



(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
07.12.2011 Bulletin 2011/49

(51) Int Cl.:
F24C 15/12 (2006.01)

(21) Application number: **10005724.9**

(22) Date of filing: **02.06.2010**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO SE SI SK SM TR
Designated Extension States:
BA ME RS

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(54) **Kitchen appliance**

(57) A kitchen appliance comprises a food preparation zone with at least one heating unit (18) and a cover element (22) which is pivotable between a substantially vertical opened position which allows access to the food preparation zone and a substantially horizontal closed position in which the cover plate covers the food preparation zone.

ration zone.

The kitchen appliance further comprises a housing member (34) having at least one first housing section (44) for accommodation of a hinge (24) for said cover element (22) and at least one second housing section (48, 72) for accommodation of an accessory component (50; 74) of the kitchen appliance.

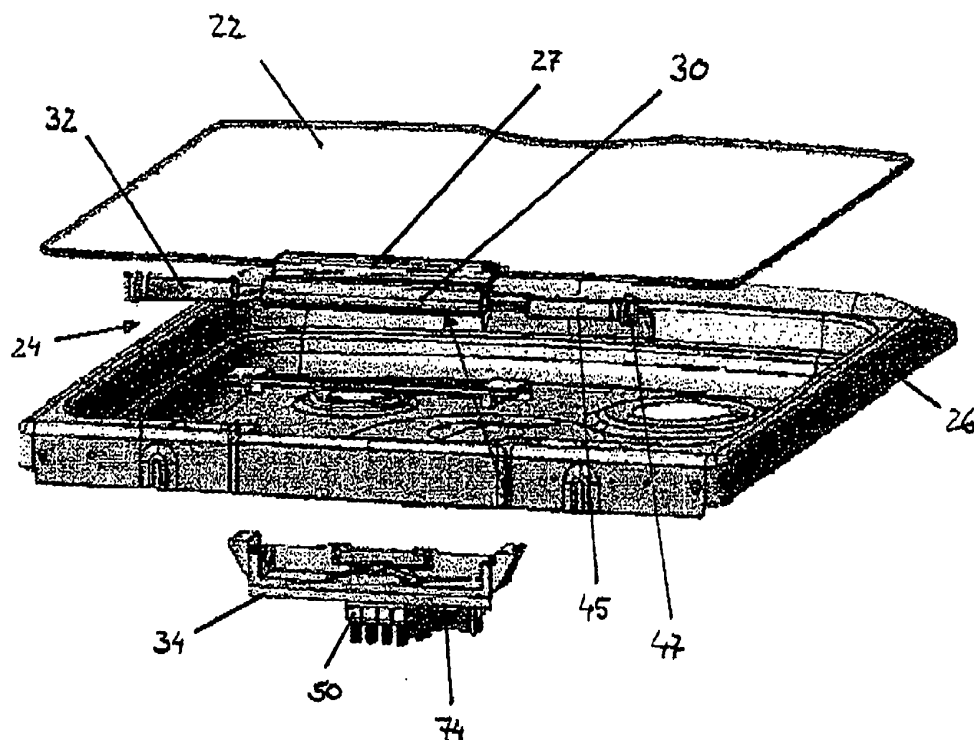


Fig. 2

Description

[0001] The present invention relates to a kitchen appliance comprising a food preparation zone with at least one heating unit and a cover element which is pivotable between a substantially vertical opened position which allows access to the food preparation zone and a substantially horizontal closed position in which the cover plate covers the food preparation zone.

[0002] It is an object of the present invention to provide a kitchen appliance of the afore mentioned type in which the integrity of the individual components is further increased so as to facilitate the manufacturing process.

[0003] In a kitchen appliance of the above-mentioned type, this object is solved in that the kitchen appliance comprises a housing member which has at least one first housing section for accommodation of a hinge for the cover element and which has at least one second housing section for accommodation of an accessory component of the kitchen appliance.

[0004] In such kitchen appliance, the housing member fulfills the double function of providing a bearing for the hinge of the cover element and further of providing at least part of a housing for an accessory component. In this manner, no additional components are required for the mounting of the accessory component, so that the assembly of the kitchen appliance is facilitated since fewer components are required and hence the integrity and complexity of the kitchen appliance is increased.

[0005] The kitchen appliance can be any appliance having a food preparation zone and a cover element for covering the food preparation zone, such as a hob, a cook top, a range or an oven having an integral hob, wherein the heating unit can be an electric heating unit or a gas-fired heating unit. The accessory component can be any kind of component that is to be mounted or can be mounted in the region of the kitchen appliance where the hinge for the cover element is provided. Examples of such accessory components are electric components, such as switches, sensors, electromagnetic valves and the like, and/or, if the heating unit comprises a gas-fired burner, components for control of the gas flow to such burner. Furthermore, if the kitchen appliance is an oven, the accessory component may be a component which is used for the control of air and fumes into and out of the oven muffle. If a plurality of accessory components is to be mounted in the region of the hinge, the housing member can comprise a plurality of further housing sections for accommodation of such additional accessory components.

[0006] Preferably, the housing member is a molded plastic part which allows to implement complex housing geometries at moderate costs.

[0007] Preferred embodiments of the present invention are defined in the dependent claims.

[0008] In preferred embodiments, the housing member comprises a trough section for the reception of spillage from the food preparation zone. In addition to pro-

viding for housings for the hinge and for the accessory component, the housing member thus serves the additional purpose of acting as a spillage tray so as to prevent spillage from entering the interior of the kitchen appliance, where such spillage could cause malfunctions of for example electric components. As will be apparent from the further detailed description, such spillage reception function is provided not only when the cover element is opened, but also when the cover element is closed and covers the food preparation zone, so that the closed cover element can be used as additional kitchen work space.

[0009] In embodiments where the housing member comprises a trough section, such trough section preferably comprises a floor and at least one side wall, wherein the first housing section for accommodation of the hinge for the cover element is provided in the side wall and wherein the second housing section for accommodation of the accessory component is provided at the bottom side, i.e. underneath, the floor. In this manner, the accessory component is effectively protected from any spillage which may reach the trough section.

[0010] In such embodiments, the side wall of the trough section furthermore can comprise two opposing first housing sections, wherein the hinge comprises two coaxial projections which project from the cover plate and which are accommodated in the first housing sections. With the hinge thus being accommodated between the two opposing first housing sections, the hinge can be provided at a protrusion of the cover element or can be designed as a member which is adapted for fixation to the cover element. For example, if the cover element is a substantially rectangular plate, for example a glass pane, the hinge can be designed as a component, for example a molded plastic part or an extruded metallic or plastic part, which comprises a groove for reception of the cover plate and a hinge section comprising the said projections.

[0011] In further preferred embodiments of the invention, the accessory component comprises a switching element which is arranged to interrupt operation of the heating unit when the cover element is in the closed position. In this manner, when the cover element is closed while the heating unit is operating, inadvertent heating of the cover element is avoided. For example, if the heating unit is an electric heating unit, the switching element can be a circuit breaker which interrupts the supply of electric energy when the cover element is positioned in or moved into the closed position. On the other hand, when the heating unit is a gas-fired burner, the switching element can be arranged to interrupt the supply of gaseous fuel to the burner.

[0012] Particularly, in embodiments wherein the accessory component comprises a switching element for interruption of the operation of the heating unit, which switching element is accommodated in a second housing that is provided at the bottom side of the floor of a housing member comprising a trough section, the switching element can comprise a spring-biased push button which

laterally projects from the second housing section, wherein for operation of such push button a cam member is associated to the hinge which cam member assumes a first operational state when the cover element is in the opened position and a second operational state when the cover element is in the closed position, and wherein the kitchen appliance further comprises an actuation member which causes operation of the switching element when the cam member changes its operational state. In such embodiments the actuation member thus serves as an operational link between the cam member, which is associated to the hinge and which thus is located within the trough section, and the switching element which is accommodated in the second housing section that is provided at the bottom side of the floor, i.e. at the underside of the housing member.

[0013] The hinge member can comprise a generally tubular member which is attached to the cover element and to pin members each of which have a first end which is received in the tubular member and a second end which is accommodated in one of the first housing sections. Instead of two separate coaxial pin members, a single pin member could be used which projects from both sides of the tubular member. The pin members further can be provided with a torsional spring, one end of which is rotatably fixed with respect to the tubular member and the other end of which is rotationally fixed with respect to the first housing section, wherein the torsional spring serves to partially balance the weight of the cover element so as to avoid an inadvertent slamming of the cover element during closure thereof.

[0014] The actuation member can comprise a U-shaped section which extends over the side wall of the trough section and which has a first leg which cooperates with the cam member and a second leg which comprises a ramping surface for operation of the push button of the switching element. In such embodiments the U-shaped section preferably has a length which provides that in all operational positions of the actuation member the upper edge of the side wall of the trough section is received within the U-shaped section. Thus, the U-shaped section embraces the side wall so as to serve as a guide during movement of the actuation member. The actuation member further can comprise additional guiding surfaces, for example guide rails in which the lateral edges of the legs are received, or vertical slots provided in the legs which cooperate with projections provided at the side wall which on the one hand prevent a movement of the actuation member in a lateral direction and which on the other hand limit the travelling path of the actuation member.

[0015] In such an actuation member, the first leg can comprise an abutment section which cooperates with the cam member and a spring section which rests on the floor of the trough section. In such embodiments, the spring section biases the actuation member towards the cam member so as to maintain the contact of the abutment section of the actuation member and the cam member associated to the hinge. While the abutment section

can be provided so as to be positioned laterally with respect to the cam member, the abutment section preferably is formed by providing in the first leg for a bend so as to provide for a generally horizontal abutment surface from which the spring sections extend downwards towards the floor of the trough section, so that the abutment section and the spring sections are located between the cam member and the floor of the trough section. The cam member, which can be provided by designing the hinge as a generally tubular member having an oval circumference thus presses down the abutment section when the cover element and with it the hinge is rotated towards the closed position of the cover member. A downward displacement of the actuation member causes the ramping surface of the second leg to engage and actuate the push button of the switching element, so as to interrupt operation of the heating unit when the cover element is closed. When the cover element again is opened, the pressure exerted by the cam member on the abutment section of the actuation member ceases, so that the elastic spring sections of the actuation member will cause the actuation member to be lifted so as to restore the operational state of the actuation member in which the switching element allows operation of the heating unit.

[0016] In particularly preferred embodiments, the actuation member is made of an elastic sheet metal which is stamped and bent into its final shape.

[0017] The heating unit can comprise a burner nozzle, in which case the switching element is arranged to interrupt the gas supply to the burner nozzle. In such kitchen appliances, the gas supply to the burner nozzle is interrupted when the cover element is closed so as to avoid on the one hand an inadvertent heating of the cover element if a burner flame still is on, and on the other hand to avoid the escape of gas when the burner flame is extinguished without the gas supply to such burner having been shut off, for example by a user closing the cover element while a burner flame still was on.

[0018] In such embodiments, the kitchen appliance can comprise an electromagnetic valve which when energized allows the gas to be supplied to the burner nozzle and which when de-energized blocks the gas supply to the burner nozzle, wherein the switching element is arranged to interrupt the supply of electric energy to the electromagnetic valve. By employing an electromagnetic valve to shut off the gas supply to the burner nozzle, a safety gas shut off feature can be implemented in which only the switching element, or if a plurality of burner nozzles is provided, the switching elements, is provided in the region of the hinge. The provision of a mechanical valve for each burner nozzle, which requires a complicated routing of the gas lines and hence is prone to failure and leakage of gas, is avoided.

[0019] In order to provide in such embodiments electric energy for the electromagnetic valve, a thermocouple can be located in proximity of the burner nozzle, wherein the thermocouple when heated supplies electric energy to energize the electromagnetic valve. With the electro-

magnetic valve thus only being energized when the thermocouple is heated, the electromagnetic valve will interrupt the gas supply to the burner nozzle when the burner flame is extinguished. In this manner, in case that the burner flame was extinguished inadvertently, for example by water boiling over a unobserved cooking pot and wetting the burner nozzle, the escape and accumulation of large amounts of gas which involves the risk of an explosion is avoided.

[0020] In kitchen appliances comprising a plurality of burner nozzles, each of which having an electromagnetic valve and a switching element, the housing member can comprise a plurality of second housing sections in which these switching elements are accommodated side by side, wherein the actuation member is arranged to simultaneously operate all the switching elements when the cam member changes its operational state. Thus, irrespective of the number of burner nozzles, the switching elements for all burner nozzles can be accommodated at the housing member without additional mounting means being required, wherein only a single actuation member is employed to simultaneously operate all the switching elements. Hence, the number of parts to be assembled is kept at a minimum.

[0021] In a kitchen appliance wherein the heating unit comprises a burner nozzle, the kitchen appliance can comprise a spark generator located adapted to generate a spark in proximity of the burner nozzle for ignition of a burner flame, wherein the housing member can comprise a third housing section for accommodation of the spark generator.

[0022] A preferred embodiment of the present invention is described in further detail below by reference to the drawings in which

- FIG. 1 is a perspective view of an oven made in accordance with the present invention;
- FIG. 2 is a schematic, perspective, exploded view of the hob section and cover element of the oven shown in FIG. 1;
- FIGS. 3 and 4 are perspective views of a housing member for the hinge of the cover element when viewed from above and from below, respectively;
- FIG. 5 is a cross-sectional view of the rear part of the hob when the cover element is closed;
- FIG. 6 is a view similar FIG. 5 when the cover element is opened; and
- FIG. 7 is a perspective rear view of the hob when the cover element is closed.

[0023] FIG. 1 shows a gas oven 10 which comprises a first oven zone 12, a second oven zone 14 and a hob 16. Hob 16 comprises a plurality of burner nozzles 18, the supply of gas to which is controlled by means of control valves 20. A burner grate 19 is located above burner nozzles 18 so as to support cooking utensils such as pans and pots that are to be heated by burner nozzles 18. In order to cover the food preparation zone of hob 16, oven 10 is provided with a cover element 22 which is connected to the frame 26 of hob 16 by means of a hinge 24.

[0024] FIG. 2 is a perspective view of hob frame 26 and lid 22 and the hinge for connecting these two parts. Hinge 24 comprises an elongate member which as can be also seen in FIGS. 5 and 6 comprises a mounting portion 27 with a groove 28 for reception of cover element 22, which in the embodiment shown in the drawings is a tempered glass pane. The lower or rear part of hinge 24 comprises a tubular member 30 (see FIG. 2). Tubular member 30 at both sides receives a pin member 32 which laterally projects from tubular member 30. Pin members 32 are supported in a housing member 34 which is attached to hob frame 26 and which will be explained below by further reference to FIG. 3.

[0025] As can be seen in FIG. 3, housing member 34 which in the figures is a molded plastic part comprises a generally rectangular trough section 36 having a floor 38, a front wall 40 and two side walls 42. Within side walls 42 there are integrally formed first housings 44 for accommodation of pin members 32 of the hinge for cover elements 22. First housing sections 44 are provided with a groove 46 so as to provide for a rotational fixation of pin members 32. In the embodiment shown in the drawings, pin members 32 comprise a tubular member 45 which is rotationally fixed with respect to tubular member 30, preferably by form-fit as shown in FIGS. 5 and 6, and a rotatable member 47 which is rotatably received within tubular member 45 and the free end of which is received within groove 46 of the first housing section 44. Internally to the tubular member 45 there is provided a torsional spring element, one end of which is fixed with respect to tubular member 45 and the other end of which is fixed with respect to rotatable member 47, so as to exert a balancing force to partially balance the weight of the cover element when the cover element is rotated towards the closed position.

[0026] As can be seen best in FIG. 4, a plurality of second housings 48 is provided at the lower side of housing member 34, i.e. at the bottom side of the floor 38 of trough section 36. Second housing sections 48 are adapted for accommodation of switching elements 50. In order to fix switching elements 50 once they have been inserted into second housing sections 48, the second housings 48 each comprise a latch member 52 which snaps about the edge of switching element 50 when the latter has been fully inserted into second housing section 48.

[0027] Switching elements 50 each comprise a spring

biased push button 54 which when released interrupts the power supply to an electromagnetic valve (not shown) which when de-energized interrupts the gas supply to burner nozzles 18. In order to operate switches 50 in dependency of the orientation of cover element 22, tubular member 30 of hinge 24 comprises a cam member 56 operation of which will be explained by reference to FIGS. 5 and 6.

[0028] When the cover element 22 is closed, as is shown in FIG. 5, cam member 56 which has an oval cross-section, abuts with its smaller diameter on an abutment surface 58 of an actuation member 60 which is also shown in FIGS. 3 and 4. Actuation member 60 is made of an elastic metal sheet material and has a U-shaped section 62 which in the assembled state shown in FIGS. 5 and 6, rests on front wall 40 of trough section 36. A front leg 64 of U-shaped section 62 comprises a straight section 65 as well as an angled ramping section 66 (see FIG. 6). The rear leg 68 of U-shaped section 62 comprises a straight section 69 which extends in parallel to straight section 65 of the front leg 64 and which merges into the abutment surface 58. Abutment surface 58 comprises a section of the sheet material of actuation member 60 which has been bent so as to project at a right angle from straight section 69 of rear leg 68. As is best seen in FIG. 3, two spring elements 70 project laterally at a downward angle from abutment surface 58 so as to rest against floor 38 of trough section 36.

[0029] When cover element 22 is opened as shown in FIG. 6, hinge 24 and hence cam member 56 are rotated in the clockwise direction. While in the closed position shown in FIG. 5 cam member 56 rests against abutment surface 58 with its smaller diameter, in the opened position of cover element 22, cam member 56 presses against abutment surface 58 with its largest diameter. Due to this pressing action, actuation member 60 is displaced downwards along front wall 40 of trough section 36. When actuation member 60 is moved downwards the angled ramping section 66 of the front leg 64 of U-shaped section 62 contacts push button 54 of switch 50. On further movement of actuation member 60, angled ramping section 66 causes push button 54 to be pressed down, until push button 54 rests against the straight section 65 of the front leg 64, as it is shown in FIG. 6. When in the opened position of cover element 22 push button 54 of switching element 50 is pressed, switching element 50 allows power to be supplied to the electromagnetic valve, which in turn allows gas to be supplied to burner nozzles 18.

[0030] In the opened position shown in FIG. 6, spring sections 70 of actuation member 60 are elastically deformed so as to essentially lay flat against floor 38 of trough section 40. When cover member 22 again is closed, the pressure of cam member 56 on abutment surface 58 is released so that elastic spring sections 70 will lift actuation member 60 into the position shown in FIG. 5 in which push button switch 54 is released so as to interrupt gas supply to burner nozzles 18.

[0031] As is shown in FIG. 4, housing member 34 is provided on the front side of front wall 40 with two guide rails 82 which accommodate the lateral edges of front leg 64 of actuation member 62 and which prevent the front leg 64 from being bent away when the angled ramping section 66 engages push button 54 of switch 50. Furthermore, in order to prevent a separation of actuation member 60 from housing member 34, so that these elements can be preassembled prior to mounting cover element 22 and hinge 24, rear leg 68 of actuation member 60 is provided with two slots 84 which cooperate with two projections 86 that are provided at the front wall 40 of trough section 36.

[0032] As can be best seen in FIGS. 3 and 4, housing member 34 further comprises a third housing section 72 for accommodation of a spark generator 74. Third housing section 72 comprises latching members 76 which fix spark generator 84 when it is fully inserted into third housing section 72.

[0033] Housing member 34 is a molded plastic part which thus allows to manufacture the various sections thereof in a cost-effective manner. As is shown in FIGS. 3 and 4, housing member 34 can be provided with reinforcing ribs 78 which are provided at the bottom side of floor 38 as well as with additional reinforcing ribs 80 which are provided in the region of the first housing sections 42 where the hinge for cover element 22 is supported.

[0034] FIG. 7 is a perspective rear view of the hob 16 of oven 10 when cover element 22 is closed. Cover element 22 when closed can be used as a kitchen work space. Should a spilling of fluids occur on cover element 22, such fluids will be guided, as shown by an arrow 88, over the mounting portion 27 as well as, as shown by arrow 90, over the tubular section 30 of hinge 24. Any fluids that thus have reached the interior of trough section 36 will flow along floor 38 of trough section 36 to eventually exit the trough section along its rear edge as it is shown in FIG. 7 by an arrow 92. If desired, trough section 36 could be provided with a rear wall so as to collect at least a portion of the fluids that reach the interior of the trough section, so that if only a small amount of spillage has occurred, such spillage can be collected within the trough section to evaporate therefrom.

[0035] In order to prevent that fluids reach the interior of the hob frame 26 when exiting the trough section 36, housing member 34 is provided with a lower lip 94 as well as with lateral lips 96 which overlap the edges of the opening in the rear wall of hob frame 26 in which the housing member 34 is mounted. In FIG. 7 here further is shown a cover 98 which covers the upper side of first housing sections 44 so as to prevent spillage fluid from entering housing sections 44.

List of reference signs

[0036]

10 oven

12 1st oven zone
 14 2nd oven zone
 16 hob
 18 burner nozzle
 19 burner grate
 20 control valve
 22 cover element
 24 hinge
 26 hob frame
 27 mounting portion
 28 groove
 30 tubular member
 32 pin member
 34 housing member
 36 trough section
 38 floor
 40 front wall
 42 side wall
 44 1st housing section
 46 groove
 47 rotatable member
 48 2nd housing section
 50 switch
 52 latch member
 54 push button
 56 cam member
 58 abutment surface
 60 actuation member
 62 u-shaped section

64 front leg
 65 straight section
 5 66 ramping section
 68 rear leg
 69 straight section
 10 70 spring element
 72 3rd housing section
 15 74 spark generator
 76 latching member
 78 reinforcing rib
 20 80 reinforcing rib
 82 guide rail
 25 84 slot
 86 projection
 88, 90, 92 fluid flow
 30 94 lower lip
 96 lateral lip
 35 98 cover

Claims

- 40 1. Kitchen appliance comprising a food preparation zone with at least one heating unit (18) and a cover element (22) which is pivotable between a substantially vertical opened position which allows access to the food preparation zone and a substantially horizontal closed position in which the cover plate covers the food preparation zone,
 45 **characterized in that** the kitchen appliance comprises a housing member (34) having at least one first housing section (44) for accommodation of a hinge (24) for said cover element (22) and at least
 50 one second housing section (48, 72) for accommodation of an accessory component (50; 74) of the kitchen appliance.
- 55 2. The kitchen appliance of claim 1, wherein said housing member (34) comprises a trough section (36) for the reception of spillage from said food preparation zone.

3. The kitchen appliance of claim 2, wherein said trough section (36) comprises a floor (38) and at least one side wall (40, 42), wherein the first housing section (44) is provided in the side wall (42) and the second housing section (48) is provided at the bottom side of the floor (38). 5
4. The kitchen appliance of claim 3, wherein the side wall (42) of the trough section (36) comprises two opposing first housing sections (44), and the hinge (24) comprises two coaxial projections (47) projecting from the cover plate (22) which are accommodated in said first housing sections. 10
5. The kitchen appliance of any one of the preceding claims, wherein said accessory component comprises a switching element (50) arranged to interrupt operation of said heating unit (18) when the cover element (22) is in the closed position. 15
6. The kitchen appliance of claims 5 and 3, comprising
 - a switching element (50) having a spring-biased push button (52) which laterally projects from the second housing section (48), 25
 - a cam member (56) associated to the hinge (24), which assumes a first operational state when the cover element (22) is in the opened position and a second operational state when the cover element is in the closed position, and 30
 - an actuation member (60) which causes operation of the switching element (50) when the cam member changes its operational state.
7. The kitchen appliance of claims 6 and 4, wherein the hinge (24) comprises a tubular member (30) attached to the cover element (22) and two pin members (32) each having a first end (45) which is received in said tubular member and a second end (47) which is accommodated in one of the first housing sections (44), wherein said cam member (56) is provided on the exterior side of said tubular member. 35 40
8. The kitchen appliance of claim 7, wherein the actuation member comprises (60) a U-shaped section (62) which extends over the side wall (40) of said trough section (36) and which has a first leg (68) cooperating with said cam member (56) and a second leg (64) comprising a ramping surface (66) for operation of the push button (54) of the switching element (50). 45 50
9. The kitchen appliance of claim 8, wherein the first leg (68) comprises an abutment section (58) cooperating with said cam member (56) and a spring section (70) which rests on the floor (38) of the trough section (36). 55
10. The kitchen appliance of any one of the preceding claims, wherein the heating unit comprises a burner nozzle (18), and wherein said switching element (50) is arranged to interrupt the gas supply to the burner nozzle.
11. The kitchen appliance of claim 10, further comprising an electromagnetic valve which when energized allows gas to be supplied to the burner nozzle (18) and which when de-energized blocks the gas supply to the burner nozzle, wherein said switching element (50) is arranged to interrupt the supply of electric energy to the electromagnetic valve.
12. The kitchen appliance of claim 11, further comprising a thermocouple located in proximity of the burner nozzle (18), the thermocouple when heated supplying electric energy to energize the electromagnetic valve.
13. The kitchen appliance of any one of claims 6 to 8 and claim 11 or 12, comprising a plurality of burner nozzles (18), each having an electromagnetic valve and a switching element (50) arranged to interrupt the supply of electric energy to the respective electromagnetic valve, wherein the housing member (34) comprises a plurality of second housing sections (48) for side by side accommodation of the switching elements, wherein the actuation member (60) is arranged to simultaneously operate all the switching elements when the cam member (56) changes its operational state.
14. The kitchen appliance of any one of claims 10 to 13, further comprising a spark generator (74) for ignition of a burner flame at said burner nozzle, wherein the housing member comprises a third housing section (72) for accommodation of the spark generator.

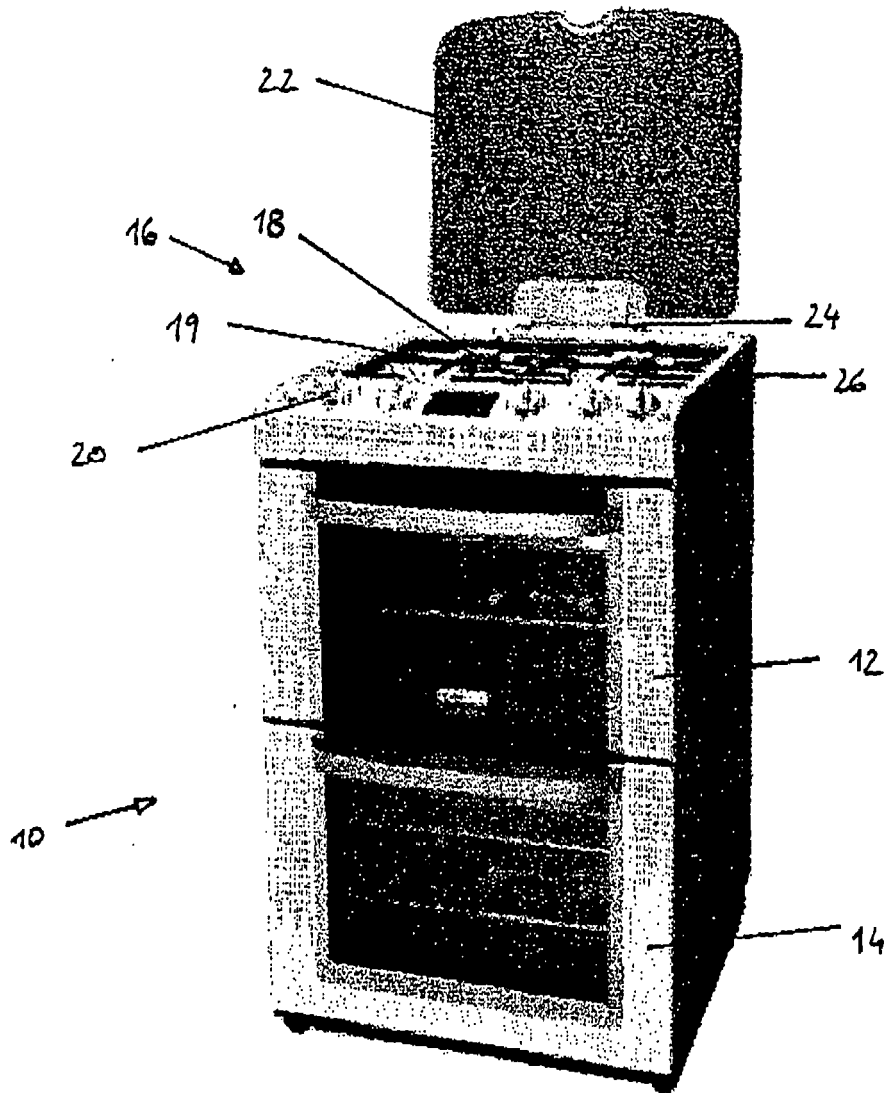


Fig. 1

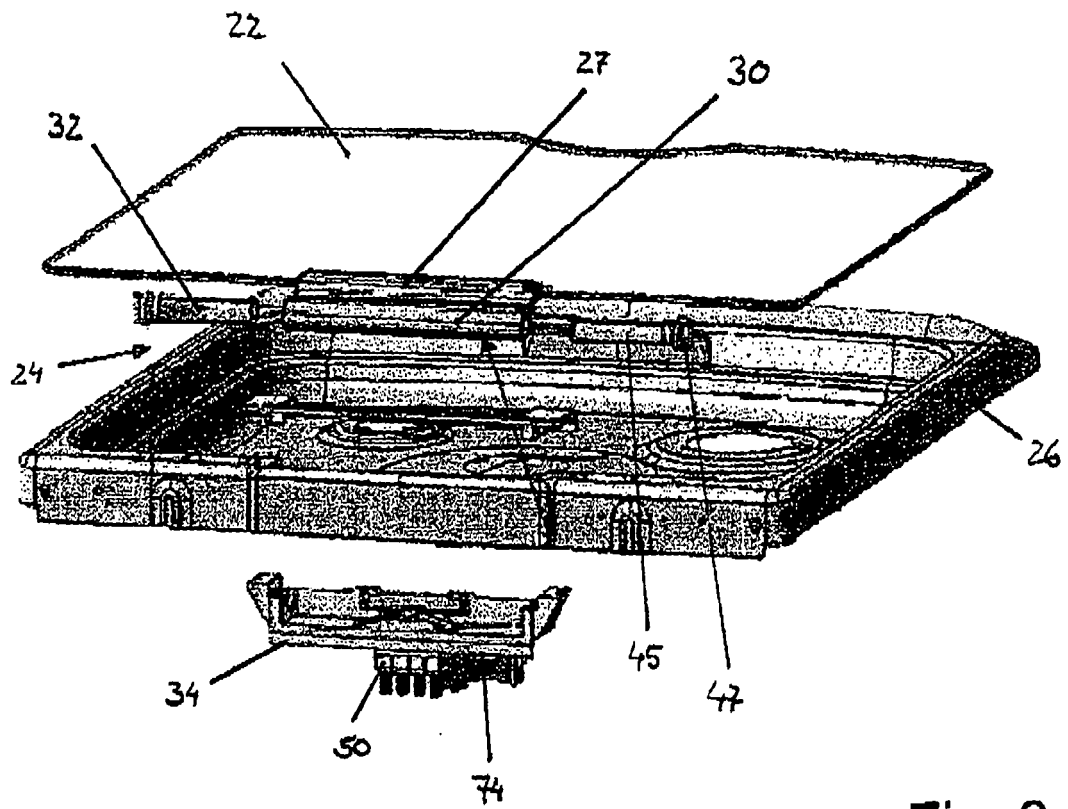


Fig. 2

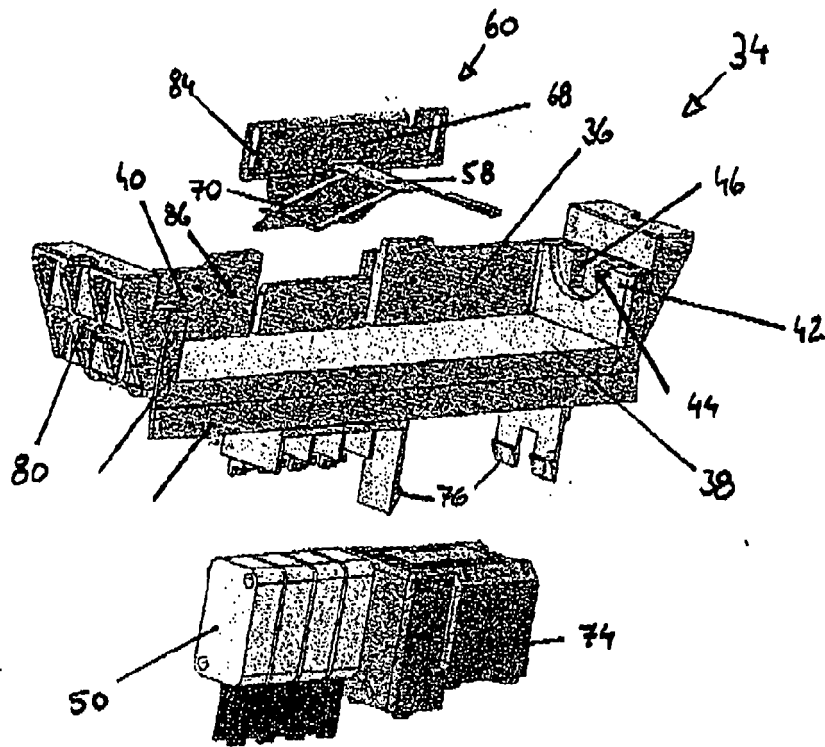


FIG. 3

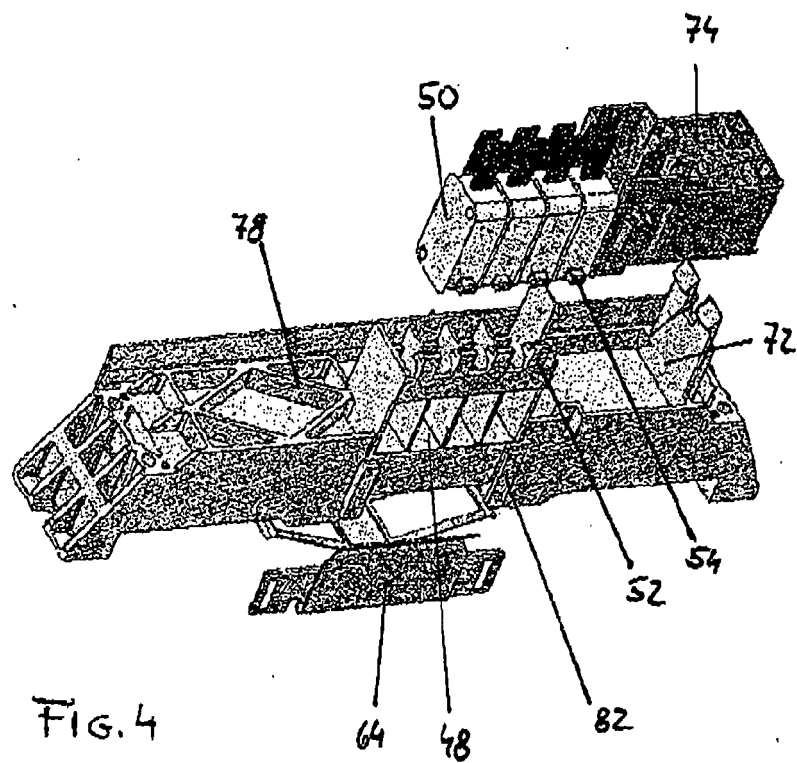


FIG. 4

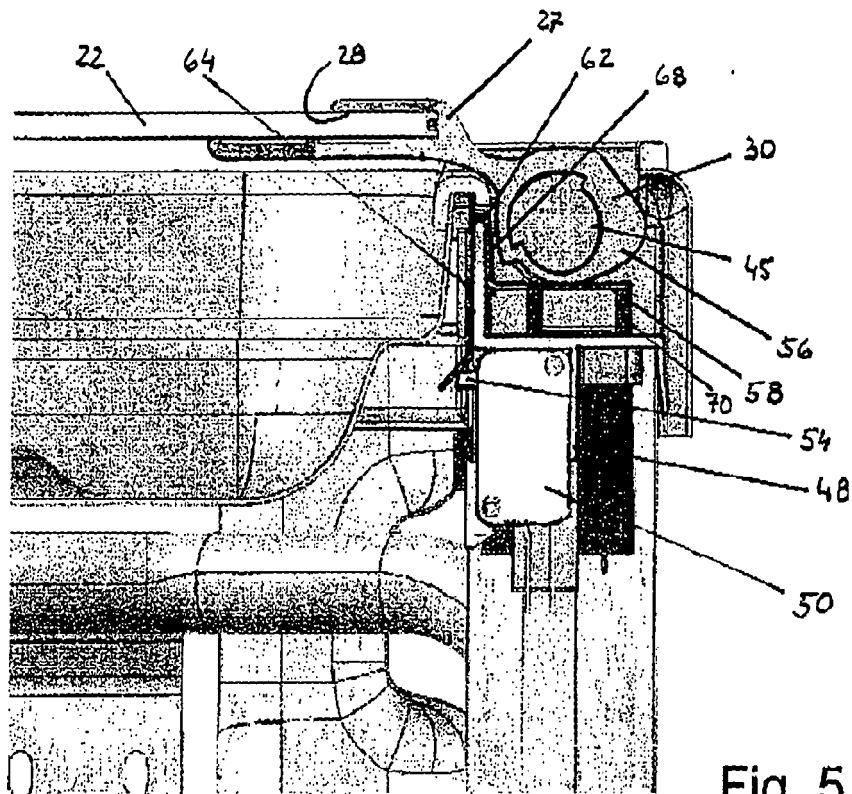


Fig. 5

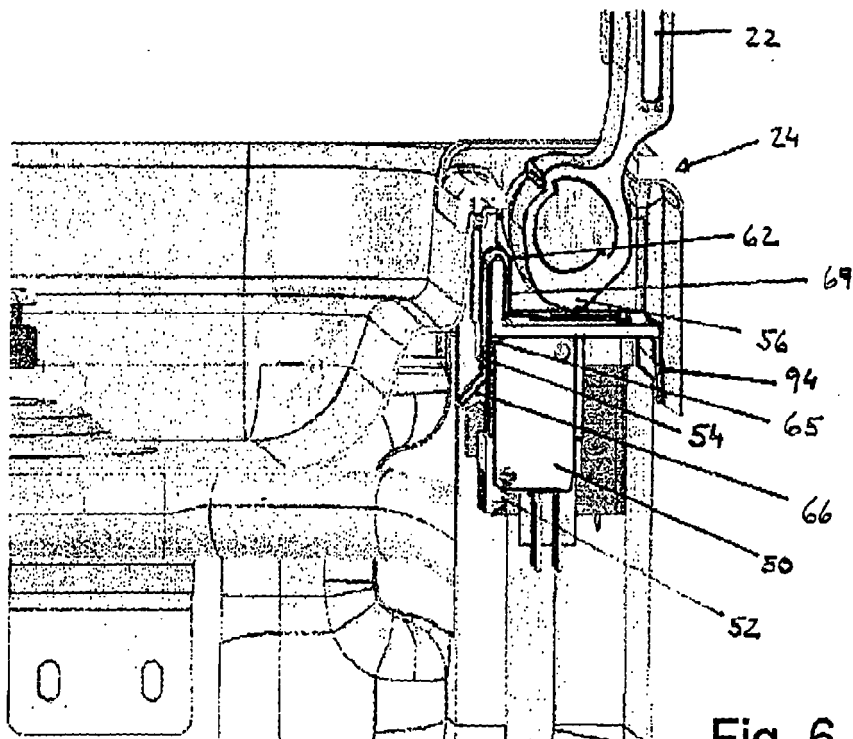


Fig. 6

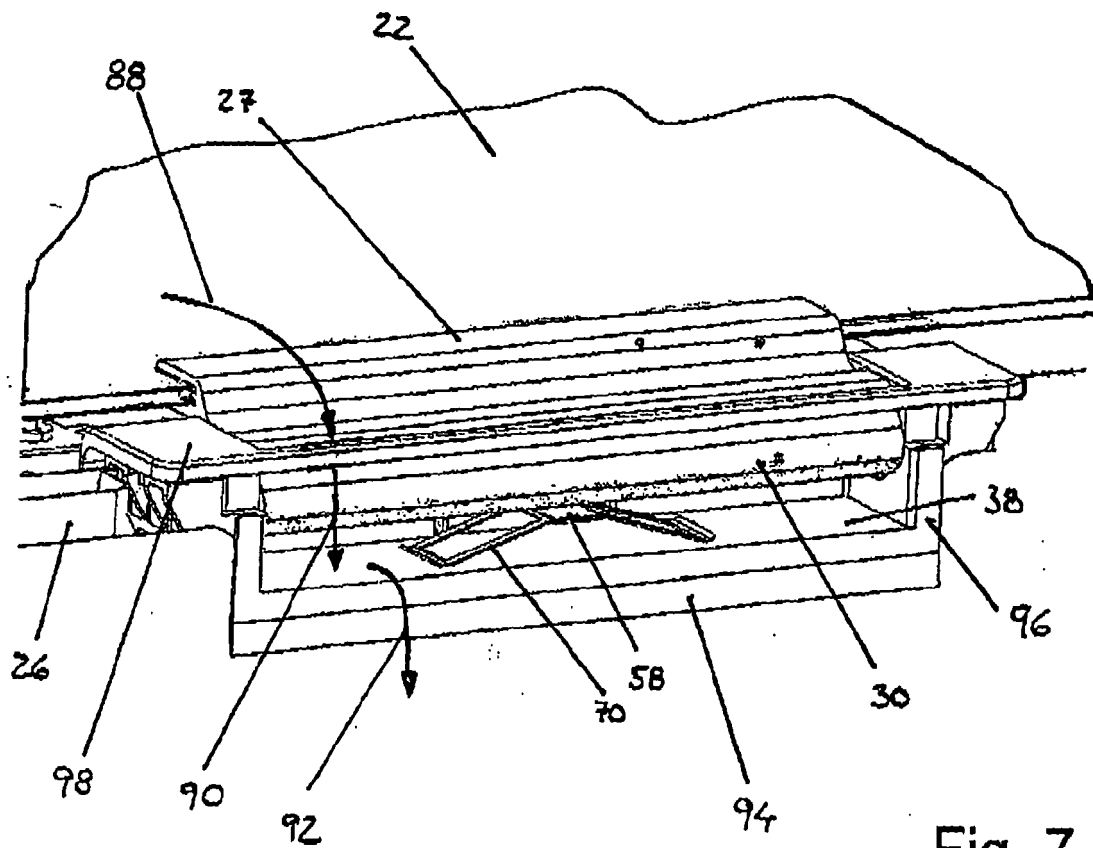


Fig. 7



EUROPEAN SEARCH REPORT

Application Number
EP 10 00 5724

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
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The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
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Place of search		Date of completion of the search	Examiner
The Hague		8 February 2011	Meyers, Jerry
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	
X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document			

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EPO FORM 1503 03/82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 10 00 5724

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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