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(12) # EUROPEAN PATENT SPECIFICATION

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(73) Proprietor : **Redring Electric Limited**
Redring Works
Peterborough PE2 9JJ (GB)

(72) Inventor : **Welsh, Alan Wilfrid**
38 New Road
Oundle Peterborough (GB)
Inventor : **Cheetham, Trevor William**
1 Deerpark Road Sawtry
Huntingdon Cambridgeshire PE17 5TT (GB)

(74) Representative : **Maury, Richard Philip**
The General Electric Company p.l.c. G.E.C. Patent Department (Wembley Office) Hirst Research Centre
East Lane
Wembley Middlesex HA9 7PP (GB)

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Description

This invention relates to electric hobs of the kind having at least one heating unit replaceably supported within an opening in a hob-plate, and more especially to heating units for use in such hobs.

U.S. Patent No. 3636309 discloses a heating unit of the kind designed to be supported within an opening in a hob-plate, and having a heating surface provided by a plate of glass ceramic material, incorporating a bezel fitting over a peripheral region of the plate, a housing accommodating an insulating support structure having a surface which faces the plate and carries electric heating means, and a wall which surrounds the heating means and serves to space it from the plate, and a plurality of straps spaced around the unit and each anchored at one end to the bezel and at the other end to the housing, so as to clamp the bezel to the housing and thereby to form a substantially rigid unit.

It is also known from U.S. Patent No. 3686477 to bias parts of the heating unit resiliently upwardly against the glass ceramic plate.

An object of the present invention is to provide a heating unit of this type which is capable of fitting more closely within a respective opening in a hob-plate, to provide the maximum practicable heating area.

Accordingly, the invention is characterised in that the glass ceramic plate is sandwiched between the bezel and the wall of the insulating support structure, and in that the housing comprises a first part which carries the insulating support structure, a second part to which the straps are anchored and which is disposed beneath the first part, and compression spring means disposed in the space between the two parts and acting to urge the first part, together with the insulating support structure, towards the glass ceramic plate.

By forming the straps of relatively thin metal, preferably having a thickness of approximately 0.6 mm, the unit can be arranged to get closely within a respective opening in a hob, so as to provide the maximum practicable heating area.

The straps are preferably provided with hooked ends which fit into openings in the bezel, and with openings at their opposite ends which fit over tags on the undersurface of the housing, the tags being bent over to secure the straps in position. However other means of anchoring the straps to the bezel and/or to the housing may be employed.

Preferably the edge of the glass ceramic plate is formed with a peripheral rebate on its upper surface so that the upper surface of the bezel is substantially flush with the upper surface of the plate.

Preferably also the bezel is formed with a downturned outer rim which is arranged to engage the surface of the hob-plate in which the unit is fitted. Preferably the edge of the hob-plate opening is arranged to have an upward ridge which, on assembly, in conjunction with a downward projection on the bezel encloses an annular space within which is contained a resilient seal.

A further seal may be contained in a peripheral rebate in the upper surface of the wall of the insulated support structure. Such a seal is preferably of plastics material such as PTFE.

The invention includes an electric hob unit comprising a hob-plate fitted with one or more heating units in accordance with the first aspect of the invention.

A glass ceramic hob-plate unit in accordance with the invention will now be described by way of example with reference to Figures 1 and 2 of the accompanying schematic drawing, in which

Figure 1 is a plan view from below of part of the unit, and

Figure 2 is a sectional elevation of the unit.

The unit comprises a coiled wire electric heating element 1 stapled or otherwise secured in position on one surface of a circular support 2 of ceramic material. The heating element support 2 is accommodated within a metal casing 3 having a circular base 4 and, around it, an upstanding side wall 5, a soft ceramic blanket 6 being interposed between the support 2 and the base 4 of the casing in order to insulate the staples or other fasteners (not shown) electrically from the casing.

The heating element 1 is surrounded by a ring 7 of ceramic material over which is fitted a glass ceramic plate 8, the ring serving to space the heating element from the lower surface of the plate. Insulated current supply terminals 10 are mounted on the side wall 5 of the case and are connected electrically to the ends of the heating element 1 in known manner.

The glass ceramic plate 8 has a peripheral rebate in its upper surface, around which is fitted a metal bezel 9a in the form of a flat ring having a downward turned outer edge 11, an inner section shaped so as to be in contact with one or both walls of the peripheral rebate of the plate 8, and a cylindrical metal flange 13 surrounding the edge of the plate 8 and at least part of the ceramic ring 7. The edge 11 of the metal bezel 9a is in contact with the outer surface of the hob-plate 21. The hob-plate 21 has, near the edge of its opening 19, an upward annular ridge 27 such that when the hob unit is assembled the said upward ridge 27 and the downward outer edge enclose an annular space 28. Within the annular space 28 is located a resilient seal 29 for the purpose of preventing liquids passing from the outside of the assembled unit to the inside of the assembled unit via the hob-plate-bezel interface. Such a seal 29 may, as shown in the diagram, be circular in cross section or may partially fill the space 28 in any other manner or completely fill it.

The ceramic ring 7 has a peripheral rebate at its upper edge which contains a further seal 30. The seal 30 is preferably a plastics material (suitably

P.T.F.E.) and is situated so as to prevent liquid passing through the interface between the plate 8 and the ring 7. In the case that the melting point of the said seal 30 is lower than the maximum working temperature within the heated chamber containing the element 1 it is desirable that the inner annular lip of the ring 7 is of sufficient thickness to prevent damage to the seal 30 from overheating.

The heating unit comprises, in addition, a metal plate 32 located beneath the base of the casing 3, and in this case the metal bezel 9a is secured to the plate by means of three equally spaced straps 14. Although this example shows three such straps it will of course be understood that the invention also encompasses further embodiments having three or more straps. Each strap has a hooked upper end 15 which passes through a respective opening 16 in the bezel flange 13, and an opening 17 adjacent its lower end which fits over a tag 43 pressed from the plate 32, which tag is subsequently bent inwards to secure the strap.

The base of the casing 3 has welded to it three studs 31 which project downwards through holes in the plate, the shaft of each stud being surrounded by a helical compression spring 33 disposed in the space between the plate 32 and the casing 3.

The attachment of the straps 14 to the plate 32 is such as to compress the springs 33 which causes the casing 3 and heating element support 2 with the ceramic ring 7 to be urged towards the glass ceramic plate 8, ensuring that the top edge of the ring 7 is held securely against the lower surface of the plate, forming a substantially rigid heating unit.

A bridge member 23 is used to clamp the heating unit to the metal hob plate 21, the bridge member being secured by means of a nut 26 screwing on to a stud 25 carried by the metal plate 32.

The use of relatively thin metal straps 14, e. g. of zintec, makes it possible for the unit almost completely to fill a co-operating opening 19 in the hob-plate thereby ensuring the maximum practicable heating area. The straps 14 have a thickness of approximately 0.6 mm and a width of approximately 5.0 mm.

Although not shown in the diagram, a gasket may be disposed between the glass ceramic plate 8 and the bezel 9a, the material for such a gasket possibly being ceramic fibres.

Although the springs 33 are shown in the drawings as helical compression springs, they may be replaced by one or more waved washers or by a number of « Z » shaped springs.

Also the heating element 1, although shown in the drawings as a spiral electrical resistance heating element, may be of any suitable form such as one or more infra-red emitting lamps such as halogen lamps.

Claims

1. A heating unit of the kind designed to be supported within an opening (19) in a hob-plate (21), and having a heating surface provided by a plate (8) of glass ceramic material, incorporating a bezel (9a) fitting over a peripheral region of the plate (8), a housing (3) accommodating an insulating support structure (2, 7) having a surface which faces the plate (8) and carries electric heating means (1), and a wall (7) which surrounds the heating means (1) and serves to space it from the plate (8), and a plurality of straps (14) spaced around the unit and each anchored at one end (15) to the bezel and at the other end (17) to the housing (3), so as to clamp the bezel (9a) to the housing (3) and thereby to form a substantially rigid unit, characterized in that the glass ceramic plate (8) is sandwiched between the bezel (9a) and the wall (7) of the insulating support structure, and in that the housing (3) comprises a first part (3) which carries the insulating support structure (2, 7), a second part (32) to which the straps (14) are anchored and which is disposed beneath the first part (3), and compression springs means (33) disposed in the space between the two parts and acting to urge the first part (3), together with the insulating support structure (2, 7), towards the glass ceramic plate (8).

2. A heating unit according to Claim 1 wherein the straps (14) are formed of relatively thin metal so as to allow the unit to fit closely within the hob-plate opening.

3. A heating unit according to Claim 1 or 2 wherein the straps (14) are provided with hooked ends (15) which fit into openings in the bezel (9a).

4. A heating unit according to Claim 1, 2 or 3, wherein the straps (14) are provided with openings (17) which fit over tags (18, 43) on the undersurface (4, 32) of the housing (3).

5. A heating unit according to Claim 4 wherein the tags (18, 43) are bent over to secure the straps in position.

6. A heating unit according to any preceding claim, wherein the edge of the glass ceramic plate is formed with a peripheral rebate on its upper surface so that the upper surface of the bezel (9a) is substantially flush with the upper surface of the plate (8).

7. A heating unit according to any preceding claim, wherein the bezel (9a) is formed with a downturned outer rim (11) which is arranged to engage the surface of the hob-plate (21) in which the unit is fitted.

8. A heating unit according to any preceding claim, wherein the wall (7) of the insulating support structure has a peripheral rebate in its upper surface, said rebate containing a resilient seal (30).

9. A heating unit according to Claim 8, wherein the seal (30) consists of P.T.F.E.

10. A heating unit according to any preceding claim, wherein said electric heating means comprise an electric resistance heating element (1).

11. A heating unit according to any of Claims 1 to 9, wherein said electric heating means comprise one or more infra-red emitting lamps.

12. An electric hob unit comprising a hot-plate fitting (21) with one or more heating units in accordance with any preceding claim.

13. An electric hob unit according to Claim 12 as appendant to Claim 7, wherein the rim of the associated hob-plate opening (19) is provided with an upwardly directed ridge (27) which, in conjunction with the downturned outer rim (11) on the bezel (9a), encloses an annular space (28) within which is contained a resilient seal (29).

Patentansprüche

1. Heizeinheit der Art, die dazu ausgelegt ist, innerhalb einer Öffnung (19) in einer Kochmuldenplatte (21) gehaltert zu werden, und die eine Heizoberfläche aufweist, die von einer Platte (8) aus Glaskeramikmaterial gebildet ist, enthaltend einen Deckring (9a), der über einen Umfangsbereich der Platte (8) paßt, ein Gehäuse (3), das eine isolierende Halterungsstruktur (2, 7) aufnimmt, die eine Oberfläche aufweist, die der Platte (8) gegenüberliegt und eine elektrische Heizeinrichtung (1) trägt, und eine Wandung (7), die die Heizeinrichtung (1) umgibt und dazu dient, diese von der Platte (8) zu beabstanden, und mehrere Bügel (14), die um die Einheit herum beabstandet angeordnet sind und jeweils an einem Ende (15) am Deckring und am anderen Ende (17) am Gehäuse (3) verankert sind, um so den Deckring (9a) am Gehäuse (3) festzuklammern und hierdurch eine im wesentlichen starre Einheit auszubilden, dadurch gekennzeichnet, daß die Glaskeramikplatte (8) zwischen dem Deckring (9a) und der Wandung (7) der isolierenden Halterungsstruktur sandwichartig angeordnet ist und daß das Gehäuse (3) ein erstes Teil (3), das die isolierende Halterungsstruktur (2, 7) trägt, ein zweites Teil (32), in dem die Bügel (14) verankert sind und das unterhalb des ersten Teils (3) angeordnet ist, und eine Kompressionsfedereinrichtung (33) aufweist, die im Raum zwischen den beiden Teilen angeordnet ist und so wirkt, daß sie das erste Teil (3) zusammen mit der isolierenden Halterungsstruktur (2, 7) zur Glaskeramikplatte (8) hin drückt.

2. Heizeinheit nach Anspruch 1, in welcher die Bügel (14) aus relativ dünnem Metall geformt sind, um zu ermöglichen, daß die Einheit innerhalb der Kochmuldenplattenöffnung dicht eingepaßt ist.

3. Heizeinheit nach Anspruch 1 oder 2, in welcher die Bügel (14) mit hakenförmigen Enden (15) versehen sind, die sich in Öffnungen im Deckring (9a) einfügen.

4. Heizeinheit nach Anspruch 1, 2 oder 3, in welcher die Bügel (14) mit Öffnungen (17) versehen sind, die über Ösen (18, 43) auf der Unterseite (4, 32) des Gehäuses (3) passen.

5. Heizeinheit nach Anspruch 4, in welcher die Ösen (18, 43) umgebogen sind, um die Bügel in ihrer Lage zu fixieren.

6. Heizeinheit nach einem der vorhergehenden Ansprüche, in welcher die Kante der Glaskeramikplatte mit einer Umfangsausfalzung an ihrer oberen Fläche ausgebildet ist, so daß die obere Fläche des Deckrings (9a) im wesentlichen bündig zur oberen Fläche der Platte (8) ist.

7. Heizeinheit nach einem der vorhergehenden Ansprüche, in welcher der Deckring (9a) mit einem nach unten umgebogenen Außenrand (11) ausgebildet ist, der so ausgelegt ist, daß er in Eingriff mit der Oberfläche der Kochmuldenplatte (21) ist, in der die Einheit eingepaßt ist.

8. Heizeinheit nach einem der vorhergehenden Ansprüche, in welcher die Wandung (7) der isolierenden Halterungsstruktur eine Umfangsausfalzung in ihrer oberen Fläche aufweist, welche Ausfalzung eine elastische Dichtung (30) enthält.

9. Heizeinheit nach Anspruch 8, in welcher die Dichtung (30) aus P.T.F.E. besteht.

10. Heizeinheit nach einem der vorhergehenden Ansprüche, in welcher die elektrische Heizeinrichtung ein elektrisches Widerstandsheizelement (1) umfaßt.

11. Heizeinheit nach einem der Ansprüche 1 bis 9, in welcher die elektrische Heizeinrichtung eine oder mehrere Infrarotemissionslampen umfaßt.

12. Elektrische Kochmuldeneinheit, aufweisend eine Kochmuldenplattenausrüstung (21) mit einer oder mehrerer Heizeinheiten nach einem der vorhergehenden Ansprüche.

13. Elektrische Kochmuldeneinheit nach Anspruch 12 in Abhängigkeit von Anspruch 7, in welcher die Randzone der zugehörigen Kochmuldenplattenöffnung (19) mit einer nach oben gerichteten Rippe (27) versehen ist, die in Verbindung mit dem nach unten umgebogenen Außenrand (11) des Deckrings (9a) einen Ringraum (28) umschließt, in dem eine elastische Dichtung (29) enthalten ist.

Revendications

1. Unité de chauffage du type conçu pour être supporté à l'intérieur d'une ouverture (19) dans une plaque chauffante (21), et comportant une surface de chauffage sous forme de plaque (8) en verre céramique, comprenant une portée (9a) disposée sur une zone périphérique de la plaque (8), un corps (3) recevant une structure de support isolante (2, 7) ayant une surface qui est en contact avec la plaque (8) et qui porte un dispositif de chauffage électrique (1), et une paroi (7) qui entoure le dispositif de chauffage (1) et sert à la séparer de la plaque (8), et plusieurs brides (14) disposées autour de l'unité, chacune d'elles ancrée par l'une de leurs extrémités (15) à la portée et par l'autre extrémité (17) au corps (3), de manière à serrer la portée (9a) sur le corps (3), et former ainsi une unité essentiellement rigide, caractérisée par le fait que la plaque en verre céramique (8) est montée en sandwich entre la portée (9a) et la paroi (7) de la structure de support isolante, et par le fait que le corps (3) comporte une première partie (3) qui porte la structure de support isolante (2, 7), une deuxième

partie (32) à laquelle sont ancrées les brides (14) et qui est disposée au-dessous de la première partie (3), et des ressorts de compression (33) disposés dans l'espace entre les deux parties et agissant de manière à forcer la première partie (3), ainsi que la structure de support isolante (2, 7), vers la plaque en verre céramique (8).

2. Unité de chauffage, selon la Revendication No. 1, où les brides (14) sont faites de métal relativement mince de manière à permettre le montage serré de l'unité dans l'ouverture de la plaque chauffante.

3. Unité de chauffage, selon la Revendication No. 1, où les brides (14) sont dotées d'extrémités recourbées (15) qui s'introduisent dans des ouvertures de la portée (9a).

4. Unité de chauffage, selon les Revendications Nos. 1, 2 ou 3, où les brides (14) sont dotées d'ouvertures (17) qui se placent au-dessus de pattes (18, 43) sur la surface inférieure (4, 32) du corps (3).

5. Unité de chauffage, selon la Revendication No. 4, où les pattes (18, 43) sont repliées pour fixer les brides en place.

6. Unité de chauffage, selon l'une quelconque des revendications précédentes, où le bord de la plaque en verre céramique est formé avec un collet périphérique sur sa surface supérieure, de manière à ce que la surface supérieure de la portée (9a) soit essentiellement au même niveau que la surface supérieure de la plaque (8).

7. Unité de chauffage, selon l'une quelconque des revendications précédentes, où la portée (9a) est formée avec un rebord extérieur tourné vers le bas (11), et disposé de manière à entrer en contact avec la surface de la plaque chauffante (21) dans laquelle l'unité est montée.

8. Unité de chauffage, selon l'une quelconque des revendications précédentes, où la paroi (7) de la structure de support isolante comporte un collet périphérique dans sa surface supérieure, ledit collet contenant un joint élastique (30).

9. Unité de chauffage, selon la Revendication No. 8, où le joint (30) est réalisé en P.T.F.E.

10. Unité de chauffage, selon l'une quelconque des revendications précédentes, où ledit dispositif de chauffage électrique comporte une résistance électrique de chauffage (11).

11. Unité de chauffage, selon l'une quelconque des Revendications Nos. 1 à 9, où ledit dispositif de chauffage électrique comporte une ou plusieurs lampes à rayons infrarouges.

12. Unité à plaque électrique comprenant une plaque chauffante (21) avec une ou plusieurs unités de chauffage selon l'une quelconque des revendications précédentes.

13. Unité à plaque électrique selon la Revendication No. 12, accessoire à la Revendication No. 7, où le rebord de l'ouverture (19) correspondante de la plaque chauffante comporte un épaulement orienté vers le haut (27) qui, avec le rebord extérieur (11) tourné vers le bas sur la portée (9a), entoure un espace annulaire (28) dans lequel est monté un joint élastique (29).

Fig. 1.

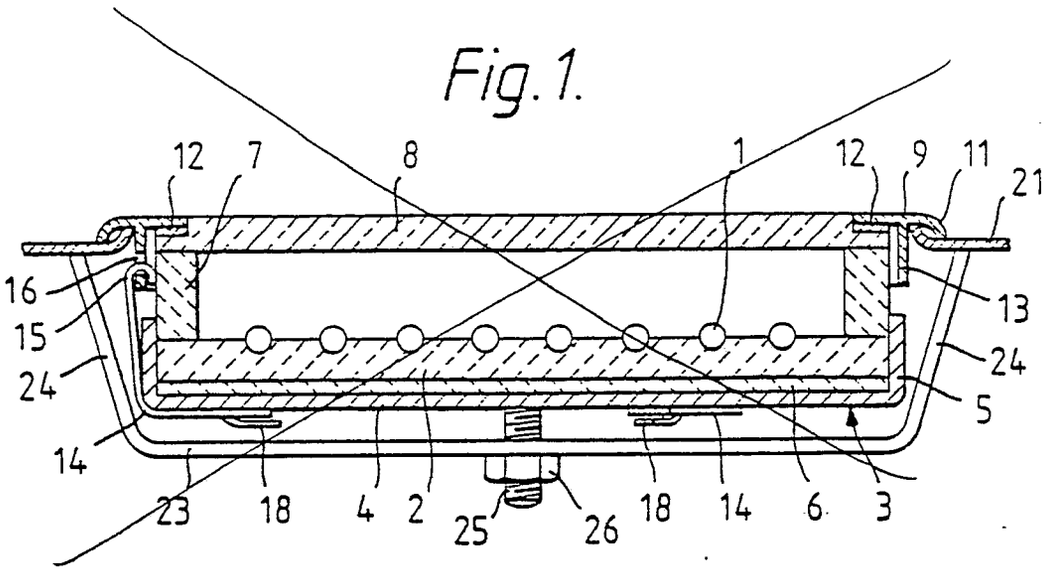
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Fig. 1.

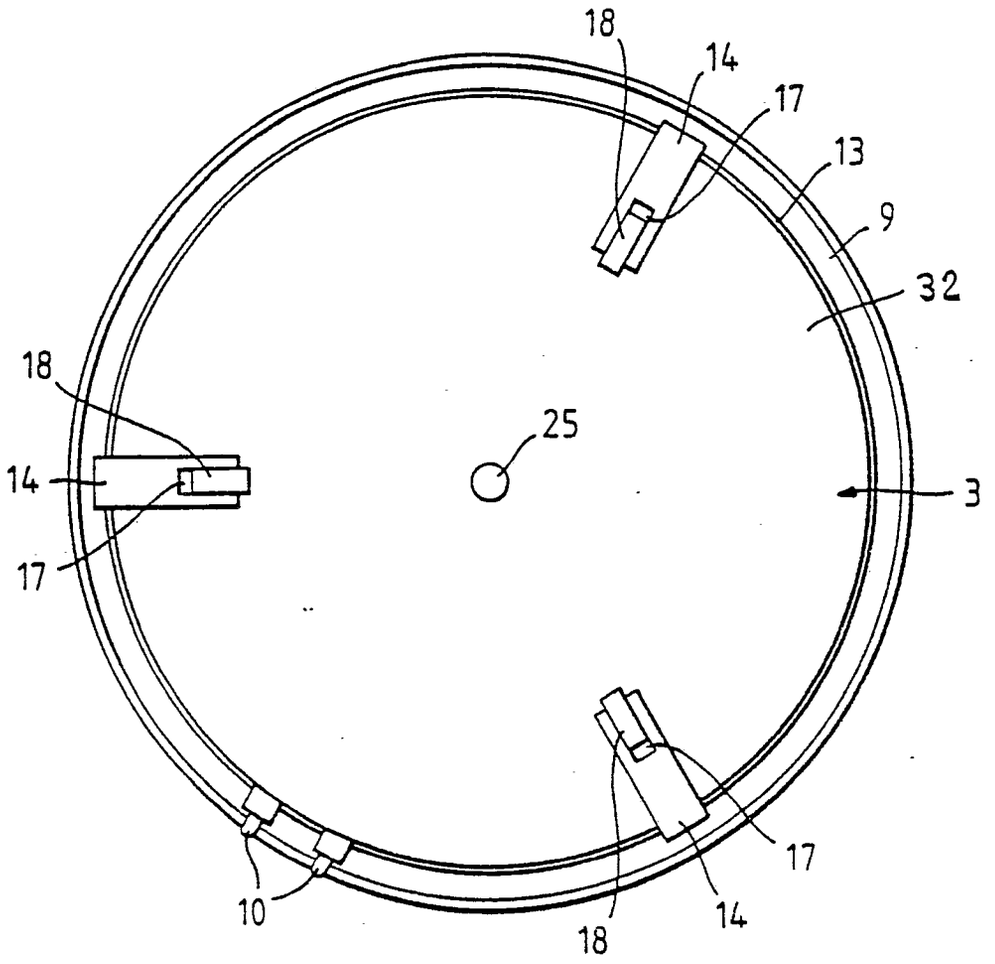
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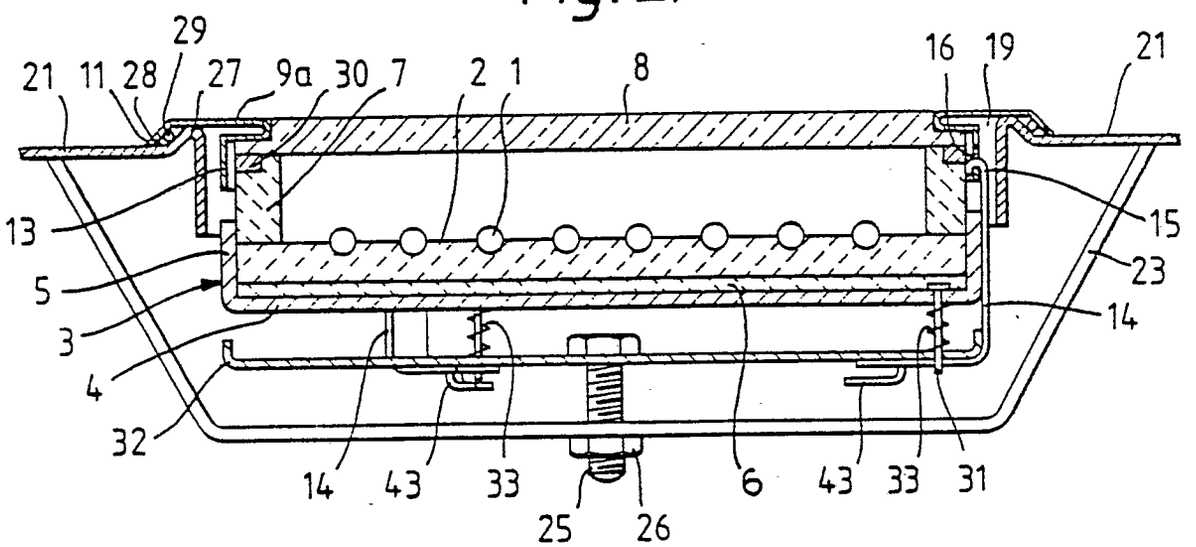
Fig. 2.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