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(54) CLOSELY ASSEMBLED MODULAR APPLIANCE

(57) A surface-mountable appliance is provided comprising a chassis (12), a perimeter portion (11) extending outwardly of the chassis (12) for engaging with a mounting surface (16), and a supporting member (26) supporting or providing a trough (22) in which a quantity of liquid may accumulate. The supporting member (26) is arranged to support the trough (22) below the perimeter portion (11) such that any liquid, in use penetrating a point of engagement between the perimeter portion (11) and a the mounting surface (16), is trapped by the trough (22) before reaching the chassis (12).

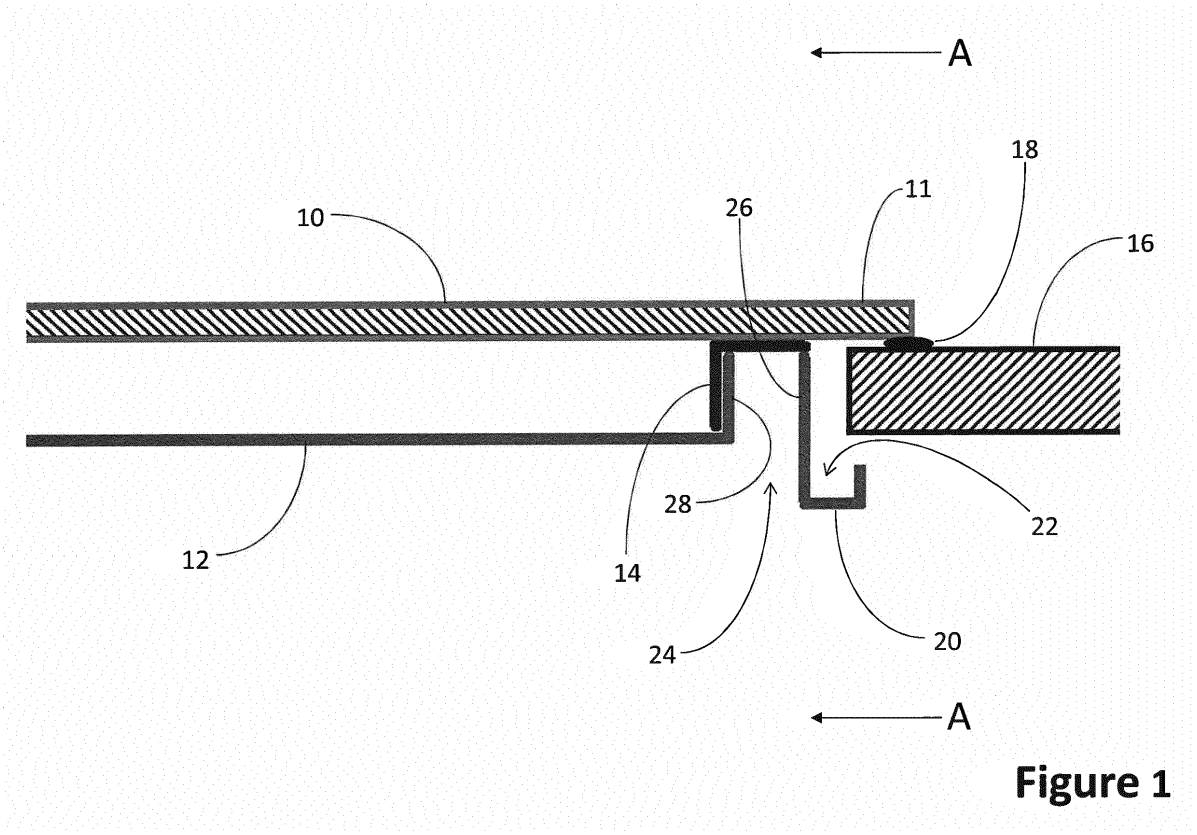

Figure 1

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Description

Technical Field

[0001] The present disclosure relates to a surface-mountable appliance, in particular a surface-mountable appliance having a trough in which a quantity of liquid may accumulate.

Background

[0002] It is known to integrate particular types of electric cooker, for example induction cookers or other types of glass or ceramic-topped cooking appliance or the like, into a work surface or counter-top. This provides a convenient cooking surface surrounded by a surface that may be used for food preparation, etc. Such appliances are often known as 'built-in' appliances. The surface of the cooking appliance is generally sealed around its perimeter, where it contacts the work surface or counter-top. A rubber, silicone or other type of seal is used to prevent any spilt liquids entering the interior of the appliance and coming into dangerous contact with electrical parts.

[0003] It is known however for such seals to fail after some period of use, or for the seal to be inadequate even when first formed, allowing liquids to bypass the seal without there being necessarily any visible evidence of failure of the seal.

[0004] It is known, for example from CN201885275U, to provide an additional barrier to liquid ingress around a perimeter of an electric cooker, besides providing a silicone seal where the perimeter of the cooker is supported. In CN201885275U, an upward annular projection surrounds an annular support region of a mounting plate. An annular extension of the cooking surface of the cooker engages with the upward projection to prevent liquids bypassing the projection and reaching the support region.

[0005] It is known, for example from CN103453562A, to insert a glass-ceramic panel of an induction cooker into a hole provided in a surrounding plate, leaving a small gap. An annular gasket or washer is bonded to an underside edge of the glass-ceramic plate of the induction cooker and to the adjacent edge of the surrounding plate to bridge the small gap between the two plates and so try to prevent any liquid that enters the small gap from penetrating beyond the gasket to a region beneath the glass-ceramic plate of the cooker.

Summary

[0006] According to a first aspect disclosed herein, there is provided a surface-mountable appliance comprising a chassis, a perimeter portion extending outwardly of the chassis for engaging with a mounting surface, and a supporting member supporting or providing a trough in which a quantity of liquid may accumulate, the supporting member being arranged to support the trough below the perimeter portion such that any liquid in use penetrating a point of engagement between the perimeter portion and the mounting surface is trapped by the trough before reaching the chassis.

[0007] The drainage guide is positioned, when fixed to the appliance, beneath the perimeter section of the appliance to trap any liquid passing between points or a line of engagement of the appliance and the mounting surface before it is able to reach the chassis of the appliance. This technique provides an alternative to prior art techniques attempting to improve a seal and so prevent liquid reaching a region beneath the appliance. A surface-mountable appliance according to the present disclosure provides means to trap any such liquids when they do pass into that region despite the presence of the seal, so preventing contact with electrical components housed within the chassis.

[0008] In an example, the supporting member of the drainage guide is provided with one or more apertures arranged to correspond with one or more apertures or fixing points formed in the chassis. In this way, access to any features provided in the chassis is enabled rather than prevented when the drainage guide is fixed to the appliance.

[0009] In an example, the aperture or at least one of the apertures provided in the supporting member is arranged to enable a flow of air into and out of an aperture in the chassis. Such a flow of air may be for the purposes of cooling the appliance or to enable heated air to escape from the appliance.

[0010] In an example, an outlet may be formed in the trough to enable liquid to be released from the trough. For example, a tube may be attached to the outlet to carry accumulated liquid away from the appliance.

[0011] In an example, the perimeter section of the appliance comprises a bracket to which the supporting member may be attached.

[0012] In an example embodiment, the drainage guide comprises plural supporting members each supporting or providing a trough, wherein the troughs are joined together to provide a continuous trough extending around the chassis. In this way, a drainage guide of any required shape and dimension may be manufactured using, for example, straight sections of drainage guide.

[0013] In an example, the appliance is an electrical appliance and the chassis houses an electrical component.

Brief Description of the Drawings

[0014] To assist understanding of the present disclosure and to show how embodiments may be put into effect, reference is made by way of example to the accompanying drawings in which:

Figure 1 shows schematically a cross section through a portion of an example of a cooking appliance having a drainage guide according to the

present disclosure;

Figure 2 shows schematically a partially sectioned side view of the cooking appliance and drainage guide of Figure 1; and

Figure 3 shows schematically a plan view of an appliance showing the position of a drainage guide fitted according to the present disclosure.

Detailed Description

[0015] There are numerous examples of so-called 'built-in' or surface-mountable domestic and commercial electrical appliances that may be integrated with horizontal surfaces.

[0016] Electric cookers with glass or ceramic cooking surfaces, of the induction cooking type or those with a direct heat source, are particularly suited to being integrated within a wider mounting surface such as a food preparation surface. It is also known to integrate display devices and other types of electrical equipment into horizontal mounting surfaces. This introduces an obvious danger of contact with liquids which may have been spilt onto a surrounding surface or onto the equipment surface directly.

[0017] To mitigate the danger posed by liquids, such electrical appliances are generally sealed around their perimeter where they contact the mounting surface using a flexible rubber or silicone seal, for example. While an exposed surface of the appliance may be assumed to be sealed against liquid ingress, the main vulnerability is usually around a perimeter of the appliance where integrity of the seal is relied upon to exclude liquids. Seals are known to fail over time, not necessarily with any visible evidence of failure initially, potentially allowing liquid to come into dangerous contact with electric components inside the appliance. A chassis of the appliance, generally intended to be hidden and sealed beneath the horizontal mounting surface, may have ventilation slots to enable heat to escape. Such slots are not generally designed to provide any resistance to liquid that may have bypassed a failing seal.

[0018] There are known liquid capture devices for use with such appliances. However, they can have the effect of enclosing the chassis of the appliance, so reducing heat dissipation from the slots provided. They may also limit access to removable sections of the chassis intended to remain accessible for maintenance from below the mounting surface.

[0019] Embodiments of the present disclosure, to be described by way of example further below, provide a liquid drainage guide around a perimeter of a 'built-in' or surface-mountable appliance. The drainage guide is positioned between a chassis of the appliance and any seal provided around the perimeter of the appliance surface or other interface between the appliance and mounting surface. One such embodiment will now be described with reference to Figure 1.

[0020] Referring to Figure 1, a sectional view is provided representing a portion of an electric induction cooker having a glass or ceramic cooking surface 10 with a perimeter section 11 and a chassis 12 for enclosing electrical components (not shown in Figure 1) of the cooker, fixed to an underside of the cooking surface 10 by means of a bracket 14. The induction cooker is mounted in a hole provided in a horizontal mounting surface 16 and the perimeter 11 of the cooking surface 10 is sealed where it contacts the horizontal mounting surface 16 by means of a rubber or silicone seal 18.

[0021] The appliance, here an electric induction cooker, has a drainage guide 20 that may be fixed to the bracket 14, for example. Alternatively, the drainage guide 20 may be fixed directly to an underside surface of the cooking surface 10, attached directly to the chassis 12, or formed as an integral part of the chassis 12. The drainage guide 20 may be made from a sheet material, such as stainless steel, which may be bent into the required cross-section or formed by moulding a plastic material. The drainage guide 20 has a substantially J-shape cross-section forming a trough 22 into which liquid may accumulate and flow. An upright supporting section 26 of the channel 20 may be fixed as suggested above to support the trough 22 such that the upright supporting section 26 lies between the trough 22 and the chassis 12 of the cooker.

[0022] The channel is positioned so as to leave a gap 24 to enable air to flow to and from any cooling slots formed in a wall 28 of the chassis 12. Any liquid bypassing the seal 18 may be expected either to flow along the underside surface of the perimeter 11 of the cooking surface 10 until it meets the upright supporting section 26 of the drainage guide 20 or to flow around the end of the mounting surface 16 before falling into the trough 22. In the latter case, it may be beneficial to arrange for an edge of the mounting surface 16 to overhang the trough 22 when the cooker is installed in the mounting surface 16. This may be achieved if the drainage guide 20 is fitted to the bracket 14 after installing the cooker in the mounting surface 16. Alternatively, a deflecting strip (not shown in Figure 1) may be attached to each edge of the mounting surface after the cooker is installed in the mounting surface 16 to deflect liquid into the trough 22.

[0023] Another example embodiment of the invention will now be described, additionally with reference to Figure 2, having features to assist cooling of the cooker and to increase access to the chassis 12 for maintenance purposes.

[0024] Referring additionally to Figure 2, a partially sectioned side view is provided in the direction A shown in Figure 1. In the view provided in Figure 2, the upright supporting section 26 of the drainage guide 20 is shown provided with one or more slots 30 to enable cooling or heat-bearing air to flow to or from the wall 28 of the chassis 12. The arrangement of one or more slots 30 in the supporting section 26 may optionally replicate an arrangement of slots formed in a wall 28 of the chassis.

Alternatively, a small number of larger slots may be formed while leaving enough structural material in the supporting section 26 to support the trough 22. Access holes 32 may be provided in the upright supporting section 26, positioned to align with and so enable access to any mounting screws in the chassis wall 28.

[0025] The drainage guide 20 may be provided along all four perimeter sides 11 of the cooker, welded together for example at mitre joints on each corner, to provide a continuous trough 22 surrounding the chassis 12. Such an arrangement can be seen in Figure 3.

[0026] Referring to Figure 3, there is provided a schematic representation of the cooker installed into a hole in the mounting surface 16, viewed from a direction at 90° to the plane of the cooking surface 10. The position of the drainage guide 20 is represented by a pair of dashed lines, showing the trough 22 forming a continuous trough 22 around the perimeter 11 of the cooker chassis 12 with the upright supporting section 26 separated from the walls 28 of the chassis by the gap 24. The cooker in this example is shown having two heating elements 40.

[0027] An outlet (not shown in the figures) may be provided at a convenient position in the trough 22 to enable accumulating liquid to be removed.

[0028] For ease of manufacture, the drainage guide 20 may be formed in straight sections. A number of straight sections may be welded or otherwise joined together to form a rectangular channel, for example, of a size and shape required. The sections may be joined together, for example by welded mitre joints formed at each corner of the rectangle. As such, a continuous trough 22 may be formed.

[0029] Example embodiments of the present invention have been described in the context of induction or other types of electric cookers, in particular. However, embodiments of the invention described above may be applied to liquid drainage for other types of electrical appliance likely to be exposed to liquids when integrated with horizontal mounting surfaces. Embodiments of the invention may also be applied to non-electrical appliances having parts not suited to contact with liquid.

[0030] The examples described herein are to be understood as illustrative examples of embodiments of the invention. Further embodiments and examples are envisaged. Any feature described in relation to any one example or embodiment may be used alone or in combination with other features. In addition, any feature described in relation to any one example or embodiment may also be used in combination with one or more features of any other of the examples or embodiments, or any combination of any other of the examples or embodiments. Furthermore, equivalents and modifications not described herein may also be employed within the scope of the invention, which is defined in the claims.

Claims

1. A surface-mountable appliance comprising a chassis (12), a perimeter portion (11) extending outwardly of the chassis (12) for engaging with a mounting surface (16), and a supporting member (26) supporting or providing a trough (22) in which a quantity of liquid may accumulate, the supporting member (26) being arranged to support the trough (22) below the perimeter portion (11) such that any liquid in use penetrating a point of engagement between the perimeter portion (11) and a said mounting surface (16) is trapped by the trough (22) before reaching the chassis (12).

2. The appliance according to claim 1, wherein the supporting member (26) is provided with one or more apertures (30, 32) arranged to correspond with one or more apertures or fixing points in the chassis (12).

3. The appliance according to claim 2, wherein the aperture (30, 32) or at least one of the apertures (30, 32) provided in the supporting member (26) is arranged to enable a flow of air into and out of an aperture in the chassis (12).

4. The appliance according to any one of claims 1 to 3, wherein the trough (22) comprises an outlet to enable liquid to be released from the trough (22).

5. The appliance according to any one of claims 1 to 4, wherein the perimeter section (11) of the appliance comprises a bracket to which the supporting member (26) may be attached.

6. The appliance according to any one of claims 1 to 5, comprising plural supporting members (26) each supporting or providing a trough (22), wherein the troughs (22) are joined together to provide a continuous trough (22) extending around the chassis (12).

7. The appliance according to any one of claims 1 to 6, wherein the appliance is an electrical appliance and the chassis (12) houses an electrical component.

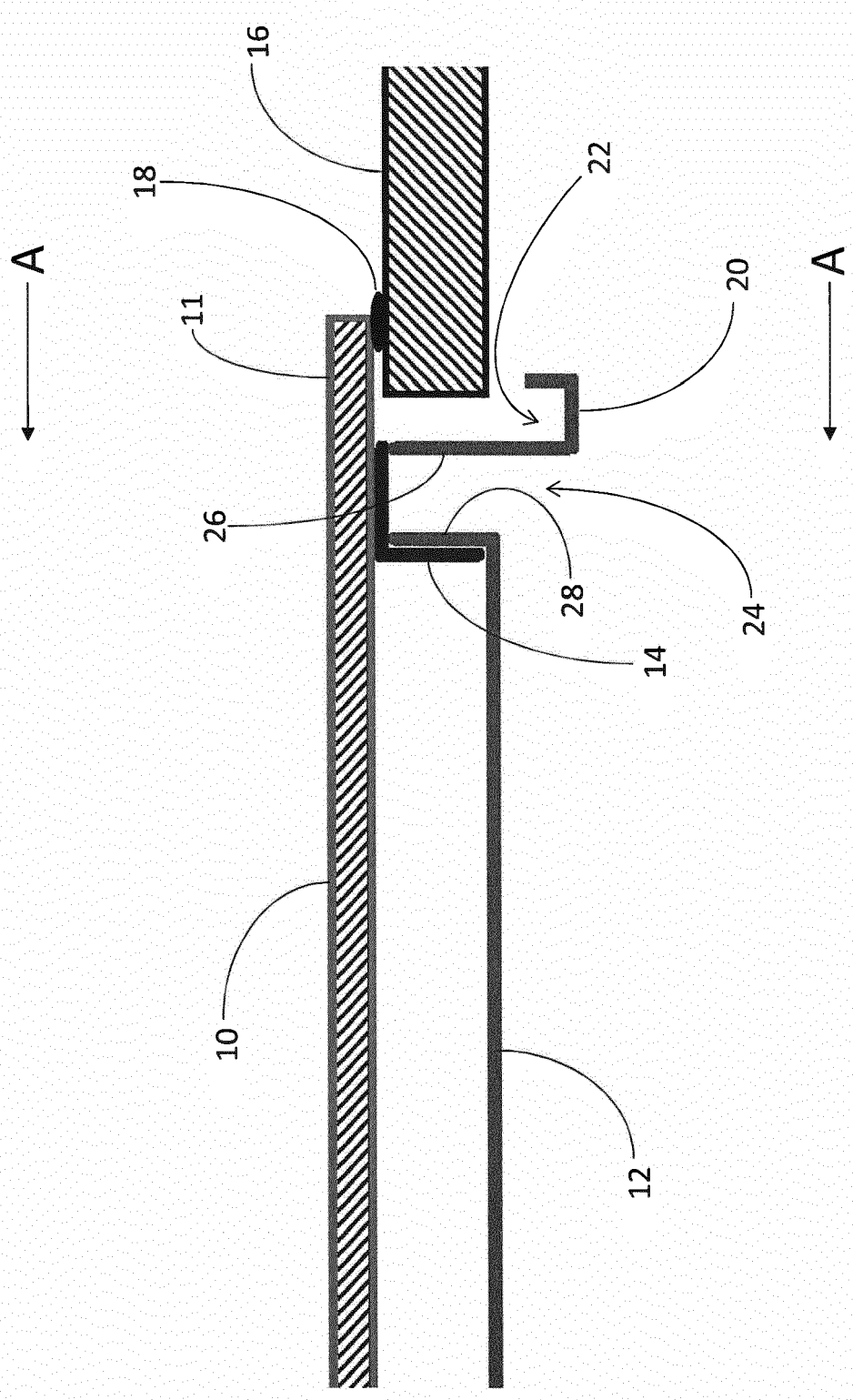

Figure 1

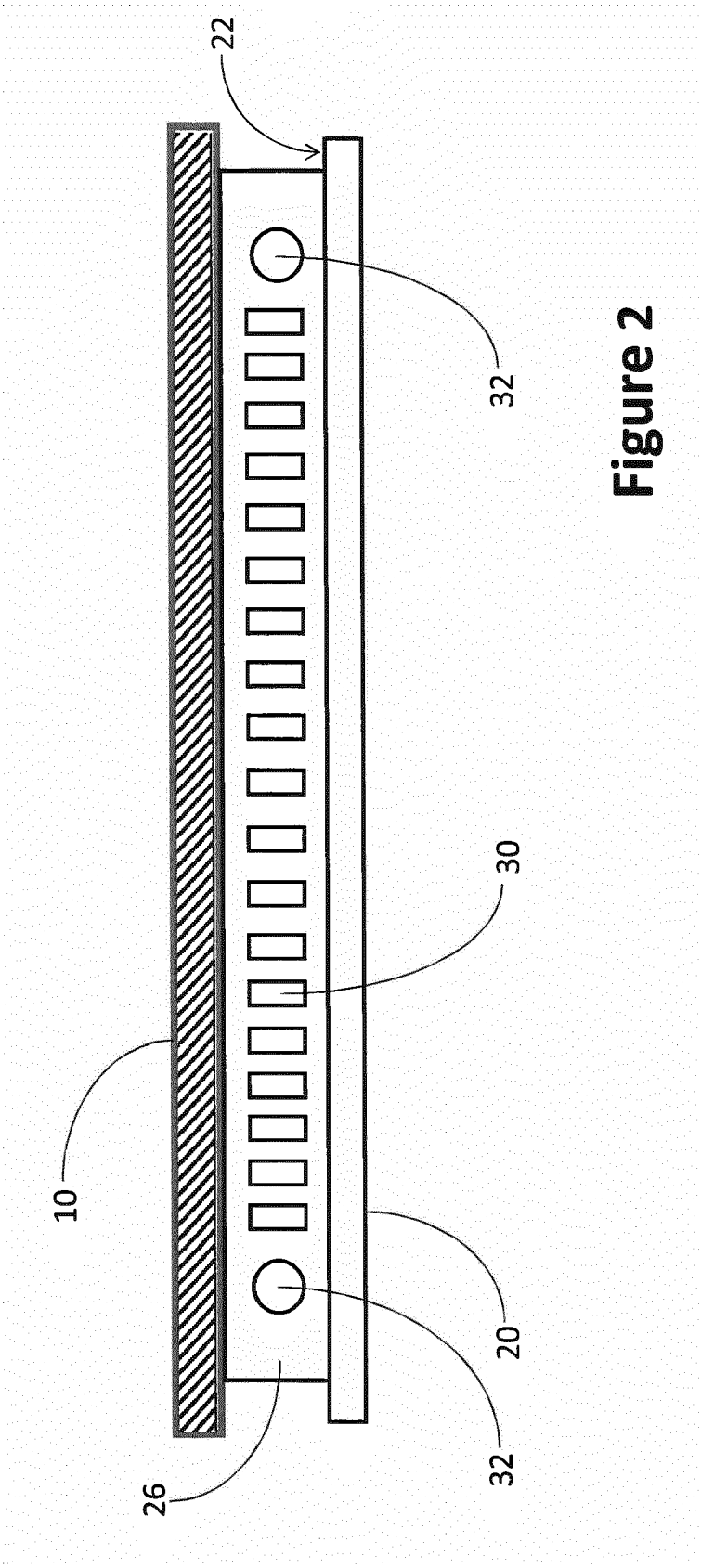

Figure 2

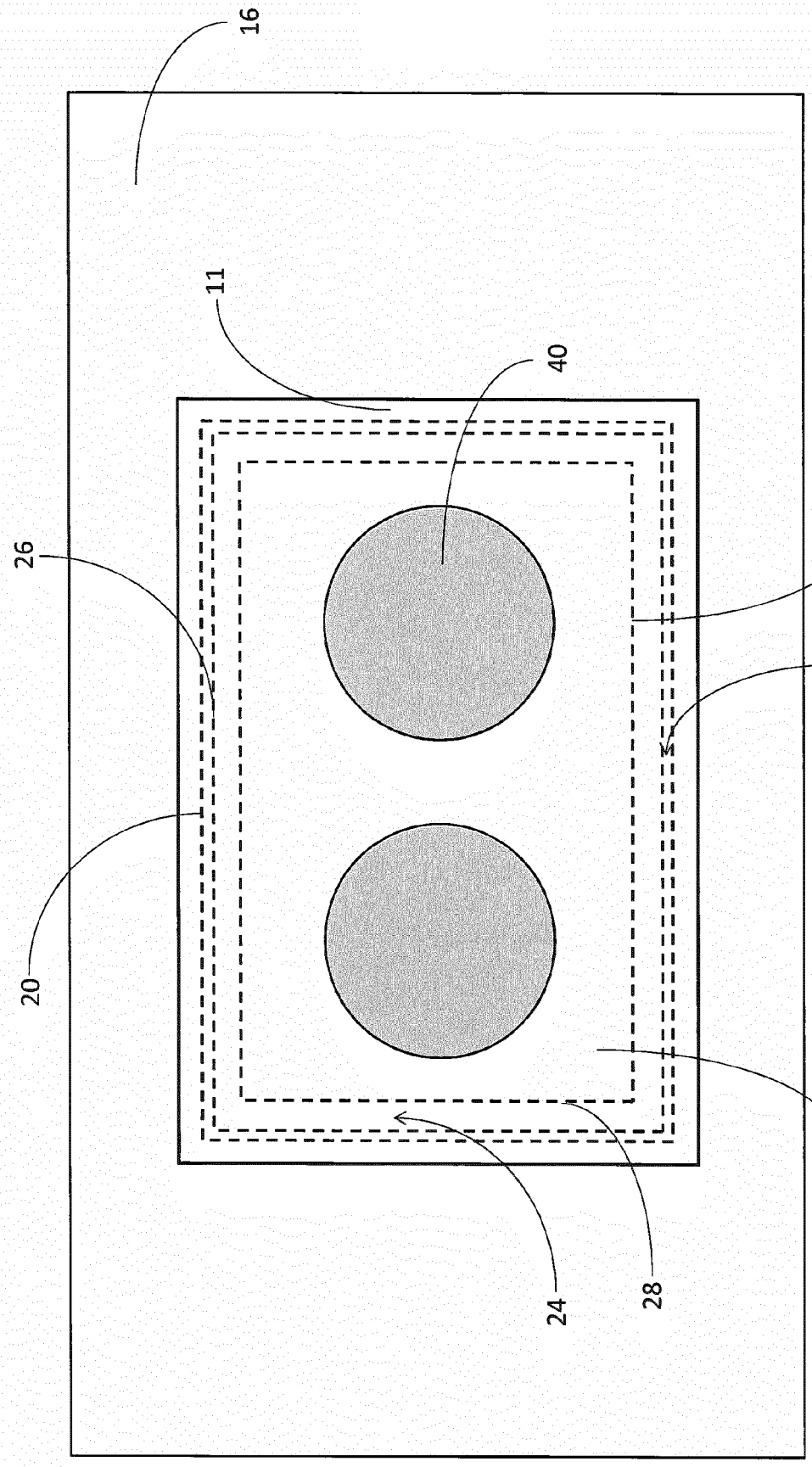

Figure 3

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EUROPEAN SEARCH REPORT

Application Number
EP 17 18 5187

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	US 2006/144388 A1 (HOSOI KOICHI [JP] ET AL) 6 July 2006 (2006-07-06) * figures 1-11 * -----	1-7	INV. E03C1/32 F24C15/10 F24C15/30
X	WO 2008/084918 A1 (LG ELECTRONICS INC [KR]; YI SOO-CHEOL [KR]) 17 July 2008 (2008-07-17) * figures 7-14 * -----	1-3,7	ADD. A47B77/06 A47B77/08
X	JP H06 5358 A (MATSUSHITA ELECTRIC IND CO LTD) 14 January 1994 (1994-01-14) * figure 4 * -----	1-3,5	
X	EP 0 271 388 A1 (ROSIERES USINES [FR]) 15 June 1988 (1988-06-15) * figures 1-9 * -----	1,4,5	

TECHNICAL FIELDS SEARCHED (IPC)
E03C A47B F24C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
The Hague	4 September 2017	Ibarrondo, Borja

CATEGORY OF CITED DOCUMENTS

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04-09-2017

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2006144388 A1	06-07-2006	AT 423295 T	15-03-2009
		CA 2523065 A1	16-09-2005
		CN 1723368 A	18-01-2006
		EP 1734309 A1	20-12-2006
		ES 2321302 T3	04-06-2009
		HK 1080540 A1	06-11-2009
		JP 4114622 B2	09-07-2008
		JP 2005265209 A	29-09-2005
		RU 2303748 C2	27-07-2007
		US 2006144388 A1	06-07-2006
		WO 2005088199 A1	22-09-2005
WO 2008084918 A1	17-07-2008	AU 2007342776 A1	17-07-2008
		EP 2102554 A1	23-09-2009
		US 2010031948 A1	11-02-2010
		WO 2008084918 A1	17-07-2008
JP H065358 A	14-01-1994	NONE	
EP 0271388 A1	15-06-1988	EP 0271388 A1	15-06-1988
		FR 2606863 A1	20-05-1988

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- CN 201885275 U **[0004]**
- CN 103453562 A **[0005]**