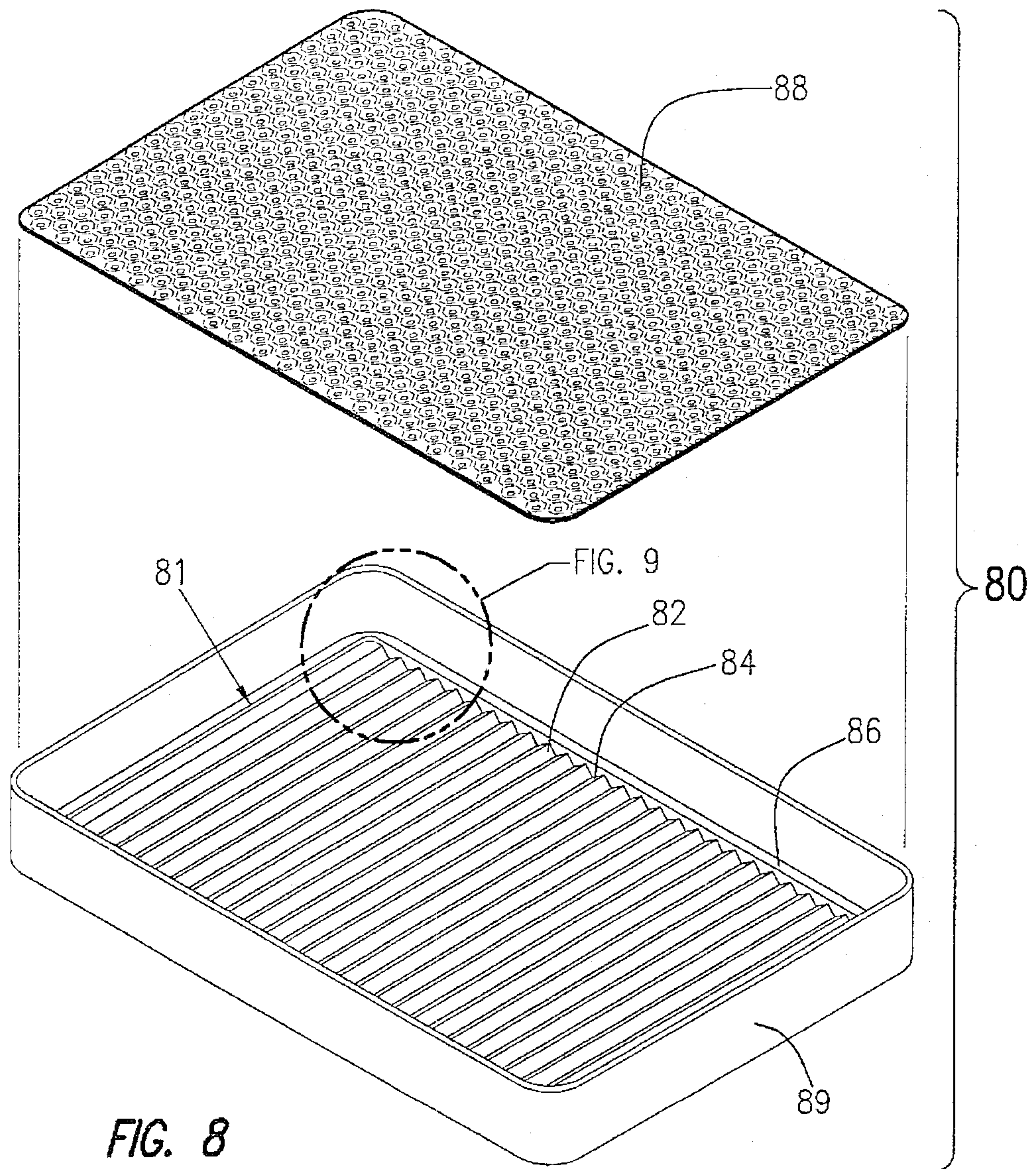


FIG. 7

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