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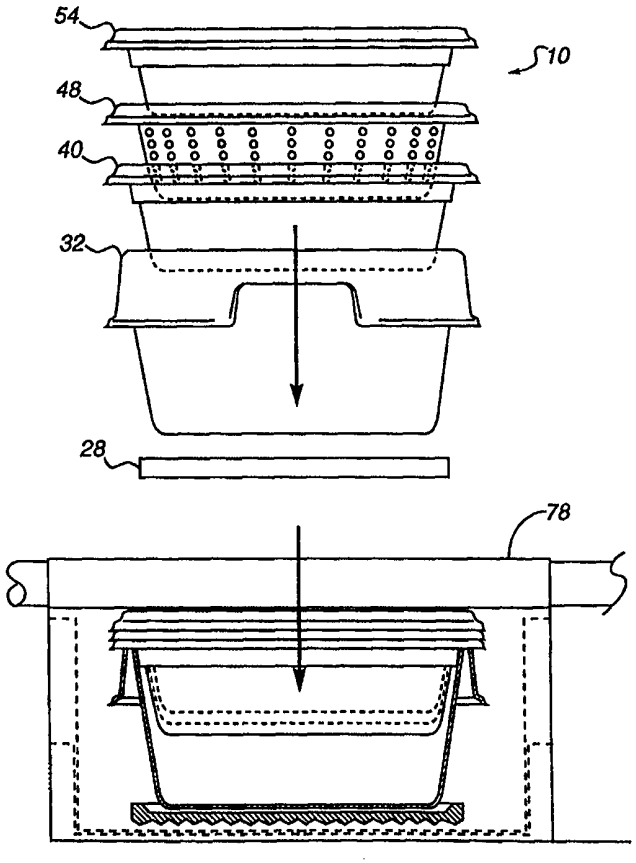
(54) Title: BARBECUE GRILL WHICH CAN ACCOMMODATE NESTING ACCESSORIES

(57) Abstract

The present invention is directed to nesting accessories (10) for a barbecue grill side burner (20) or a main grill burner (74). When used with either the side burner (20) or the main burner (74), the nesting accessories (10) provide a convenient way to cook various types of food items. The nesting accessories (10) include pans which are partially set inside the cooking compartment of the grill side burner or main burner. The pans can be used alone or in cooperation with other pans and accessories which nest together. The pans include an outer rim which rests over a top surface of the grill, and an inset portion which is positioned inside the cooking compartment or cavity for stability and space efficiency. When the nest accessories are used with a side burner, a heat pipe (16) may surround the lower burner to channel heat upwardly. The heat pipe may have a top section (17) that is either removable or spring loaded in order to accommodate the insertion of the pans.



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BARBECUE GRILL WHICH CAN ACCOMMODATE NESTING ACCESSORIES

FIELD OF THE INVENTION

This invention relates to a barbecue grill which can accommodate nesting accessories in a side burner or main grill portion for cooking, or in a side drawer for storage when not in use.

BACKGROUND OF THE INVENTION

Over the years, the barbecue grill has been transformed from what was, originally, a relatively simple cooking device, to a multi-purpose outdoor cooking unit, in an attempt to more efficiently and conveniently prepare food. The present-day barbecue grill is now used to prepare many types of foods in a variety of different forms.

As part of the cooking revolution, side burners positioned adjacent to the main grill have been designed to work in association with the main grill in order to cook food held in containers, such as pots or pans, apart from the main grill. Generally, the side burner includes a small cooking grate placed over a separately controlled lower burner, and offers several advantages over barbecue grills lacking side burners. First, additional cooking space is provided to the user. Furthermore, the user has the ability to vary heat settings to items placed on the side burner without disrupting the cooking of food on the main grill. In addition, the side burner allows the user to more effectively cook foods in pots and pans, rather than on the main cooking grate or on the household stove.

The cooking grate on the side burner or main grill, however, is ill suited to perform various cooking functions. The cooking grate is ill-equipped to accommodate a large pot or pan placed on the grate, or for holding one pan placed inside another pan in order to provide a double-boiler or steamer function. Large or multiple pans used on either the main or side

cooking grate result in a cluttered work space which provides a rather unpleasant and inconvenient cooking experience.

Although the side burner provides the user with some additional cooking options, it is always desired to equip a barbecue grill with additional cooking functions, while at the same time providing the user with additional cooking space. While the conventional side burner and main grill provide some additional work space and convenience, an inexpensive arrangement or assembly is needed to increase cooking space, while also providing additional cooking options on the barbecue grill.

SUMMARY OF THE INVENTION

The present invention solves the above-mentioned problems by providing a side burner or main grill that can be transformed into a receptacle for holding various food containers. The food containers may be used alone or in combination to provide a variety of cooking options. The containers may be inset into the burner cavity and rest on its outer edge in order to provide a stable support for additional nesting pans placed therein. In addition, the inset or nesting containers function to limit the clutter and inconvenience that may arise where one large pan or multiple nesting pans are resting directly on the cooking grate.

The present invention is directed to a cooking assembly for a barbecue grill comprising a heating compartment defining a cavity therein. the heating compartment having a bottom wall and side walls, the side walls extending upwardly and terminating to form a top edge defining a top opening. A heat source is housed within the heating compartment for cooking food. One container having a top rim and a lower inset portion can then be placed inside the heating compartment such that the top rim rests over the top edge of the heating compartment, with the lower inset portion positioned inside the cavity and above the heat source.

Where the nesting containers are placed inside a side burner for a grill, the heat source is positioned substantially lower than the conventional heat source in order to accommodate insertion of a deep container. Other various shallow containers may then nest

inside the deep container to perform a double boiling or steamer function. In order to effectively channel heat to the grate or the inset container, a heat pipe may be positioned over the heat source and extends upwardly to just below the edge of the top opening of the heat compartment. A top piece of the heat pipe may be removable or spring loaded in order to accommodate the inset containers. When the top grate is in place, the heat pipe is positioned just below the top grate.

Other details and advantages of the present invention will become apparent from the following detailed description of the presently preferred embodiments of practicing the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

In the accompanying drawings, preferred embodiments of the invention and preferred methods of practicing the invention are illustrated in which:

Figure 1 is a side plan view of the nesting accessories of the present invention placed in a side table of a barbecue grill.

Figure 2 is a prospective view of the alternate embodiments of the heat pipe of the present invention.

Figure 3 is a side plan view of the nesting accessories placed in a grill main burner.

Figure 4 is split-cross sectional view of the alternate forms the side burner utilizing the nesting accessories illustrated in Figure 1.

Figure 5 is a prospective view of the lid of the nesting accessories illustrated in Figure 1.

Figure 6 is a cross-sectional view of the lid covering the side burner of the present invention.

Figure 7 is a prospective view of the griddle of the nesting accessories illustrated in Figure 1.

Figure 8 is a cross-sectional view of the griddle in place of the top grid of the present invention.

Figure 9 is a prospective view of the deep pan of the nesting accessories illustrated in Figure 1.

Figure 10 is a cross-sectional view of the deep pan positioned over the lower burner.

Figure 11 is a prospective view of the shallow pan of the nesting accessories illustrated in Figure 1.

Figure 12 is a split cross-sectional view of the shallow pan and deep pan of the present invention.

Figure 13 is a prospective view of the steamer pan of the nesting accessories illustrated in Figure 1.

Figure 14 is a split cross-sectional view of the steamer pan and deep pan of the present invention.

Figure 15 is a prospective view of the divided pan of the nesting accessories illustrated in Figure 1.

Figure 16 is a split cross-sectional view of the divided pan and deep pan of the present invention.

Figure 17 is an alternate embodiment of the present invention showing corner metal risers.

Figure 18 is a split cross-sectional view of the metal risers supporting the deep pan of the nesting accessories illustrated in Figure 1.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

As illustrated in FIGS. 1-3, the present invention is directed to nesting accessories 10 for a barbecue grill side burner 20 or a main grill burner 74. When used with either the side burner 20 or the main burner 74, the nesting accessories 10 provide a convenient way to cook various types of food items. The nesting accessories 10 are inset into the grill for stability and space efficiency.

As illustrated in FIGS. 2 and 4, the side burner 20 comprises, generally, a conventional top grid 2 overlaying a slightly recessed portion 4. Although the recessed

portion 4 may be any suitable shape and size, the recessed portion 4 is preferably rectangular and measures approximately 9 inches wide and 11.5 inches long. The top grid 2 is centrally positioned over a lower heat source, generally 12, for heating food placed directly or indirectly on the top grid 2. The top grid 2 is constructed of any heat transferring metal such as steel, stainless steel, copper, cast iron, or the like. The recessed portion 4 is the same shape as the top grid 2, and is preferably rectangular. As best shown in FIG. 4, which is a split view of two operating modalities of the side burner 20, the top grid 2 is sized slightly smaller than the recessed portion, such that the top grid 2 is securely positioned and inset into the recess 4 and retained therein in order to limit the lateral movement of the top grid 2. The top grid 2 is removable from the recessed portion 4 which exposes a cavity 8 in which is housed the heat source 12.

Where the present invention is utilized with a gas grill, the heat source 12 generally includes a lower burner 6 connected to a gas inlet 14. In order to receive the nesting accessories 10, described below, the heat source 12, specifically the lower burner 6, is positioned substantially below the top grid 2. Because it is important to have as much heat reach the top grid 2 as possible when the nesting accessories 10 are not utilized, it is preferable that a heat pipe, generally, 16 surround the lower burner 6 in order to channel heat to the top grid 2.

As best shown in FIG. 4, the heat pipe 16 is an open ended cylindrical tube which is secured over the lower burner 6 and acts in a fashion similar to a chimney, channeling heat centrally upward from the lower burner 6 to the top grid 2. In this way, the main heat output is effectively directed to the center of the top grid 2 rather than dispersed throughout the relatively large cavity 8, and inefficiently heating the side walls 19 forming the cavity 8. The heat pipe 16 is preferably a two-piece cylindrical tube having a removable top section 17 and a bottom section 18. Both the top section 17 and the bottom section 18 preferably include apertures 22 that extend around a periphery of an upper portion of each section. Apertures 22 in the bottom section 18 permit the flow of secondary air into the heat pipe 16 to aid in combustion, while apertures 22 in the top section 17 allow for combustion venting. The

bottom section 18 of the heat pipe is preferably secured to a bottom wall 21 of the side burner 20 by any conventional fastening means including welding, press fit, screwing, bolting, or the like. The top section 17 of the heat pipe 16 preferably includes a lower skirt 15 having a diameter greater than the diameter of the bottom section 18 such that the top section 17 rests over the bottom section 18, thereby providing substantially vertical alignment between a peripheral wall 24 of the top section 17 of the heat pipe 16 and a bottom peripheral wall 26 of the bottom section 18 of the heat pipe 16. The alignment of the peripheral wall 24 of the top section 17 over the peripheral wall 26 of the bottom section 18 allows heat to rise from the lower burner 6 directly up to the top grid 2.

As most clearly shown in the right side split view of FIG. 4, removal of the top grid 2 and the top section 17 of the heat pipe 16 provides a substantially rectangular cavity 8 extending downwardly to the lower burner 6, which is surrounded by the bottom section 18 of the heat pipe 16. The distance between a top edge of the bottom section 18 of the heat pipe 16 and the recessed portion 4 is preferably approximately 3 inches, which provides sufficient distance to accommodate the nesting accessories 10, described below.

As shown in FIGS. 1, 3, and 4, the nesting accessories, generally, 10, preferably include a griddle 28, a deep pan 32, a shallow pan 40, a steamer pan 48, a divided pan 54, and a lid 60, which cooperate together for convenient cooking and/or storage inside the barbecue grill. Apart from the lid 52 which may be placed over the top grid 2 (described below), the nesting accessories 10 are used in place of the top grid 2, and, where indicated, are utilized with the top section 17 of the heat pipe 16 removed. The nesting accessories 10 are constructed of conventional cooking metals such as copper, stainless steel, aluminum, or any other metal sufficient to withstand the heat of a barbecue grill.

As best shown in FIGS. 5 and 6, the top lid 60 can be used alone or in combination with other nesting accessories, as further described below. Although any size may be used, the lid 60 is preferably 10.5 inches wide and 13 inches long. The lid 60 can be used to cover the top grid 2 in order to retain heat. The lid 60 includes a top handle 61 for easy lifting and placement during cooking and storage. The lid 60 also includes a lip 62 which, when

properly positioned, covers the top grid 2 and the recessed portion 4. The lid 60 also acts as a cover for each of the pan accessories described below.

As shown in FIGS. 7 and 8, the two-sided griddle 28 includes a flat cooking surface 29 on one side and a grated cooking surface 27 on the reverse side. The griddle 28 includes outer peripheral raised edges 31 on the flat cooking surface 29 in order to retain greases and juices from the cooked food on either cooking surface of the griddle 28 during the cooking process. The griddle 28 is substantially the same shape as the recessed portion 4, and is preferably rectangular. Similar to the top grid 2 described above, the recessed portion 4 is sized slightly larger than the griddle 28, such that the griddle 28 is securely positioned within the recess 4 to keep the lateral movement of the griddle 28 to a minimum. The removal of the top section 17 of the heat pipe 16 is not necessary for the proper placement of the griddle 28, as the griddle 28 does not extend substantially downwardly into the cavity 8 of the side burner 20 to impinge on the proper functioning of the lower burner 6 and the two-piece heat pipe 16. The griddle 28 also includes side handles 33 for easy lifting and placement during cooking and storing. As best shown in FIG. 8, with the griddle 28 in place, the top lid 60 rests over the griddle 28 substantially in the same manner as when used to cover the top grid 2, described above.

As best shown in FIG. 9, the deep pan 32 preferably includes a lower inset portion 34 and an integral upper skirt portion 35 having side handles 36 for easy lifting and placement for cooking and storage. Although any size may be used, the deep pan 32 is preferably 10 inches wide, 12.5 inches long, and 4.5 inches deep. As best shown in FIG. 4, with the top grid 2 and the top section 17 of the heat pipe 16 removed, the deep pan 32 can be placed into the cavity 8 of the side burner 20, such that the sides of the deep pan are spaced inwardly from the walls 19 forming the cavity, and the bottom wall 37 of the deep pan 32 is positioned slightly above the bottom section 17 of the heat pipe 16. The upper skirt portion 35 rests directly on the upper surface 19 of the side burner 20 covering the recessed portion 4, as shown. The deep pan 32 includes a top rim 38 over which can overlay the lid 60 (as best

shown in FIG. 10), the shallow pan 40 (FIG. 12), the steamer pan 48 (FIG. 14), or the divided pan 54 (FIG. 16).

As best shown in FIG. 11 and split FIG. 12, the shallow pan 40 may be used alone or in combination separately with the deep pan 32, as described above. Although any size may be used, the shallow pan 40 is preferably 10 inches wide, 12.5 inches long, and 2.5 inches deep. The shallow pan 40 includes an inset portion 41 and a top rim 42. The top rim 42 extends around the periphery of the shallow pan 40 and has a cut out portion 43 at both ends for easy lifting and placement for cooking and storage. As shown in FIG. 12, when used alone, the shallow pan 40 is placed inside the cavity 8 of the side burner 20, with the bottom wall 44 positioned above the lower burner 6 and bottom section 18 of the heat pipe 16. The top rim 42 rests directly on the upper surface 19 of the side burner 20 covering the recessed portion 4, as shown. On occasion, the user may desire to partially fill the deep pan 32 with water and insert the shallow pan 40 therein, thereby causing the combination to act as a double boiler. When the deep pan 32 and the shallow pan 40 are used together, as shown in FIG. 12, the deep pan 32 is placed into the cavity 8, as described above, and partially filled with water. The shallow pan 40 is then placed inside the deep pan 32. The top rim 42 of the shallow pan 40 rests over the top rim 38 of the deep pan 32, while the side walls of the shallow pan 40 are spaced inwardly from the side walls of the deep pan 32, as shown, thereby providing a stable cooking support. When desired, the lid 60 may be placed over the top rim 42 of the shallow pan 40 in order to retain heat.

As shown in FIGS. 13 and 14, the steamer pan 48 may be used in combination with the deep pan 32 in a similar fashion as described above with respect to the deep-shallow pan combination, in order to steam vegetables, fish or other foods. Although any size may be used, the steamer pan 48 is preferably 10 inches wide, 12.5 inches long, and 2.5 inches deep. The steamer pan 48 includes a number of small apertures 49 over the entire bottom wall 50 and side walls 51. The steamer pan 48 includes a top rim 52 extending around its periphery. The top rim 52 may include side handles 53 for easy lifting and placement for cooking and storage. As shown in FIG. 14, when the deep pan 32 and the steamer pan 48 are used

together, the deep pan is placed into the cavity 8, as described above, and partially filled with any desired liquid for steaming. The steamer pan 48 is then placed inside the deep pan 32. The top rim 52 of the steamer pan 48 rests over the top rim 38 of the deep pan 32, while the side walls of the steamer pan 48 are spaced inwardly from the side walls of the deep pan 32 as shown, thereby providing a stable cooking support. When desired, the lid 60 may be placed over the top rim 52 of the steamer pan 48 in order to retain heat.

As illustrated in FIG. 15 and split FIG. 16, the divided pan 54 may be used alone or in combination with the deep pan 32 in a similar manner to that described above with respect to the deep-shallow pan combination. Although any size may be used, the divided pan 54 is preferably 10 inches wide, 12.5 inches long, and 2.5 inches deep. The divided pan 54 preferably includes three main compartments 55 in which to place separate food items to be cooked. The divided pan 54 includes an inset portion 56 and a top rim 58. The top rim 58 extends around the periphery of the divided pan 54 and may have a cut out portion 59 at both ends for easy lifting and placement for cooking and storage. When used alone, the divided pan 54 is placed inside the cavity 8 of the side burner 20, with the bottom wall 57 positioned above the lower burner 6 and surrounding bottom section 18 of the heat pipe 16. The top rim 58 rests directly on the upper surface 19 of the side burner 20 covering the recessed portion 4, as shown. On occasion, the user may desire to partially fill the deep pan 32 with water and insert the divided pan 54, thereby causing the combination to act as a three-compartment double boiler. When the deep pan 32 and the divided pan 54 are used together, the deep pan 32 is placed into the cavity 8, as described above, and partially filled with water. The divided pan 54 is then placed inside the deep pan 32. The top rim 58 of the divided pan 54 rests over the top rim 38 of the deep pan 32, while the side walls of the divider pan 54 are spaced inwardly from the side walls of the deep pan 32 as shown, thereby providing a stable cooking support. When desired, the lid 60 may be placed over the top rim 58 of the divided pan 54 in order to retain heat.

As illustrated in FIG. 3, it is also contemplated that the nesting accessories 10 of the present invention may be placed into the cavity 72 of the main grill 70. One or more of the

main grill grids may be removed exposing the cavity 72 in which is contained the main burner 74. Because the nesting accessories 10 would be, generally, smaller than the size of the cavity 72, preferably a rectangular adapter or flange 73 have a length and width slightly larger than the cavity 72 and an opening slightly smaller than the outer rim of the nesting accessories 10 would be placed over the cavity 72 to alter the size of the opening, in order to accommodate the inserted nesting accessories 10. It is contemplated that the hood 76 (shown in hidden lines in FIG. 3) of the main grill 70 will properly lift and close when the nesting accessories 10 are in place. Although the size and shape of the nesting accessories 10 may vary according to the desired cavity 72 opening, it is contemplated that this fact should have no bearing on the manner in which the nesting accessories 10 are inset and retained by the cavity 72 for the main grill 70. If the deep pan 32 is used as an accessory in combination with the main grill cavity 72, it is preferable that L-shaped metal risers 85 (shown in FIGS. 17 and 18, and described below) are included at the four corners of the flange 73 in order to raise the deep pan 32 substantially above the top surface of the main grill 70. This is because the deep pan 32 is too deeply inset into the cavity 72 to be accommodated by a standard gas grill due to the positioning of the main burner 74.

As illustrated in FIG. 1, the nesting accessories 10 may be properly stored in a side drawer 78 of a barbecue grill when not in use. Preferably, the side drawer 78 is approximately 7 inches deep in order to accommodate all nesting accessories 10. Storage of the nesting accessories 10 begins by first placing the griddle 28 against a bottom wall 80 of the side drawer (preferably, the flat cooking surface 29 is facing up for a smooth contact). Next, the deep pan 32 is placed on top of the griddle 28. Next, the shallow pan 40, the steamer pan 48 and divided pan 54, respectively, are placed inside the deep pan 32 with the rim of each pan resting on the rim of the next adjacent pan. The lid 60 is preferably stored over the top grid 2 as shown in FIG. 6 to prevent unnecessary weathering of the top grid 2 and the lower burner 6.

In another embodiment, as shown in FIGS. 17 and 18, four L-shaped metal risers 85 engaging the four corners of the upper surface 19 of the side burner 20 act in place of the

large upper skirt portion 35 (where shown) of the deep pan 32. The metal risers 85 aid in raising the level of the nesting accessories substantially above the upper surface 19 of the side burner 20. In this way, the lower burner 6 is spaced a smaller distance from the upper surface 19 of the side burner 20, thereby necessitating a shallower cavity 8, and reducing heat loss. Also, openings 86 adjacent to the risers 85 allow for combustion venting of the lower burner 6 to the outside air. In this embodiment, the upper skirt 35 (where shown) of the deep pan 32 could be eliminated and replaced with a relatively small lip 87 which would rest on the risers 85, as shown. The risers 85 would provide the support for all nesting accessories 10 when used alone or in combination with the other accessories, as described above.

As described above, the heat pipe 16 preferably includes a removable top section 17 from a stationary bottom section 18 thereby providing the space within the cavity 8 of the side burner 20 to place the various nesting accessories 10. As best shown in FIGS. 2, 17, and 18, it is also contemplated that the top section 17 of the heat pipe 16 may be telescoping or spring-loaded and in relative engagement with the bottom section 18. In this embodiment, as shown in the drawings, the top section 17 has a slightly larger diameter than the bottom section 18. The weight of a pan acting against the top section 17 in a downward direction causes compression of the top section 17 over the bottom section 18, thereby providing the necessary spacing to accommodate the nesting accessories 10 described above. It is also noted that the top section 17 may have a slightly smaller diameter than the bottom section 18, whereby the top section 17 may compress inside the bottom section 18, thereby providing the necessary spacing for the nesting accessories 10, described above. In this embodiment, apertures are preferably not included around the periphery of the heat pipe 16. Rather, grill members 84 are attached to the top section 17 of the heat pipe 16 in order to provide the necessary spacing between the inset pan and the top section 17 for the necessary combustion venting.

In addition, it is contemplated that although the present invention is preferably used in a gas barbecue grill the heat source could be an electric or conventional charcoal briquettes, or

any other heat source utilized in a barbecue grill for cooking food, rather than the gas burner 6 described above.

Although the invention has been described in detail in the foregoing for the purpose of illustration, it is to be understood that such detail is solely for that purpose and that variations can be made therein by those of ordinary skill in the art without departing from the spirit and the scope of the invention as defined by the following claims, including all equivalents thereof.

We Claim:

1. A cooking assembly for a barbecue grill comprising:

a heating compartment defining a cavity therein, said heating compartment having a bottom wall and side walls, said side walls extending upwardly and terminating to form a top edge defining a top opening;

a heat source housed within said heating compartment; and

at least one first container having a top rim and a lower inset portion, said top rim of sufficient size to rest over and be supported by said top edge of said heating compartment, thereby positioning said lower inset portion inside said cavity and above said heat source.

2. The cooking assembly of claim 1 wherein said at least one first container can receive at least one second container nesting within said at least one first container.

3. The cooking device of claim 1 wherein said heat compartment is the main burner of a grill.

4. The cooking assembly of claim 1 wherein said heat compartment is a side burner of the grill.

5. The cooking assembly of claim 3 wherein said heat source is a gas burner.

6. The cooking assembly of claim 4 wherein said heat source is a gas burner.

7. The cooking assembly of claim 6 wherein said gas burner engages said bottom wall of said side burner.

8. The cooking assembly of claim 7 further comprising a heat pipe surrounding said gas burner, said heat pipe having a top and bottom section, said bottom section mounted to said bottom wall of said side burner, said top section extending upwardly from said bottom section inside said cavity.

9. The cooking assembly of claim 8 wherein said top section is removable from said bottom section.

10. The cooking assembly of claim 8 wherein said top section is in spring-loaded engagement with said bottom section.

11. The cooking assembly of claim 1 wherein said at least one first container comprises multiple nesting containers which can be stored in a drawer of the barbecue grill.

12. The cooking assembly of claim 11 wherein said multiple nesting containers includes a deep pan, a shallow pan, and steamer pan.

13. A cooking assembly for a barbecue grill, comprising:

a heating compartment defining a cavity therein, said heating compartment having a bottom wall and side walls, said side walls extending upwardly and terminating to form a top edge defining a top opening;

a heat source having a top edge, said heat source housed within said heating compartment and engaging a bottom wall of said heating compartment;

a two-piece tubular pipe surrounding said heat source, said tubular pipe having a bottom portion secured to said bottom wall of said heating compartment at one end and a top removable portion engaging an opposite end of said bottom portion, said top edge of said heat source positioned below a top edge of said bottom portion, said top removable

portion extending upwardly so that a top edge of said pipe is positioned below said top edge of said heating compartment;

at least one container having a top rim and a lower inset portion, such that when said top portion of said tubular pipe is removed, said top rim is of sufficient size to rest over and be supported by said top edge of said heating compartment, thereby positioning said lower inset portion inside said cavity and above said top edge of said bottom portion of said tubular pipe.

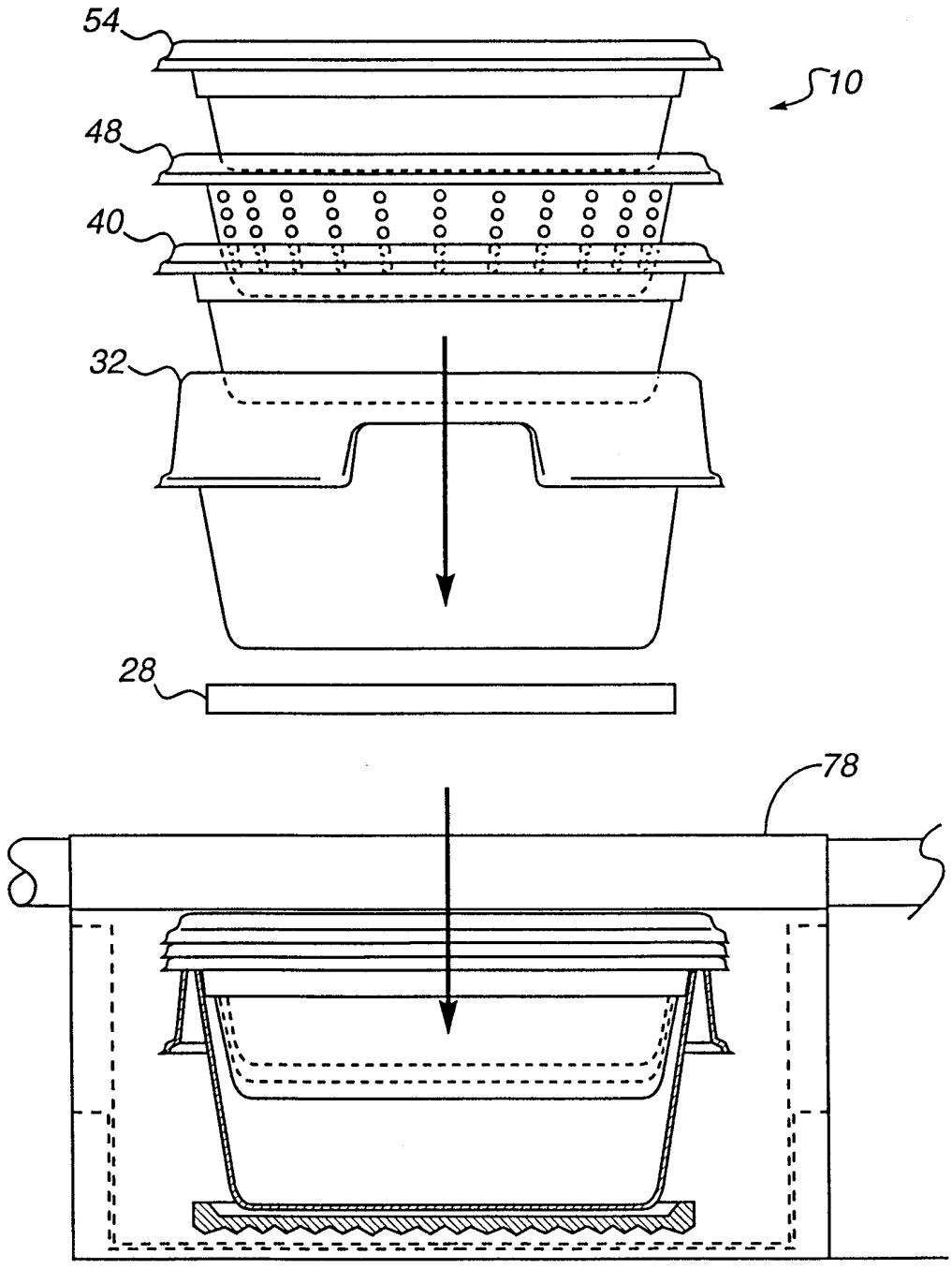

FIG. 1

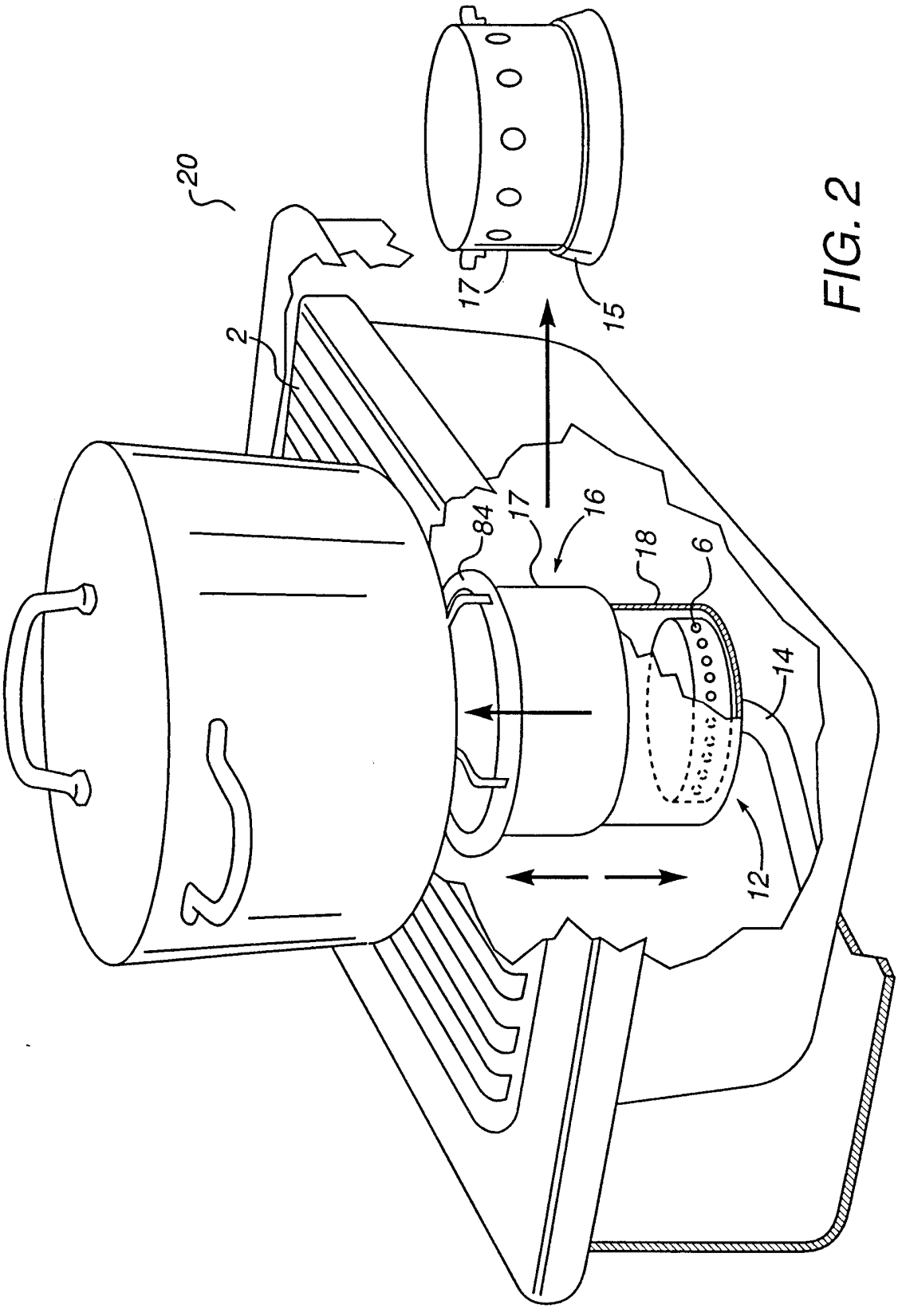

FIG. 2

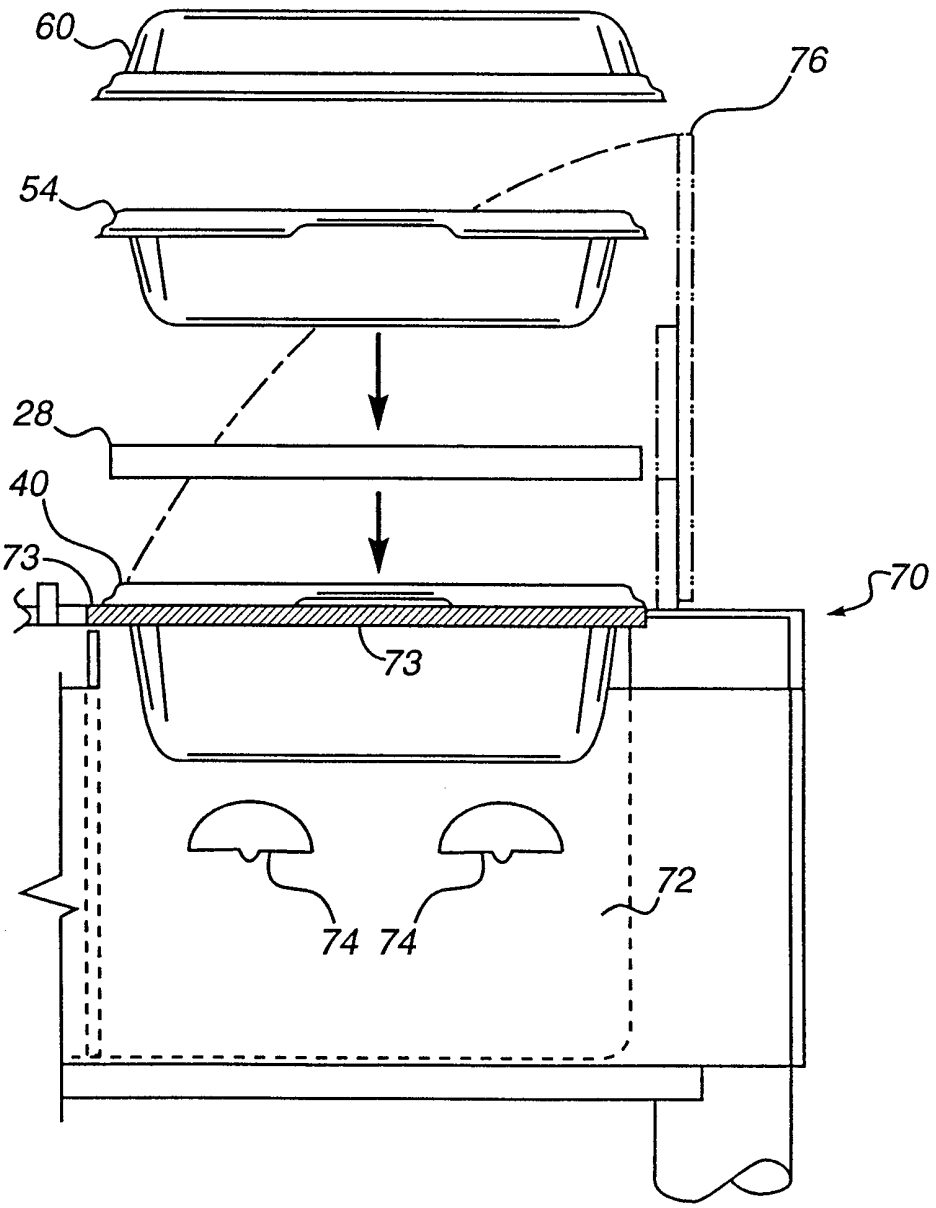

FIG. 3

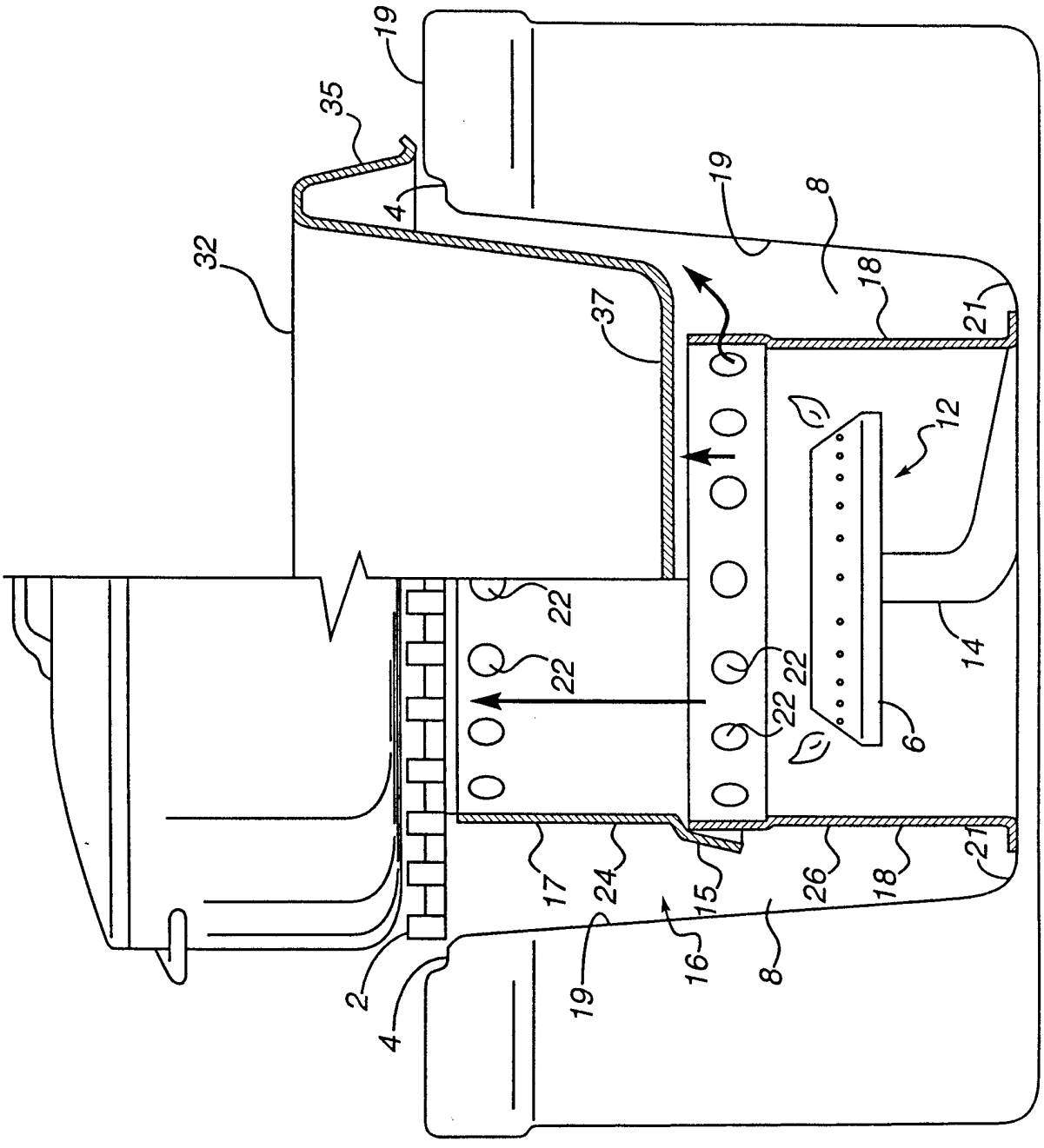

FIG. 4

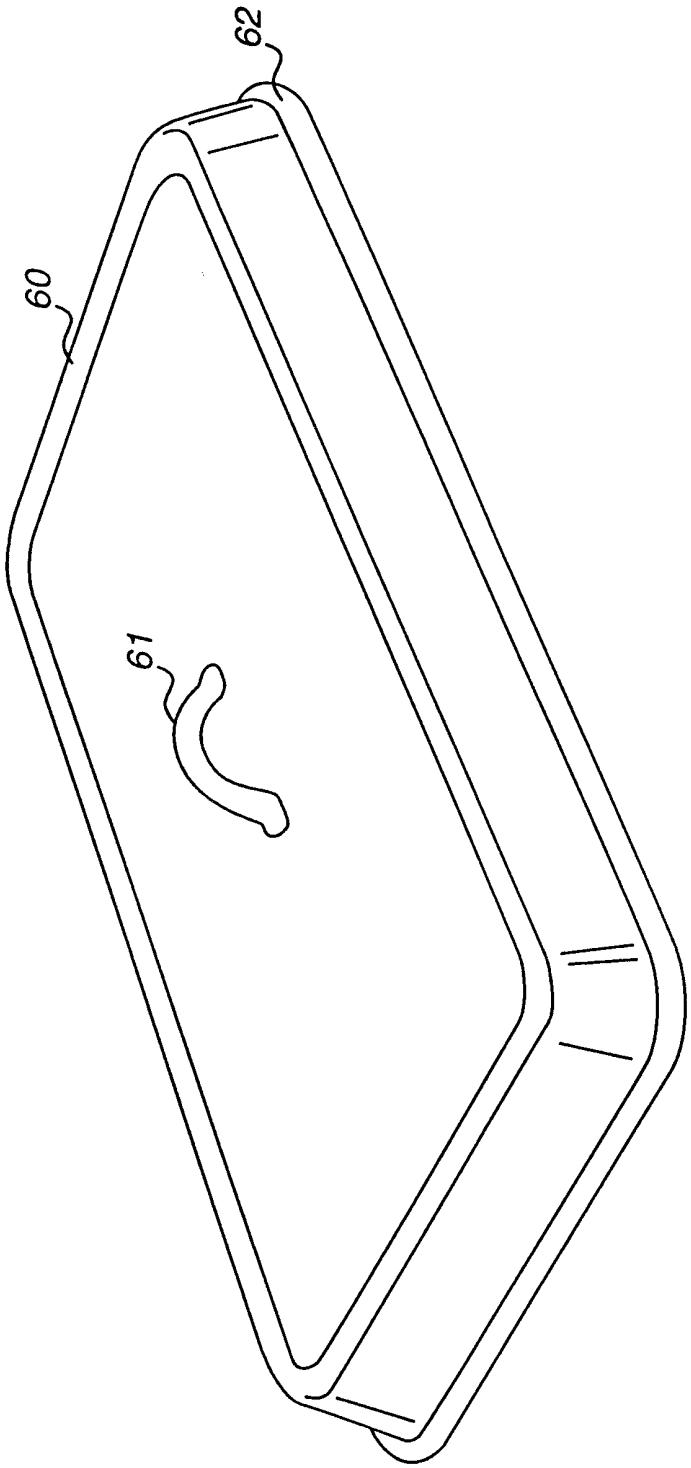

FIG. 5

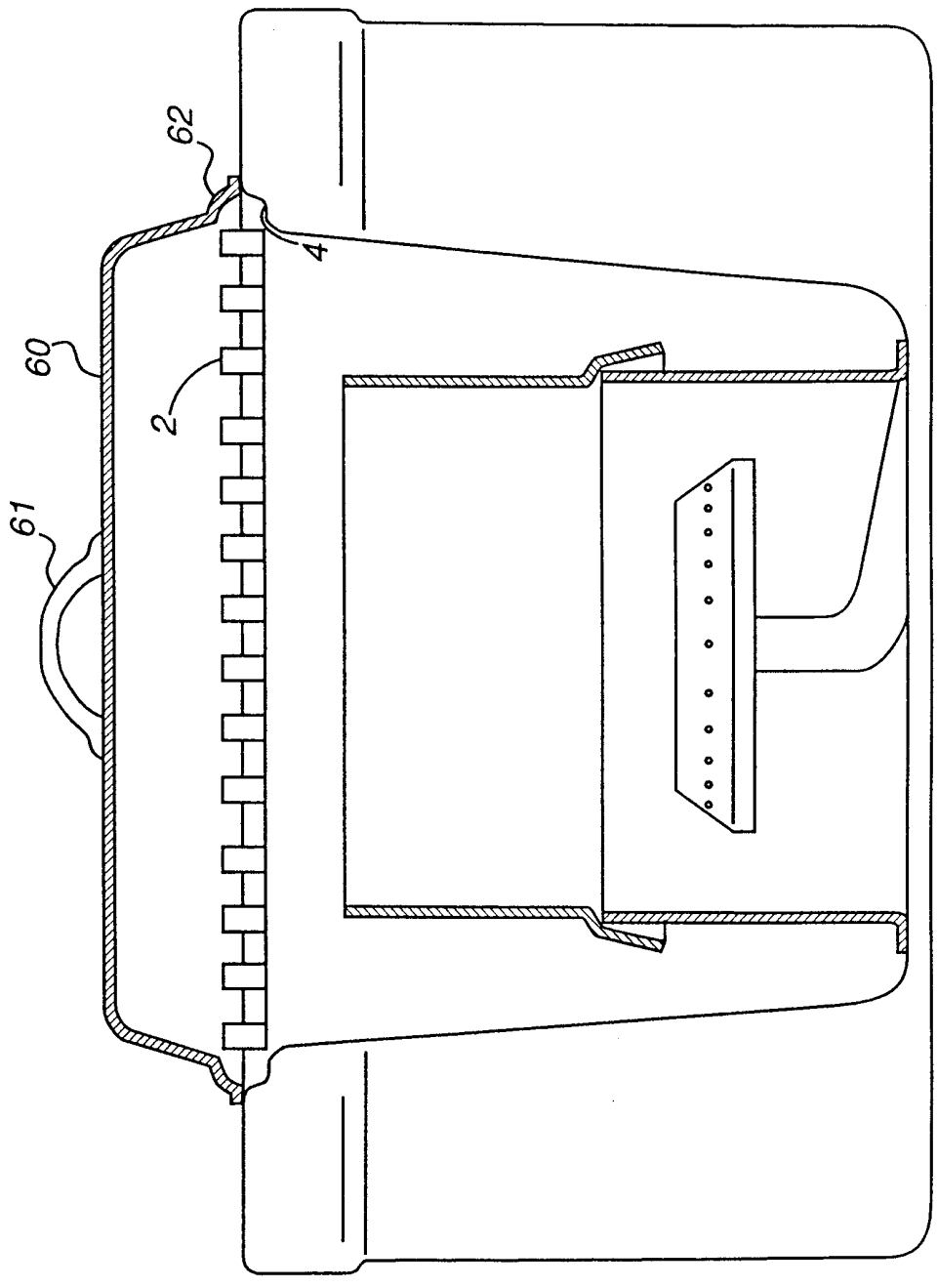

FIG. 6

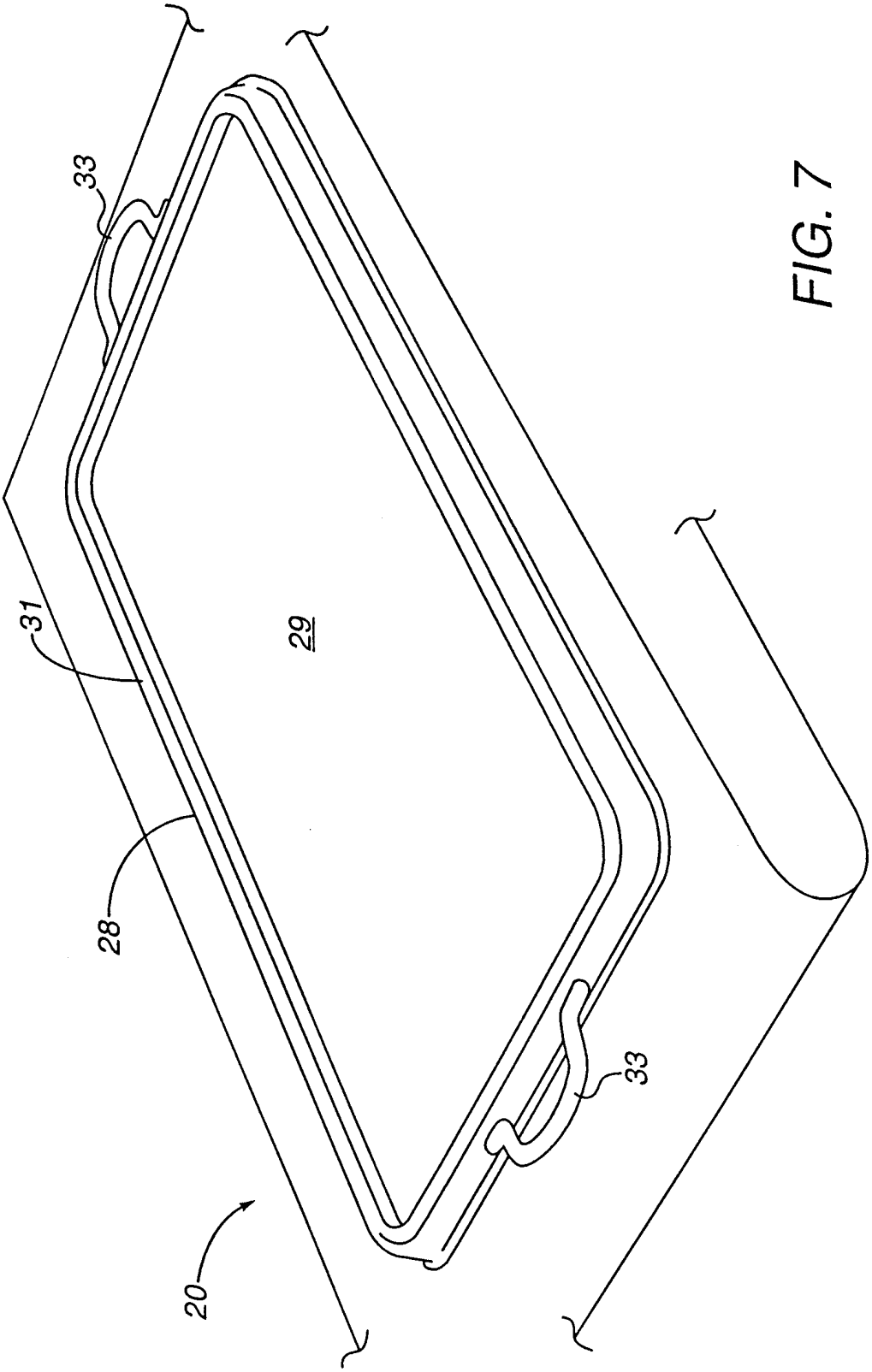

FIG. 7

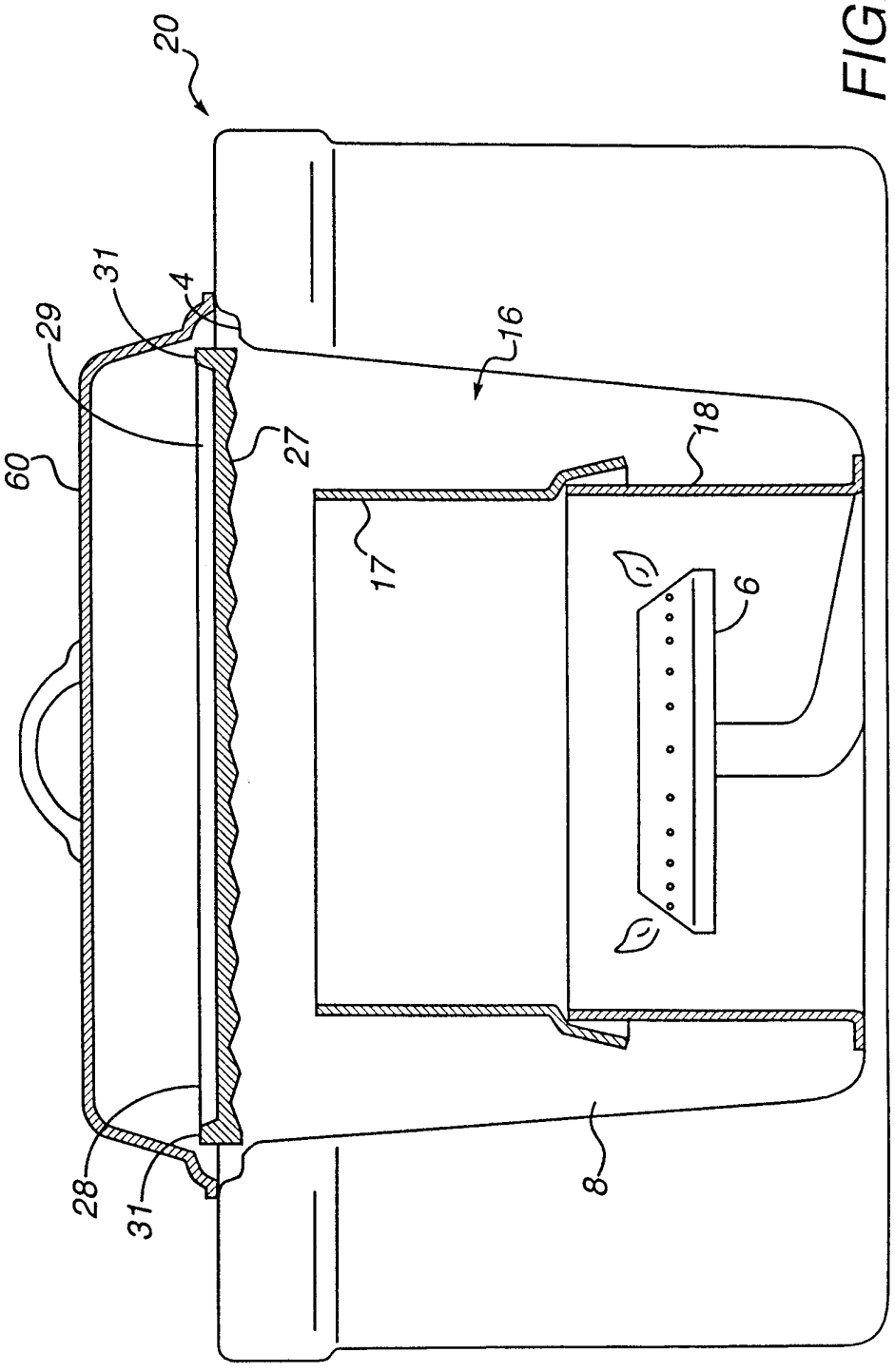

FIG. 8

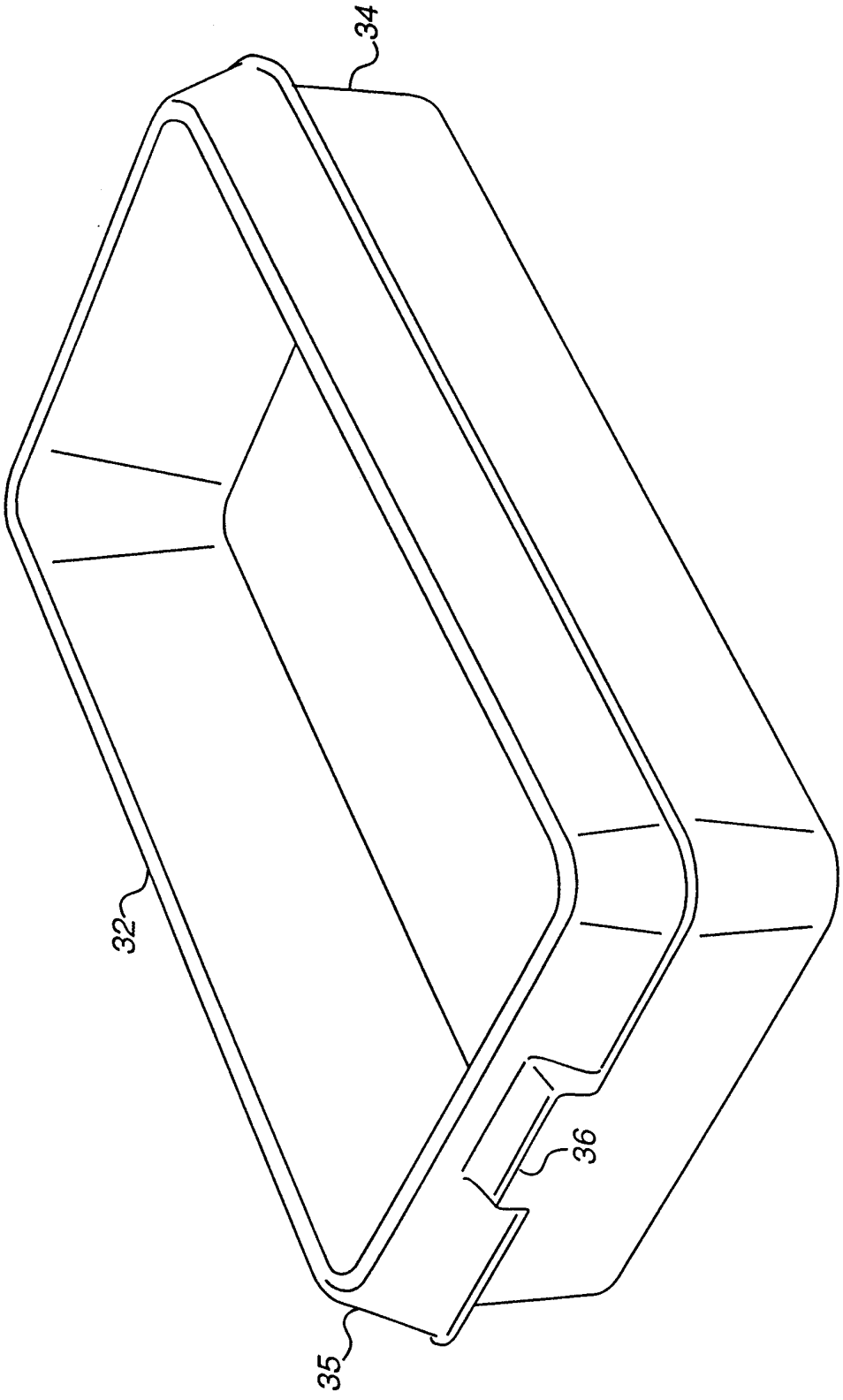

FIG. 9

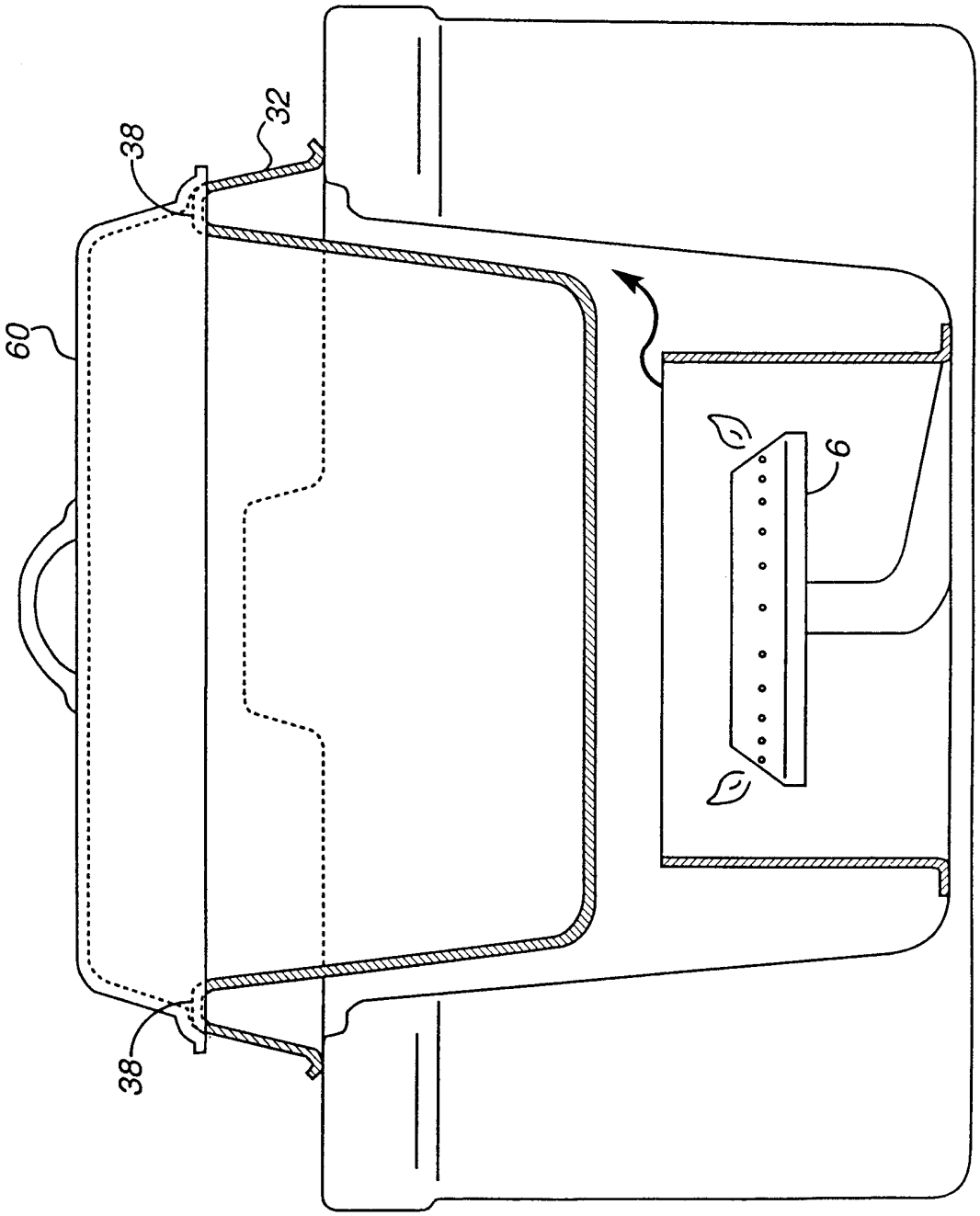

FIG. 10

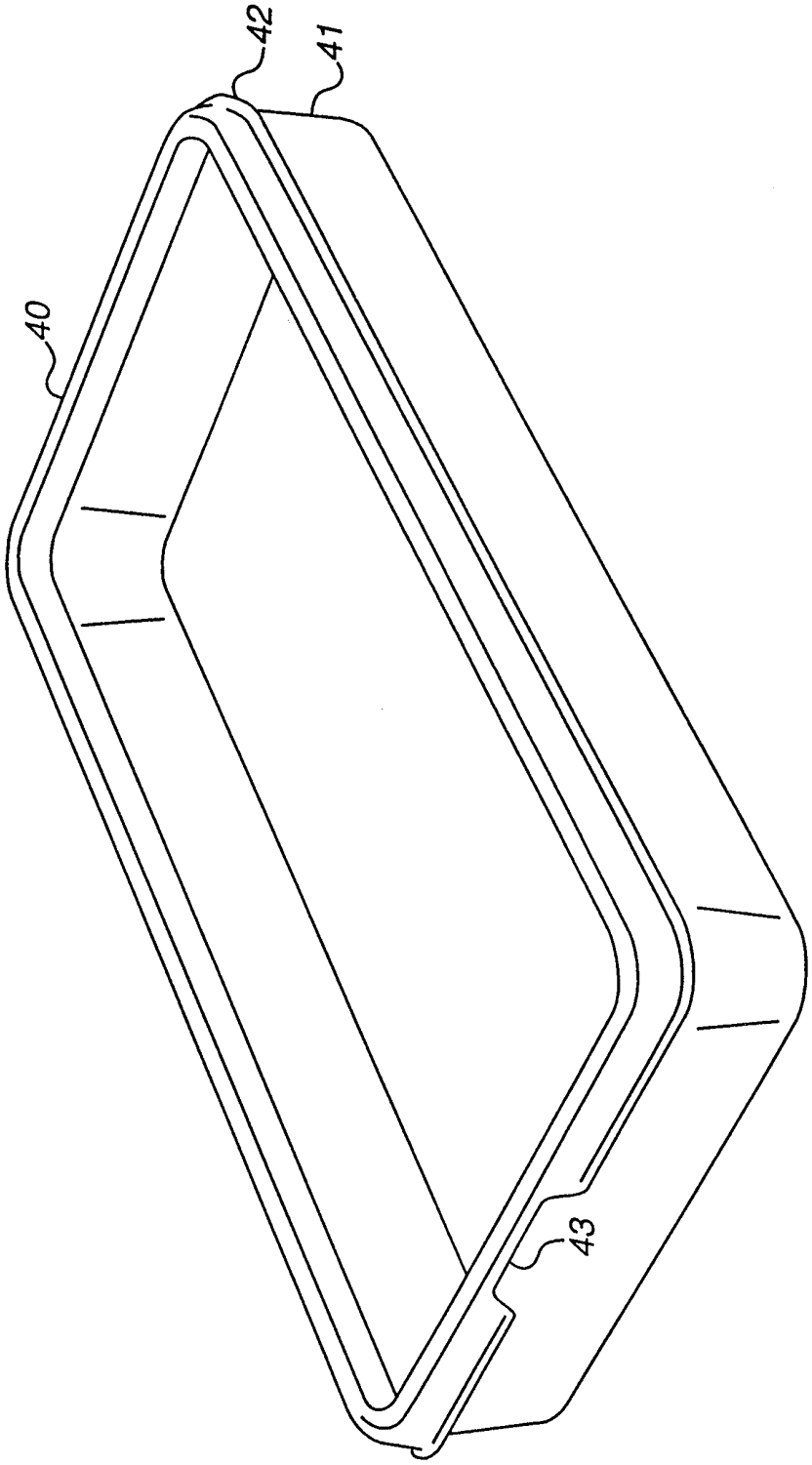

FIG. 11

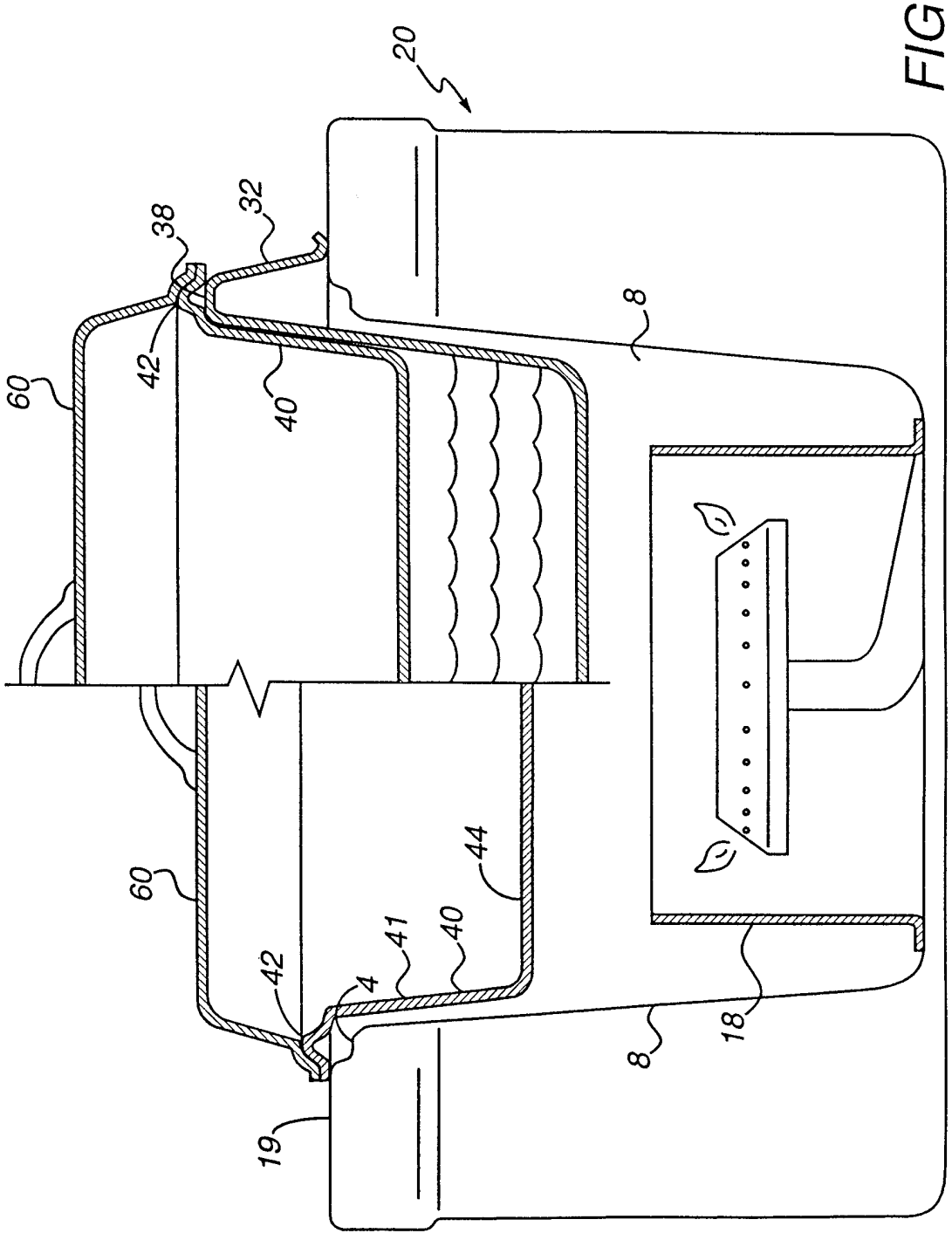

FIG. 12

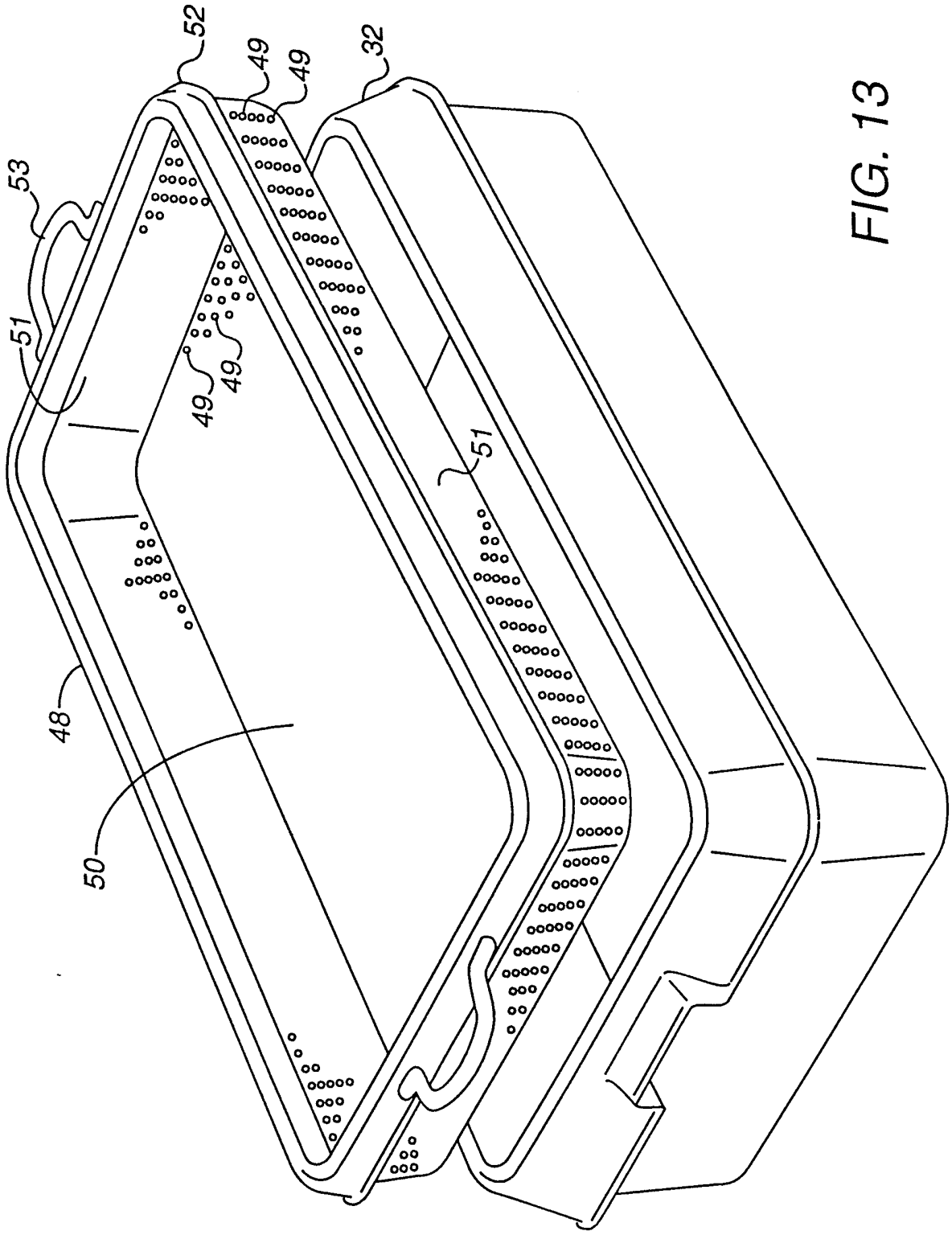

FIG. 13

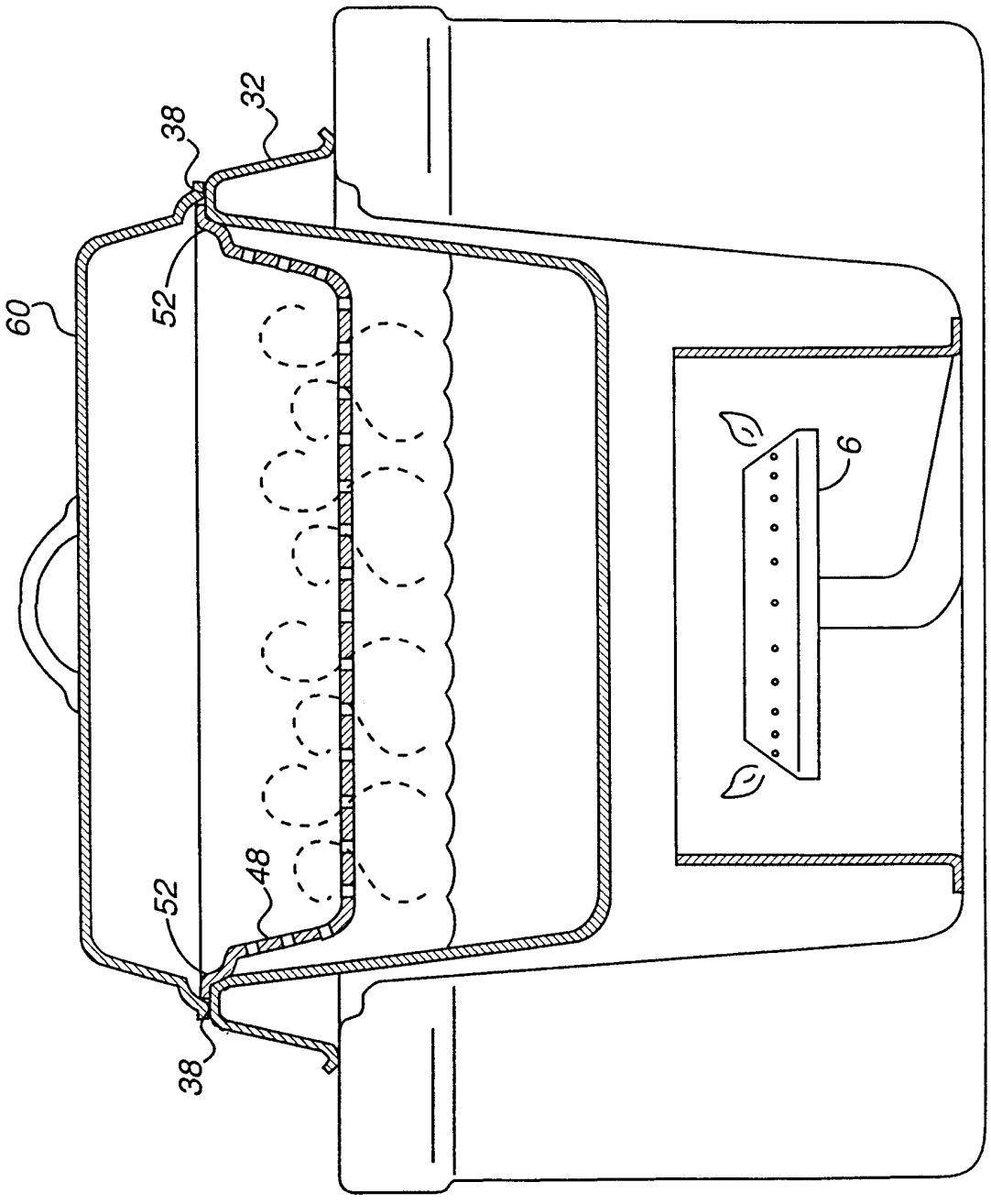

FIG. 14

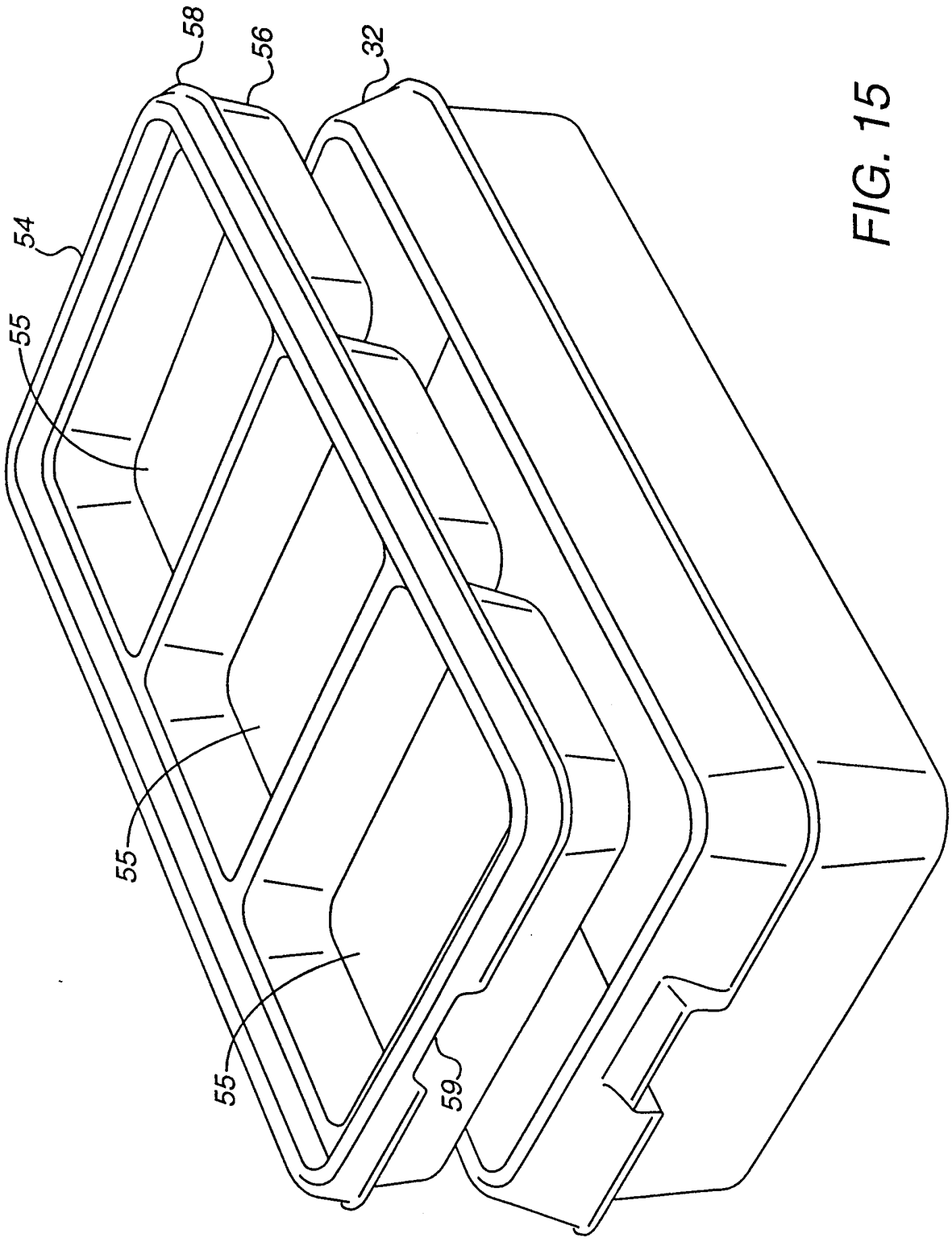

FIG. 15

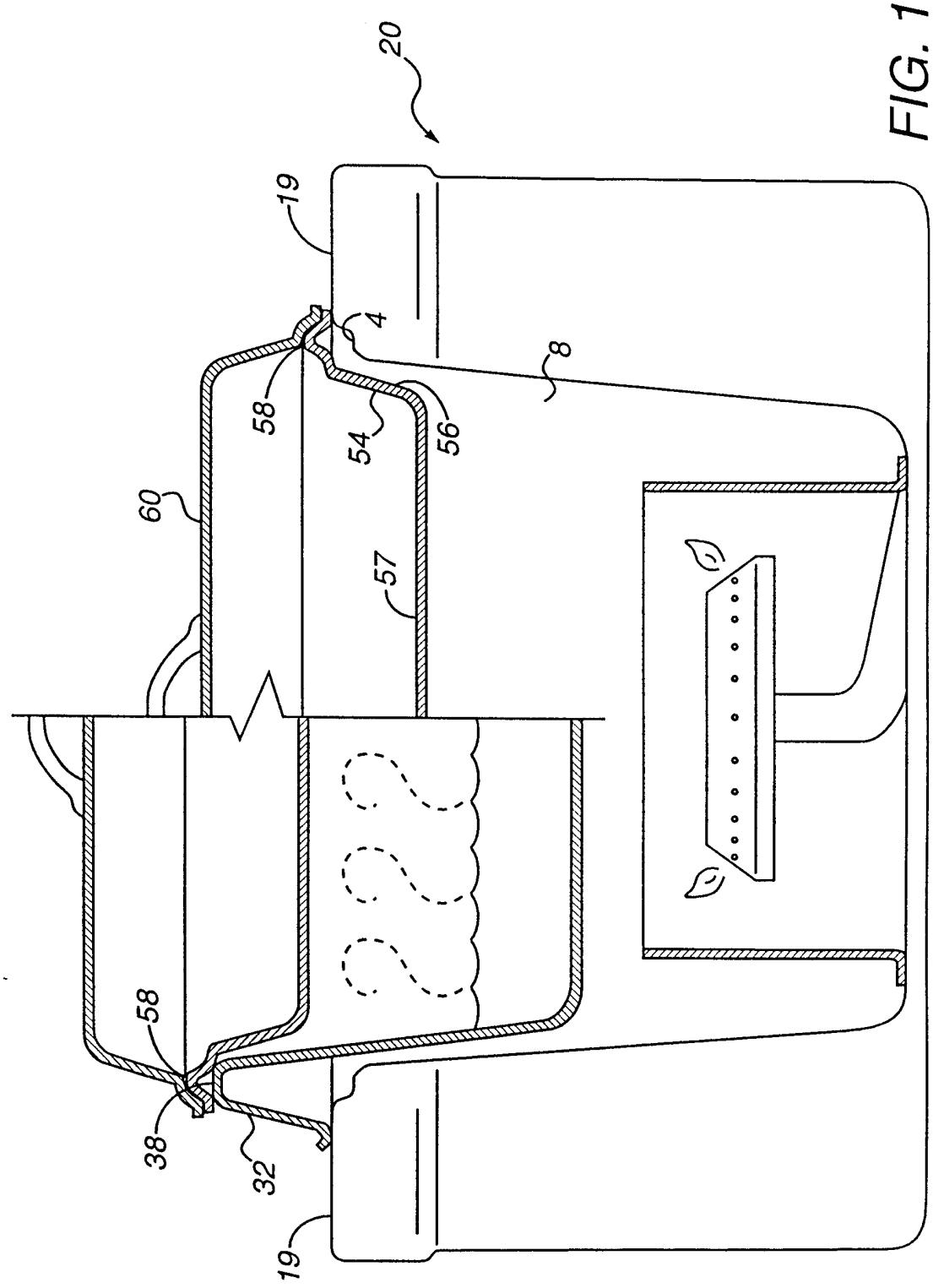

FIG. 16

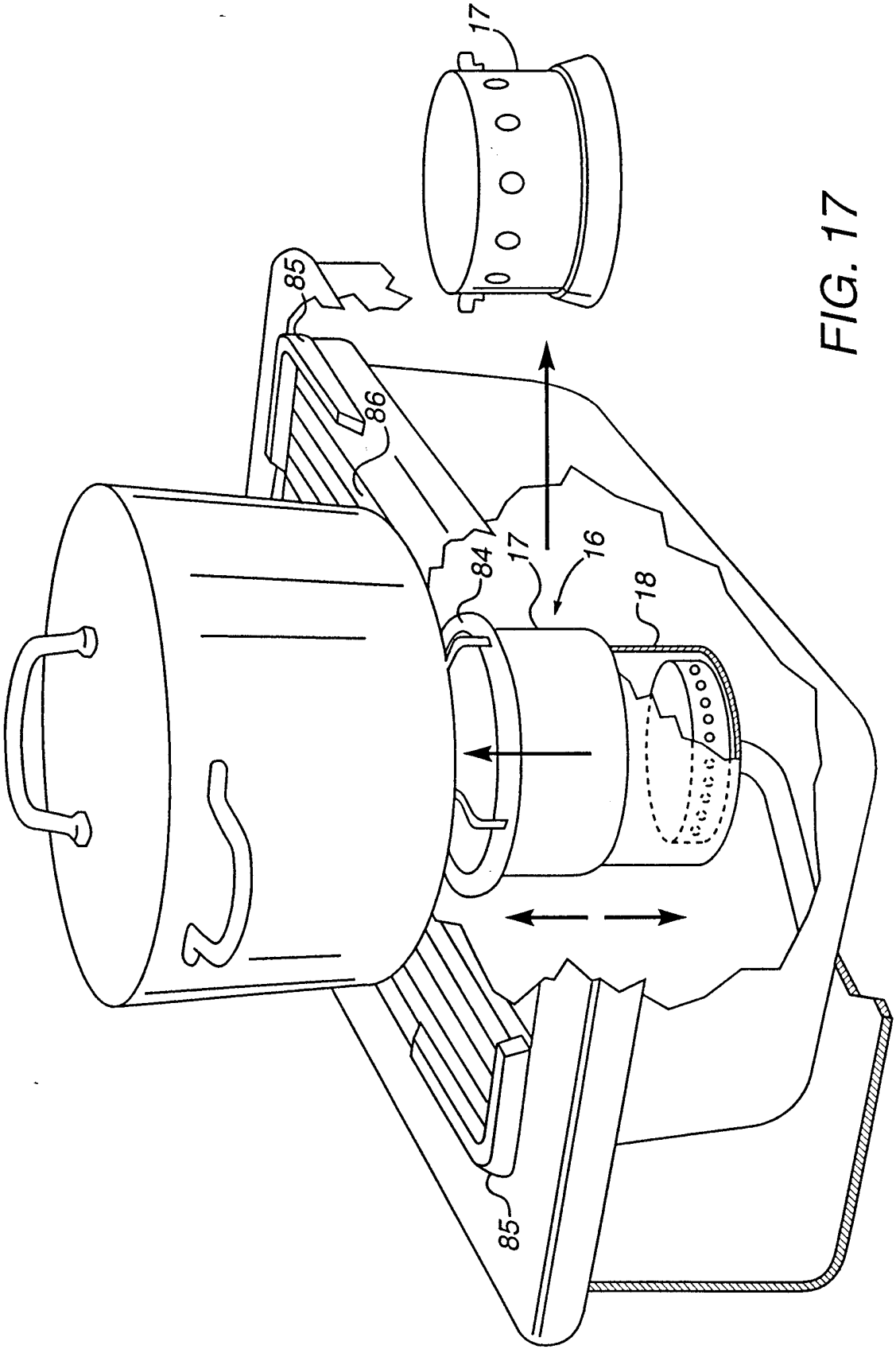

FIG. 17

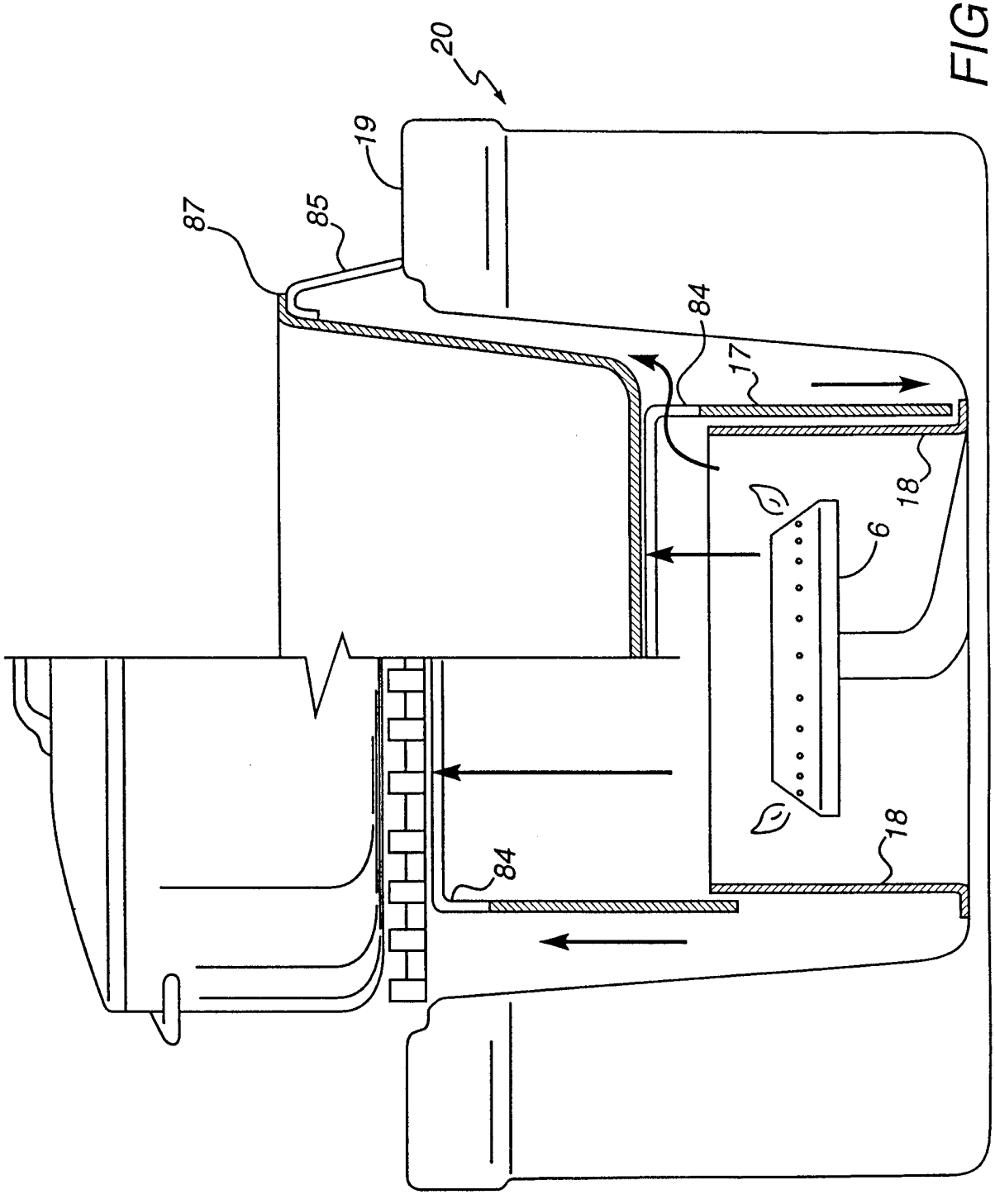

FIG. 18

INTERNATIONAL SEARCH REPORT

Inter nal Application No
PCT/US 98/16445

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 A47J37/07 A47J36/24

According to International Patent Classification(IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 A47J

Documentation searched other than minimumdocumentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X Y	US 5 517 903 A (KAUFMAN KENNETH L) 21 May 1996 see column 2, line 34 - column 5, line 43; figure 1	1-4,11, 12 5-7
Y A	US 5 638 808 A (HOME WILLIAM) 17 June 1997 see the whole document	5-7 1,13
X A	US 4 920 873 A (STEVENS KENNETH V) 1 May 1990 see column 2, line 19 - column 3, line 42; figures 1,3,4	1-4,11, 12 5-7,13
X	US 5 119 800 A (ROBERTS MELVIN F ET AL) 9 June 1992 see column 3, line 19 - column 6, line 10; figures 3,5	1,2

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

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"O" document referring to an oral disclosure, use, exhibition or other means

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"&" document member of the same patent family

Date of the actual completion of theinternational search	Date of mailing of the international search report
17 November 1998	25/11/1998

Name and mailing address of the ISA	Authorized officer
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INTERNATIONAL SEARCH REPORT

Inter. ɔnal Application No
PCT/US 98/16445

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	FR 2 597 198 A (RAMOND MARCEL) 16 October 1987 see page 3, line 10 - page 6, line 16; figures	1-13
A	US 4 164 930 A (JOHNSTON HAROLD E) 21 August 1979 see column 2, line 15 - column 6, line 19; figures 1,3,5,7	1-13
A	GB 695 447 A (BANKS C.) 12 August 1953 see page 1, line 94 - page 2, line 46; figure 1	1,13

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INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter ional Application No
PCT/US 98/16445

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US 5638808 A	17-06-1997	CA 2158673 A	21-03-1997
		FR 2739542 A	11-04-1997
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