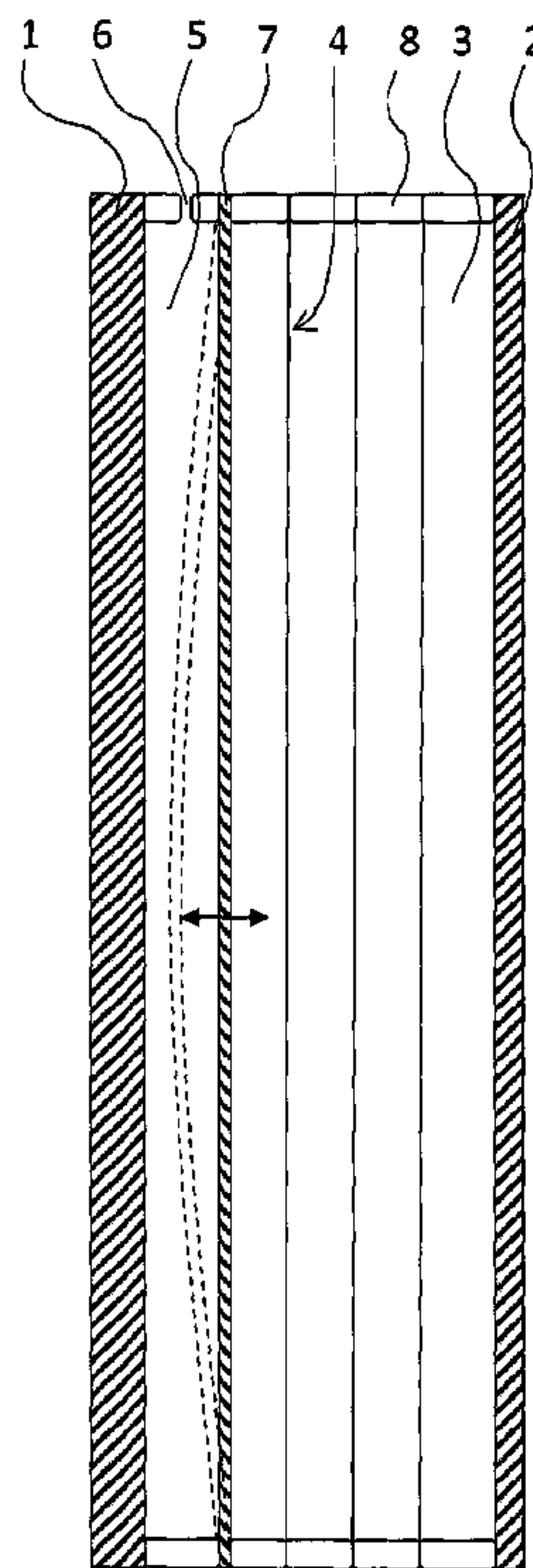




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(54) Title: MULTI CHAMBER GAS FILLED CONSTRUCTION PANEL



(57) **Abrégé/Abstract:**

Multi Chamber gas filled building panel is structured of essentially plan parallel inner (1) and outer (2) plate (fig. 1). Between the plates preferably of glass (1) and (2) there is at least one Chamber (3) filled with insulation glass, said Chambers (in case of plurality thereof) divided between themselves using dividers (4) usually manufactured of transparent polymer foils. The building panel according to this invention in addition features at least one air filled Chamber (5) which is connected to surrounding air via opening (6) enabling inner Volumetrie expansion and contraction of insulation gas.

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(54) Title: MULTI CHAMBER GAS FILLED CONSTRUCTION PANEL

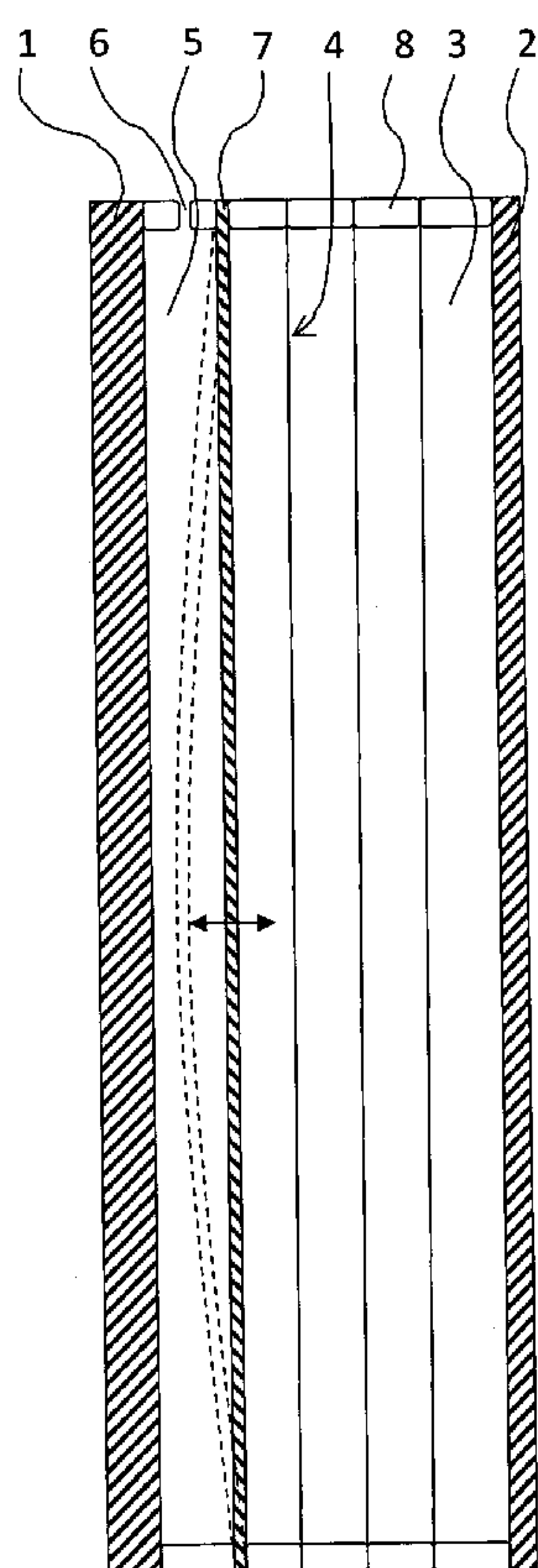


Fig. 1

(57) Abstract: Multi Chamber gas filled building panel is structured of essentially plan parallel inner (1) and outer (2) plate (fig. 1). Between the plates preferably of glass (1) and (2) there is at least one Chamber (3) filled with insulation glass, said Chambers (in case of plurality thereof) divided between themselves using dividers (4) usually manufactured of transparent polymer foils. The building panel according to this invention in addition features at least one air filled Chamber (5) which is connected to surrounding air via opening (6) enabling inner Volumetric expansion and contraction of insulation gas.

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Multi chamber gas filled construction panel

Field of Technology

This invention relates to technical solutions in the area of transparent or translucent heat insulation based on principle of multi chamber gas filled panel (GFP) which is used for general use, in particular in civil engineering, and even more in particular in prefabricated building envelopes - integrated façades.

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Technical problem

Technical problem to be solved by this invention is problem due to significant buckling in or out of outer or inner covering panel during contraction or expansion (hereinafter both processes denoted as “dynamics”) of insulation gas used in gas filled and optionally transparent or translucent building panels while at the same time addressing lack of sealing of insulation gas.

State of the Art

With demise of fossil fuel availability, these fossil fuels having most comfortable mode of use our civilization is facing new ways of use of remaining energy sources. One of possible solutions is reduction of energy use for heating, cooling and erection of buildings. Thermal insulation of buildings is important in achieving reduction of energy use. Having need for effective thermal insulation corresponded to need for insulation systems with low thermal conductivity. These systems use composite panels which use (for their insulation core) also gas filled panels (GFP). Thick gas filled panels may result in buckling in or out of covering panels during extreme temperatures which may cause problems for mechanical or esthetic function of the panel.

State of the art features our own application **WO2011031242** solving problem of dynamics of insulation gas in multi chamber gas filled panel by expansion air chamber, said chamber formed between panel and gas-tight foil which is positioned in concave position during manufacturing. Unfortunately gas-impermeable foils are usually metal and hence not translucent. Otherwise the problem of gas dynamics is solved by allowing of buckling of outer panels plates or by installation of plurality of small gas filled pockets (cushions) which are locally surrounded by air as air allows for dynamics of filled gas. The latter solution is not usable for translucent panels as thin polymer foils do not contain gases for prolonged time.

Summary of the invention

In one embodiment of the present invention there is provided a multi chamber gas filled building panel comprising at least of essentially plan parallel plates, of spacers between chambers, of at least one insulation gas filled chamber, said multi chamber gas filled building panel further comprised of at least one air filled chamber, said air filled chamber on at least one side divided by a gas-impermeable divider, and further that the air filled chamber features at least one opening wherein there are at least two adjacent insulation gas filled chambers divided by a divider or plurality thereof and whereby the opening or openings allow for pressure equalization in order to enable inner volumetric expansion and contraction of the insulation gas.

Detailed description of the invention

Multi chamber gas filled building panel solves above referenced technical problem by construction of building panel comprising essentially plan parallel inner (1) and outer (2) plates (fig. 1), these usually manufactured from tempered float glass.

Fig. 1 used for better depiction of the invention and forming part of this application shows inner plate (1), outer plate (2), insulation gas filled chamber (3), polymer foil (4), air filled chamber (5), opening (6), divider (7), spacer (8).

The plates preferably of glass (1) and (2) are usually approximately 6 to 8 mm thick monolithic or thicker while the glass is either etched glass or composite etched or fully transparent glass. For purposes of this application the composite glass refers to laminated safety glass, fire proof and/or insulation glass (IGU) or some other solution known in state of the art achieving same or similar purpose. Between the plates preferably of glass (1) and (2) there is at least one gas tight chamber (3) filled with insulation gas or insulation gas mixture, said chambers (in case of plurality thereof) divided between themselves using dividers (4) usually manufactured of transparent polymer foils or thin glass. These polymer foils may be commercially available polyester foils whereby the best results were achieved using foils around 0.1 mm in thickness, this in no way limiting this invention and used as an example only. The polymer foils or thin glass (4) may have one sided or both sided low emission coating. The building panel according to this invention in addition features at least one air filled chamber (5) which is connected to surrounding air via opening (6) or plurality thereof for air pressure equalization in order to enable inner volumetric expansion and contraction of insulation gas as shown on the fig.1. Air filled chamber has on one or both sides gas-impermeable divider (7). Said gas-impermeable divider (7) is usually comprised of a float glass preferably thick from 2 to 6 mm, more preferably around 4 mm thick, preferably tempered. Air and gas filled chambers are separated one from another and attached with spacers (8) which may be usual spacers from insulation glass technology. Gas-impermeable (7) may also have low emission coating. The gas-impermeable dividers (7) are in embodiment approximately 50% thinner than inner (1) or outer (2) plate in order to ensure expansion or contraction of gas filled chamber (5) due to expansion or contraction of insulation gas in chambers (3) according to Fig. 1. The plates (1) and (2) may therefore remain approximately flat during summer and winter which is purpose of this invention. Between the spacers, foils and glasses there are appropriate sealants or adhesives, around whole panel there is sealing-adhesive mass which is in this embodiment polysulphide based. For adhesive or sealants one may use those known in manufacturing and assembly of insulation glasses or windows. Opening or plurality thereof (6) are also drilled through sealing-adhesive mass. Said opening or plurality thereof (6) may be additionally connected to surrounding air by means of

appropriate tubes. The air filled chamber should have volume at least approximately 10% of total volume of gas filled chambers (3). The insulation gas in chambers (3) may be usual insulation gas or mixture used in insulation glass technology (IGU) such as Argon, Krypton, Carbon dioxide etc.

Preferred embodiment

The panel of dimensions height 2620 mm and width 1080 mm (fig. 1) is comprised with outer plate (2) of 8 mm tempered glass. Three foils (4) are HM88 of manufacturer Southwall Technologies. Five spacers (8) Chromatech Plus of stainless steel of nominal width 20 mm are manufactured by Rolltech. The divider (7) is comprised of 4 mm thick tempered float glass with low emission coating. Between spacers and dividers there is butyl sealing mass as customary used in insulation glasses and windows. On inner side there is a plate (1) which is composed of insulation glass with intermediate 16 mm spacers, 4 mm tempered glass turned toward panel interior and 8 mm tempered glass turned toward building interior. All glasses were manufactured by local manufacturer Reflex. Across the dividers and inner glasses there is 4 mm of standard polysulphide mass, said mass customary used in insulation glass or windows technology.

The embodiments of the present invention for which an exclusive property or privilege is claimed are defined as follows:

1. A multi chamber gas filled building panel comprising at least of essentially plan parallel plates, of spacers between chambers, of at least one insulation gas filled chamber, said multi chamber gas filled building panel further comprised of at least one air filled chamber, said air filled chamber on at least one side divided by a gas-impermeable divider, and further that the air filled chamber features at least one opening wherein there are at least two adjacent insulation gas filled chambers divided by a divider or plurality thereof and whereby the opening or openings allow for pressure equalization in order to enable inner volumetric expansion and contraction of the insulation gas.
2. The multi chamber gas filled building panel of claim 1, wherein the plan parallel plates comprise outer and inner plates.
3. The building panel according to claim 1 or claim 2 wherein the gas-impermeable divider is comprised of float glass.
4. The building panel according to claim 2 wherein the outer and inner plates are comprised of standard float glass.
5. The building panel according to any one of claims 2 to 4 wherein the gas-impermeable divider has a thickness lower than a thickness of each of the outer and inner plates.
6. The building panel according to claim 1 wherein the gas-impermeable divider is comprised of tempered float glass having a thickness of 2 mm to 6 mm.
7. The building panel according to claim 6 wherein the tempered float glass has a thickness of approximately 4 mm.

8. The building panel according to claim 4 wherein the outer and inner plates are comprised of glass with a thickness of at least 6 mm.

9. The building panel according to claim 1 wherein the openings are holes drilled into the spacer.

10. The building panel according to claim 1 wherein said divider or plurality thereof are comprised of transparent polymer.

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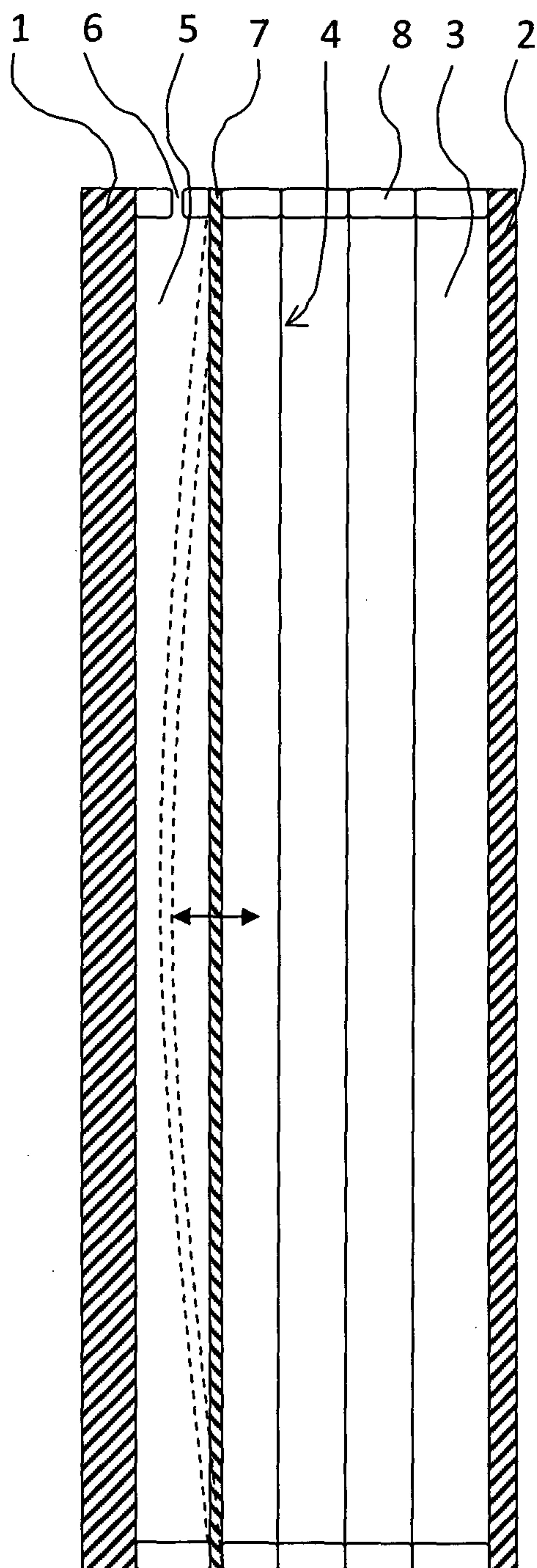


Fig. 1

