



(22) Date de dépôt/Filing Date: 2018/12/05
(41) Mise à la disp. pub./Open to Public Insp.: 2019/07/09
(45) Date de délivrance/Issue Date: 2019/12/24

(51) Cl.Int./Int.Cl. *A47J 31/02* (2006.01),
A47J 31/18 (2006.01)
(72) Inventeur/Inventor:
SWARTZ, GARY I, CA
(73) Propriétaire/Owner:
SWARTZ, GARY I, CA
(74) Agent: LOVELAND, DAMIEN G.

(54) Titre : CAFETIERE POUR FOUR A MICRO-ONDES
(54) Title: MICROWAVE COFFEE-MAKER

(57) **Abrégé/Abstract:**

A coffee-maker to make coffee in a microwave oven consists of: a plastic vessel having a bottom with a hole into which is inserted a downward facing umbrella valve; expression vent holes covered by the valve; a side-wall; a plastic lid; and a plastic and nylon mesh filter basket with a flange on its bottom exterior, inserted into the vessel to create a shallow cavity above the valve and below the basket, and a larger cavity above the basket for ground coffee and water. The coffee-maker sits on a mug. When the water boils, steam opens the valve and hot coffee is expressed through the holes. If the valve fails, an upper umbrella valve relieves the pressure. The upper umbrella valve has a handle to open it manually, to equalize the pressure in order to remove the lid.

ABSTRACT

A coffee-maker to make coffee in a microwave oven consists of: a plastic vessel having a bottom with a hole into which is inserted a downward facing umbrella valve; expression vent holes covered by the valve; a side-wall; a plastic lid; and a plastic and nylon mesh filter basket with a flange on its bottom exterior, inserted into the vessel to create a shallow cavity above the valve and below the basket, and a larger cavity above the basket for ground coffee and water. The coffee-maker sits on a mug. When the water boils, steam opens the valve and hot coffee is expressed through the holes. If the valve fails, an upper umbrella valve relieves the pressure. The upper umbrella valve has a handle to open it manually, to equalize the pressure in order to remove the lid.

MICROWAVE COFFEE-MAKER

TECHNICAL FIELD

[0001] The present invention is directed to a novel coffee-maker that is essentially a pressure vessel with an umbrella valve in the bottom that releases an infusion of coffee under the steam pressure of water just boiled in a microwave oven, more particularly a microwaveable coffee-maker.

BACKGROUND

[0002] Easily-made, single-portion, freshly brewed coffee is very popular. Typical devices use disposable pods which have a negative environmental impact (metal). Individual servings are relatively expensive as they require a sophisticated manufacturing process beyond simply grinding coffee beans. The devices are not particularly mobile. The devices themselves are relatively expensive. The blends of coffee available in pods are restricted to those manufacturers choose to offer. There are multiple pod standards. There is limited flexibility as to the strength of the coffee made.

[0003] In view of the current state of the art, there is a need for a device that can quickly, conveniently and inexpensively brew a single cup of coffee; that allows flexibility as to the strength of the coffee; that can use any blend of coffee beans or ground coffee; and that is inexpensive to acquire.

[0004] Citations: US4577080A - Coffee maker adapted for use in a microwave oven; US8485089B2 - Microwave coffee maker; US5095185A - Microwave coffee maker

SUMMARY OF INVENTION

[0005] The present invention is directed to a quick and convenient method and device to freshly brew coffee in a microwave oven.

BRIEF DESCRIPTION OF THE DRAWING

[0006] FIG. 1 is a cross-sectional drawing representing a microwave coffee-maker according to an embodiment of the present invention.

DESCRIPTION OF INVENTION

A. Reference numbers

[0007] Reference may now be made to the drawing which illustrates various preferred embodiments that the invention may take in physical form and in certain parts and arrangement of parts wherein:

1. Round container vessel consisting of a bottom wall and side walls
2. Screw on lid
3. Lid umbrella valve
4. Bottom umbrella valve
5. Nylon mesh filter basket
6. Nylon mesh
7. Pressure release vent holes
8. Expression vent holes
9. Vessel threads
10. Lid threads
11. Bottom-wall exterior flange
12. Lid gasket
13. Filter basket flange
14. Pressure release handle
15. Groove
16. Concave flexible flaps

B. Exemplary Apparatus

[0008] A coffee-maker that is used to make coffee in a microwave oven that consists of: a cup-like clear plastic vessel having a flat bottom-wall with a round hole in its centre into

which is inserted a downward facing food safe silicon umbrella valve plus 2 – 4 expression vent holes covered by the umbrella valve; a side-wall extending vertically from the bottom-wall with threads for a lid; a plastic inverted-U shaped lid with an air-tight food safe silicon gasket around its interior edge and shaped to press air-tight against the lip of the vessel with threads to allow the lid to be screwed tightly onto the vessel, and with a round hole in the center of the lid into which is inserted an upward facing food safe umbrella valve with a pressure release handle plus 1 or more pressure release vent holes covered by the umbrella valve; and a plastic and nylon mesh filter basket with a small flange on its bottom exterior to be inserted into the vessel and sit on the bottom-wall to create a shallow cavity above the bottom-wall umbrella valve and below the basket, and a larger cavity above the basket, into which are put ground coffee and water. A flange extends from the exterior bottom-wall of the vessel with a lesser diameter than the vessel to enable the coffee-maker to sit securely in a cup or mug.

[0009] In order to make coffee, the coffee-maker sits on and slightly into a typical coffee cup or mug. A nylon mesh filter-basket, ground coffee and a cup of water are put into the filter-basket and the lid is screwed on tight to create an air-tight seal between the lid and the vessel. Both umbrella valves also make the vessel air-tight. As result, no water can escape from the vessel prior to the opening of the lower umbrella valve.

[0010] Next the coffee-maker and cup are put into a microwave oven. The device and contents are heated in the microwave oven at the high setting for the length of time the microwave oven requires to boil a cup of water (approximately two to two and a half minutes) plus 5-10 seconds. When the water in the vessel boils, the steam created generates the pressure required to open the lower umbrella valve and the hot coffee infusion (freshly brewed coffee) is rapidly expressed through the expression vent holes. The nylon mesh prevents contamination of the coffee infusion with coffee grinds. If the lower umbrella valve fails to open, the upper umbrella valve opens to relieve the steam pressure in the vessel while the screwed on lid is designed to resist the pressure.

[0011] After the coffee has been made and the device removed from the microwave oven and begins to cool, the interior of the coffee-maker contains a partial vacuum and the upper umbrella valve has a small handle to enable it to be opened manually to allow air to enter the coffee-maker to equalize the pressure in order to easily remove the lid. It should be noted the device does not require metal or bi-metal parts, melting parts or essentially moving parts such as are typical with other patented or patent applied for microwave coffee-makers.

[0012] In one non-limiting aspect of the present invention, there is provided a clear plastic microwave coffee-maker that includes a round container vessel (1) having a bottom-wall with a downward facing exterior flange (11), a side-wall that extends upwardly from the bottom-wall to form a container cavity with threads around the lip (9); a nylon mesh filter basket (5) with a flange (13); and a screw on lid (2) with a gasket (12) and threads on the interior side wall (10). The bottom-wall includes a food safe umbrella valve (4) plus 2–4 expression vent holes (8) covered by the umbrella valve to enable a hot coffee infusion to be expressed from the container cavity. The lid is designed to create an air-tight seal with a food safe gasket around the interior diameter and has a food safe umbrella valve (3) with a pressure release handle (14) plus 1 or more pressure release vent holes (7) covered by the umbrella valve to allow for pressure release if the lower umbrella valve fails to open. The umbrella valves have concave flexible flaps (16) that become convex under sufficient steam pressure to allow venting. The nylon mesh filter basket is immersed in water and contains ground coffee. The nylon mesh (6) is sufficiently fine to prevent ground coffee granules from expressing out of the vessel expression vent holes and contaminating the freshly brewed coffee. There are one or more grooves (15) on the outside bottom of the coffee-maker to allow air to easily vent from the cup being filled with coffee. The vessel is made of clear plastic to visually monitor boiling and venting.

[0013] In another and/or alternative aspect of the present invention, the coffee-maker could be made of coloured plastic, ceramic pottery, glass or similar non-metallic material. Said aspect would require a method to maintain the airtight seal other than threads such

as making the lid heavy enough to resist the steam pressure generated in the coffee-maker or clamps to hold the lid tight against the lip. Visual monitoring might not be possible.

[0014] In another aspect of the invention the umbrella valves are made of food safe rubber or similar material in place of silicon.

[0015] In another aspect of the invention the lower umbrella valve could be a duckbill or similar pressure operated one-way valve.

[0016] In another aspect of the invention the lid is made entirely of food-safe rubber or silicon or similar material with an umbrella release valve that would release at a higher pressure than the bottom valve and designed to wrap around a lid similar to the lid on some travel mugs. The vessel would require an exterior facing lip for the lid to wrap around. Said lid would be ideal for a ceramic vessel.

[0017] In another aspect the present invention it could be used to brew tea or an herbal infusion.

[0018] In another aspect, milk could be used instead of water.

[0019] In another aspect of the invention milk and sugar could be added to the water.

[0020] In another aspect of the present invention there are small handles on the lid and/or vessel.

[0021] In another aspect of the invention it uses a disposable paper filter and would include a plastic or ceramic device to help retain the integrity and shape of the paper filter in boiling water.

[0022] In another aspect of the invention it can use more or less than a cup of water.

[0023] These and other objects of the present invention will become readily apparent upon further review of the following claims and drawings.

C. Original Claim Support

[0024] A clear plastic coffee-maker that sits on and partially within a typical coffee mug or cup comprising: a vessel having a bottom-wall, a side-wall extending upwardly from said bottom-wall to form a container cavity; a plastic and nylon mesh filter basket that forms a small cavity below it and a larger cavity above it; and a lid with a gasket and threads; said bottom-wall including 2 – 4 expression vent holes and an umbrella valve that covers the holes, said umbrella valve manufactured to immediately open under the pressure of steam generated by water in the vessel just brought to the boil and that by opening enables an infusion of hot, freshly brewed coffee to be expressed from said container cavities; said lid with a gasket that when screwed onto the vessel forms a locked, airtight seal over the top of said container cavities, said seal to provide greater resistance to the steam pressure generated by boiling water than an umbrella valve; said lid including 1 or more pressure release vent holes and an umbrella valve that covers the holes manufactured to open at slightly more pressure than the lower umbrella valve should the lower umbrella valve fail to open.

[0025] In an embodiment, the coffee-maker as designed in paragraph [0024] is equal to or larger in exterior diameter than the coffee cup upon which it will sit to prevent the bulk of the vessel from entering the coffee cup.

[0026] The coffee-maker as designed in paragraph [0024] has a flange extending downward from the exterior bottom wall that is smaller in diameter than the exterior diameter of the main vessel and smaller in diameter than the interior diameter of a typical coffee cup or mug, so that the coffee-maker can snugly sit on and partially within a typical coffee cup.

[0027] The coffee-maker as designed in paragraph [0024] has one or more grooves engraved in the outside bottom edge to allow air inside the coffee cup to freely escape from the coffee cup.

[0028] The coffee-maker as designed in paragraphs [0024] and [0027] with the lid in position to create an airtight seal is so designed as to retain water for sufficient time for it

to be heated to the boil point in order to form a typical infusion with ground coffee, and at the boiling point for the lower umbrella valve to open and for the infusion of coffee to express rapidly through the expression vent holes into a coffee cup or mug.

[0029] The side-wall as designed in paragraph [0024] has at its exterior top threads to accommodate a screw on lid.

[0030] The screw on lid as designed in paragraph [0028] has a top-wall with a food safe gasket on the interior and a side-wall that extends downward, has a very slightly larger inside diameter than the outside diameter of the main vessel threads and has its own threads that allow it to be screwed tightly onto the exterior side-wall of the vessel in order to press the gasket tightly against the rim of the vessel in order to form an airtight barrier requiring significant steam pressure to break the air-tight seal. There is an umbrella valve in the center of the lid with a pressure release handle and with 1 or more pressure release vent holes that releases under less steam pressure than would be required to break the gasket seal and more steam pressure than is required to open the lower umbrella valve.

[0031] The vent holes as designed in paragraphs [0024] and [0030] are dispersed to evenly distribute pressure against the concave flexible flaps of the umbrella valve.

[0032] The coffee-maker as designed in paragraph [0024] with the lid in position to create an airtight seal is so designed as to retain water for sufficient time for it to be heated to the boil point in order to form a typical infusion with ground coffee, and at the boiling point for the lower umbrella valve to open and for the infusion of coffee to express through the expression vent holes.

[0033] The umbrella valves as designed in paragraph [0024] are food-safe and intended to be replaceable.

[0034] The plastic nylon mesh filter basket designed in paragraph [0024] has downward facing flange on the interior of the bottom-wall to create a cavity above the umbrella vent and expression vent holes so as to not block the holes.

[0035] The nylon mesh designed in paragraph [0034] is sufficiently fine to prevent coffee grinds from passing through it thereby contaminating the freshly brewed coffee.

[0036] The nylon mesh designed in paragraph [0034] is strong enough when sufficiently supported by the plastic basket so as not to lose its shape or integrity in boiling water.

[0037] The plastic nylon mesh filter basket designed in paragraph [0024] allows a sufficient volume of boiling water to pass through the ground coffee to create an acceptable coffee infusion before being expressed out of the expression vent holes.

[0038] The expression vent holes designed in paragraph [0024] are intended to enable the vessel to express the coffee infusion as rapidly as possible to limit the time the coffee grinds are exposed to boiling water.

CLAIMS

1. A coffee-maker comprising:
 - a vessel having a bottom wall and a fluid communication through the bottom wall;
 - a side wall extending upwards from the bottom wall to form a cavity;
 - a lower valve attached below the vessel and covering the fluid communication;
 - a filter inside the cavity;
 - a lid with at least one vent hole that attaches to the vessel to form a seal between the lid and the vessel; and
 - an upper valve on top of the lid and covering the at least one vent hole, wherein the upper valve opens at a higher pressure than the lower valve.
2. The coffee-maker of claim 1, wherein the fluid communication comprises two or more expression vent holes.
3. The coffee-maker of claim 1, wherein the lower valve opens when water boils in the vessel.
4. The coffee-maker of claim 3, wherein the lower valve opens immediately as a result of steam pressure generated when water is just brought to boil in the vessel.
5. The coffee-maker of claim 1, wherein the lower valve is an umbrella valve.
6. The coffee-maker of claim 5, wherein the fluid communication comprises two or more expression vent holes, wherein the expression vent holes are dispersed to distribute pressure against flexible flaps of the umbrella valve.
7. The coffee-maker of claim 1, wherein the lower valve is a duckbill valve.
8. The coffee-maker of claim 1, wherein the lower valve is a pressure-operated one-way valve.

9. The coffee-maker of claim 1, wherein, when coffee grinds and water are placed in the filter and the coffee-maker microwaved, infused coffee is expressed through the fluid communication and lower valve when the water boils.
10. The coffee-maker of claim 1, wherein the lid attaches to the vessel via screw threads.
11. The coffee-maker of claim 1, wherein the lid has a gasket that forms the seal.
12. The coffee-maker of claim 1, wherein the vessel is equal or larger in exterior diameter than a cup or mug onto which the coffee-maker is placed.
13. The coffee-maker of claim 12, comprising a flange extending downward from the bottom wall, the flange being smaller in diameter than the exterior diameter of the vessel and smaller in diameter than an interior diameter the cup or mug.
14. The coffee-maker of claim 1, wherein one or more grooves are located in an outside bottom edge of the vessel in order to release air from a coffee cup or mug onto which the coffee-maker is placed.
15. The coffee-maker of claim 1, wherein the upper valve is an umbrella valve.
16. The coffee-maker of claim 15, wherein the umbrella valve has a pressure release handle and opens under less pressure than would be required to break the seal.
17. The coffee-maker of claim 15 comprising at least two vent holes, wherein the vent holes are dispersed to distribute pressure against flexible flaps of the umbrella valve.
18. The coffee-maker of claim 1, wherein the upper and lower valves are food-safe and replaceable.

19. The coffee-maker of claim 1, wherein the filter has a downward facing flange on an outer, bottom surface thereof that creates a space between the filter and the fluid communication.
20. The coffee-maker of claim 1, wherein the filter is a mesh filter basket.
21. The coffee-maker of claim 1, wherein the filter basket maintains its shape and integrity in boiling water.
22. The coffee-maker of claim 1, wherein the filter is a paper filter.
23. The coffee-maker of claim 1, wherein the filter retains coffee grinds that are placed in the filter.
24. The coffee-maker of claim 1, wherein the vessel is clear.
25. The coffee-maker of claim 1, wherein the vessel is plastic.
26. The coffee-maker of claim 1, wherein the filter comprises nylon.
27. The coffee-maker of claim 1 wherein the seal retains water for sufficient time for the water to be heated to boiling, and for the lower valve to open and express infused coffee from the filter through the fluid communication.
28. The coffee-maker of claim 11, wherein the gasket is food-safe.
29. The coffee-maker of claim 1, wherein the vessel comprises handles attached thereto.
30. The coffee-maker of claim 1, wherein the lid comprises handles attached thereto.

31. The coffee-maker of claim 1, wherein the lid is made entirely from silicone.
32. The coffee-maker of claim 1, wherein the lid is made entirely from rubber.
33. The coffee-maker of claim 1, having no metal parts.
34. The coffee-maker of claim 1, having no melting parts.
35. The coffee-maker of claim 1, wherein the upper valve is attached to the lid via a hole in the lid.
36. The coffee-maker of claim 1, wherein the lower valve is attached to the vessel via a hole in the bottom wall.
37. A method for infusing coffee comprising the steps of:
- placing a filter inside a cavity formed by a vessel having a bottom wall and a side wall extending upwards from the bottom wall;
 - placing water and coffee grinds in the filter;
 - sealing a lid onto the vessel wherein the lid has at least one vent hole and an upper valve on top of the lid and covering the at least one vent hole;
 - placing the vessel on a mug or cup;
 - microwaving the vessel with water and coffee grinds to bring the water to boil; and
 - expressing infused coffee, via steam pressure generated by the boiling water, through a fluid communication through the bottom wall and a lower valve attached below the vessel and covering the fluid communication, into the mug or cup, wherein the upper valve opens at a higher pressure than the lower valve.
38. The method of claim 37 comprising:

after the expressing and after the expressed coffee begins to cool, opening the upper valve to equalize pressure in the cavity.

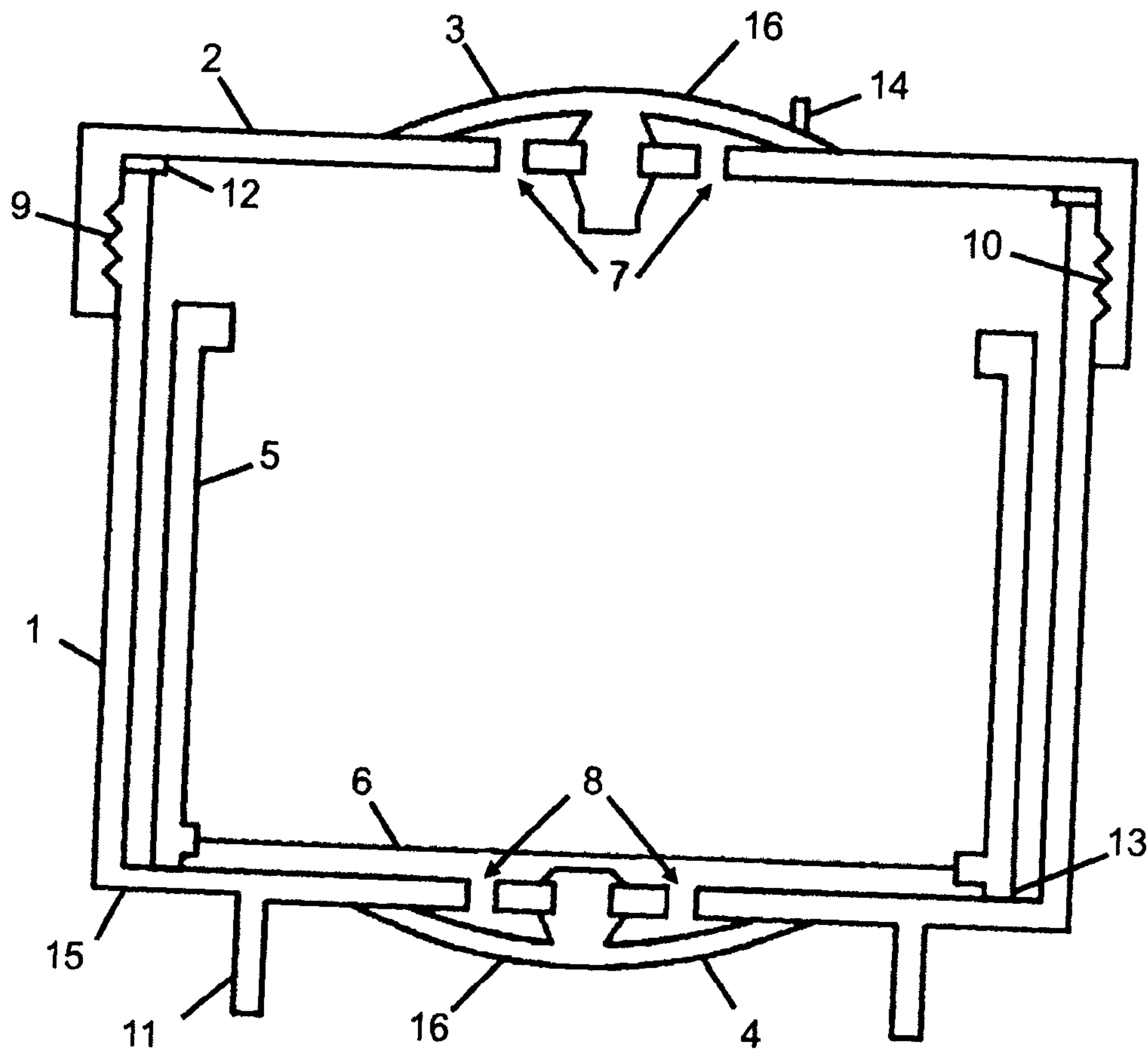


FIG. 1