April 26, 1955 G. C. PEARCE 2,707,225

ELECTRIC RANGE

Filed Oct. 13, 1951

2 Sheets-Sheet 1

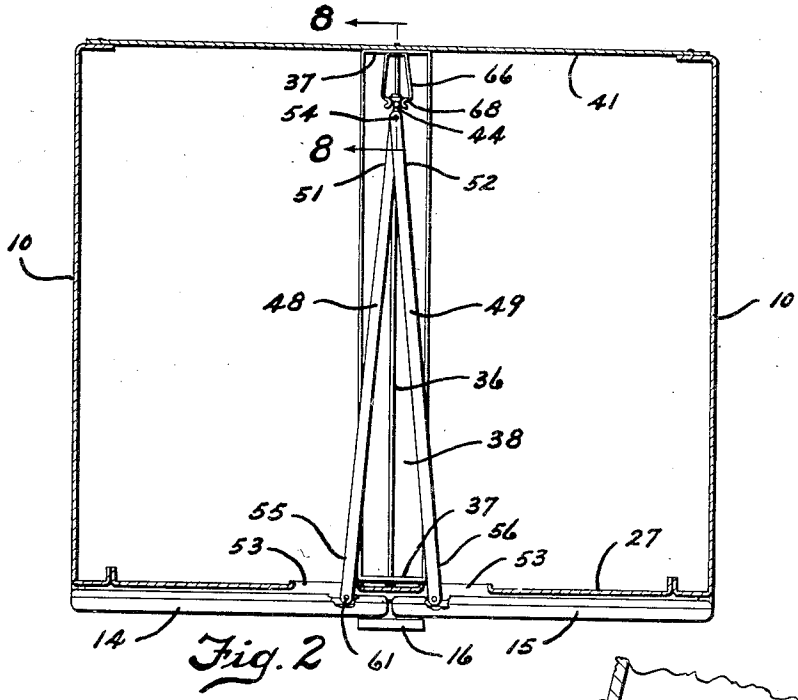


Fig. 2

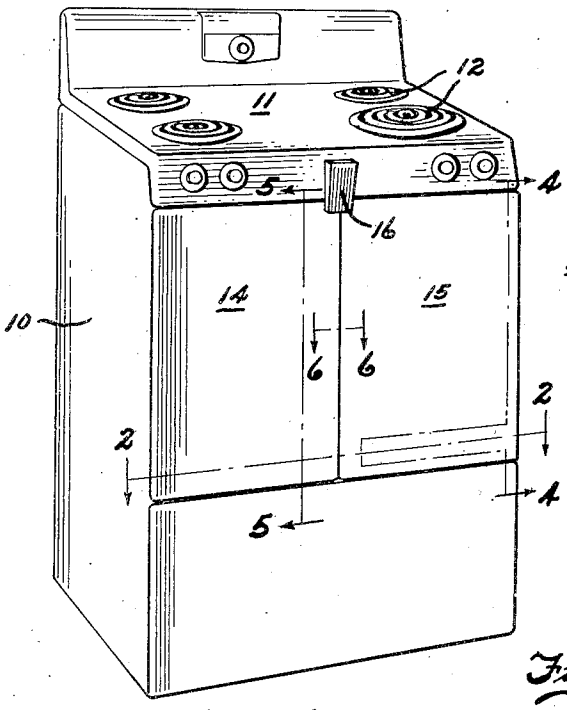


Fig. 1

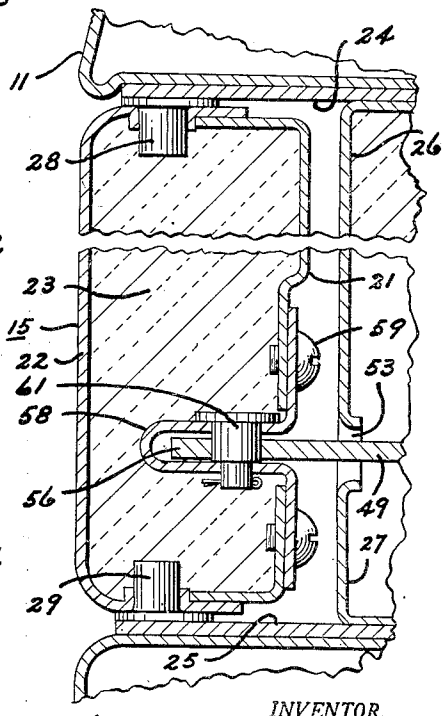


Fig. 4

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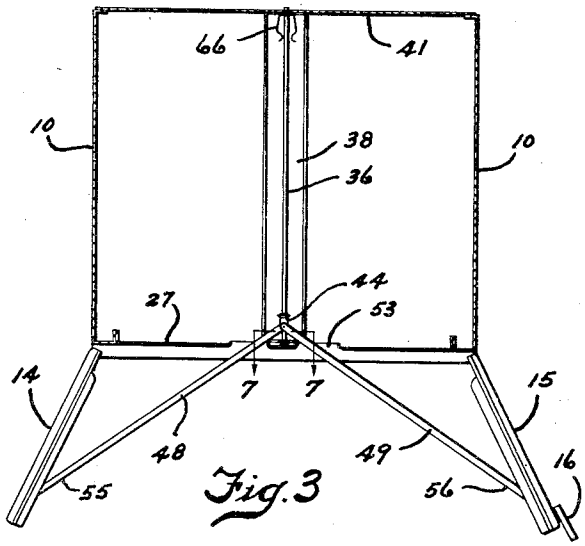


Fig. 3

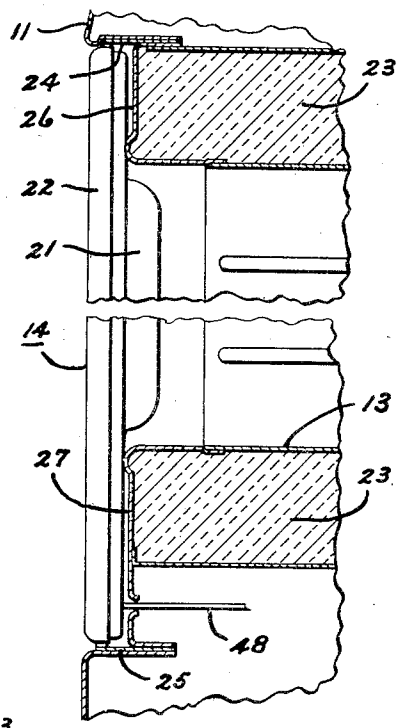


Fig. 5

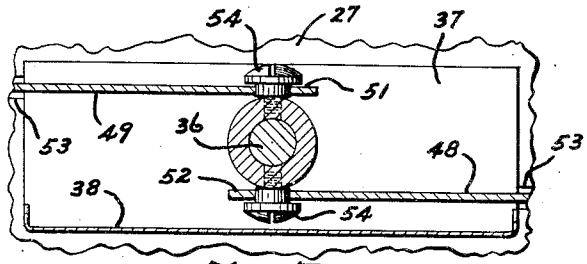


Fig. 7

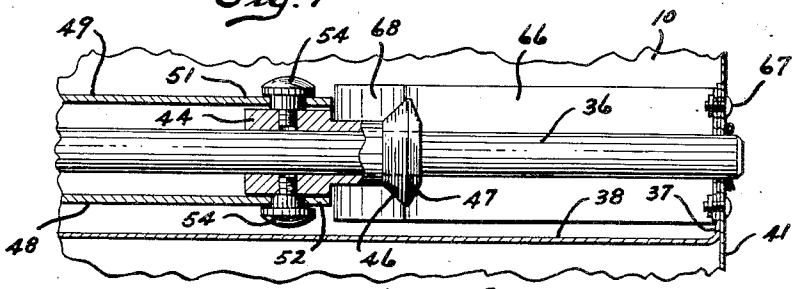


Fig. 8

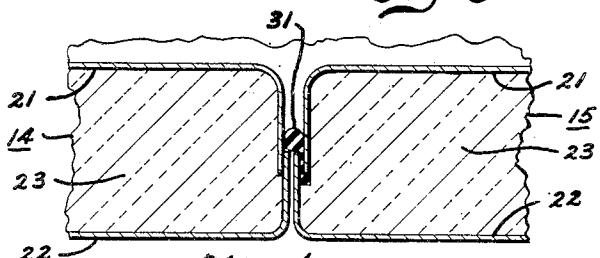


Fig. 6

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United States Patent Office 2,707,225 Patented Apr. 26, 1955

2,707,225

ELECTRIC RANGE

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Application October 13, 1951, Serial No. 251,202

2 Claims. (Cl. 219—35)

This invention relates to cooking ranges and particularly to a door arrangement providing access to an oven within the range.

It has long been the practice to provide an oven of a cooking range with a single rectangularly shaped door which is mounted for vertical swinging movement whereby the top of the oven door is pulled outwardly of the range about horizontally disposed pivot hinges and lowered into a horizontal position. While this type of oven door has been conventional it is not entirely satisfactory because difficulties have been experienced in installing a range in a kitchen and objections in the use thereof by a housewife have been expressed. For example, a vertical swinging oven door, when opened and lowered to a substantially horizontal position, projects or extends outwardly of a range a considerable distance necessitating the range to be installed at a great distance away from a wall or cupboards and/or other kitchen appliances opposite the front of the range and this wastes much valuable floor space. Such an oven door, when opened, requires the housewife to stand at the side of the horizontally disposed opened oven door and lean over the door while placing pans or the like into or removing the same from an oven and this is objectionable in that the housewife must assume unnatural or awkward postures in gaining access to the oven.

In present day small apartment type electric cooking ranges wherein the range construction is made as light in weight as is practicable a vertically swinging oven door on such a range has presented a most perplexing and serious problem. For example, when the vertically swinging oven door is lowered to a horizontal open position and a receptacle containing a large roast or the like is removed from the oven and supported on the oven door the weight of the door together with the weight of the roast thereon has, in some instances, been sufficient to cause the range to tip or tilt forward. Such tipping or tilting of a range has created a hazard which must be eliminated because water or the like boiling in a container located on top of a range, over an electric surface heating element, is likely to be spilled therefrom onto the user of the range during the act of examining the contents of a roaster removed from the range oven and placed on the open oven door thereof. I contemplate the provision of a door arrangement for a cooking range which will eliminate prior difficulties, objections and hazards to a range oven having a conventional vertical swinging door.

An object of my invention is to provide an improved door arrangement for opening and closing the open front of an oven of a cooking range.

Another object of my invention is to provide a range oven door construction which will, when opened, project only a minimum distance outwardly from the front of the range to thereby render the range capable of installation and use in confined areas of so-called utility kitchens of appartments and small homes that are usually compact due to the many built-in cabinets and other kitchen accessory features.

A further object of the invention is to provide a cooking range having a double door or side-by-side horizontally swinging doors for normally closing the oven access opening with means for simultaneously opening and/or closing both of the doors when a horizontal force or movement is imparted to either door.

In carrying out the preceding object it is a still further object of my invention to effectively seal the clearance space between the inner vertical edges of the side-by-side

horizontally swingable doors of a range oven and to also provide means for simultaneously urging or biasing both of the doors into their closed position after the same have been moved into a position to close the oven access opening.

This application is related to my copending application Serial No. 416,498, filed March 16, 1954, which is directed to a wall oven in which double doors are used to materially reduce the hazard from burns when inserting and removing objects in a hot open oven.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a perspective view of an electric cooking range having the horizontally swinging doors of the present invention shown in oven closing position;

Fig. 2 is an enlarged horizontal sectional view taken on the line 2—2 of Fig. 1 illustrating a movable tie connection between swinging oven doors shown in elevation;

Fig. 3 is a view similar to Fig. 2 on a slightly smaller scale showing the oven doors swung to fully open position;

Fig. 4 is a fragmentary enlarged vertical sectional view taken on the line 4—4 of Fig. 1, partly broken away, showing the pivotal mounting of one of the oven doors and the attachment thereto of an arm of the movable tie connection;

Fig. 5 is a fragmentary vertical sectional view taken on the line 5—5 of Fig. 1 and partly broken away showing insulation around the oven liner;

Fig. 6 is a fragmentary horizontal sectional view taken on the line 6—6 of Fig. 1 showing a gasket seal between the edges of the oven doors;

Fig. 7 is a fragmentary sectional view taken on the line 7—7 of Fig. 3 showing the pivotal mounting of the rear end of arms of the door tie connection; and

Fig. 8 is a fragmentary vertical sectional view taken on the line 8—8 of Fig. 2 showing a slidable cam member mounted on a rod of the door tie connecting means.

Referring to the drawings I have shown in Fig. 1 thereof, an electric cooking range comprising a cabinet having outer porcelain enameled metal panels 10 and a metal top 11 provided with a plurality of openings in which are mounted conventional electric surface heating units 12. A baking oven within the range is formed by a metal liner 13 (see Fig. 5) having a top, bottom, back and side walls and has its open front or access opening normally closed by a double door or a pair of side-by-side relatively tall narrow doors 14 and 15 (see Figs. 1, 2 and 3). The doors 14 and 15 are pivotally mounted for horizontal swinging movement in accordance with my invention. A knob or hand hold 16 (see Fig. 1) is located at the center of the range and is secured, in any suitable or conventional manner (not shown), to the upper portion of the one door 15 near its inner vertical edge for applying force thereto and imparting a horizontal movement which simultaneously moves the other door 14 as will be more fully described hereinafter. As far as the simultaneous swinging of doors 14 and 15 is concerned the knob or hand hold 16 may be mounted on either of the doors. The general construction of the range is not herein described in detail and it may be constructed in accordance with the range structure disclosed in my copending application S. N. 163,047, filed May 19, 1950, and entitled Domestic Appliance.

In the present disclosure the doors 14 and 15 each comprise inner and outer metal pans 21 and 22 respectively secured together in any conventional or well known manner and have insulating material 23 disposed therebetween (see Figs. 4 and 6). Upper and lower hinge brackets 24 and 25 are welded to metal panels 26 and 27 respectively secured to the liner 13 and forming the front face portion of the oven (see Figs. 4 and 5) and which brackets are each provided with a vertically disposed hinge pin 28 and 29 welded thereto. At least the overlapping flange portion of the door pan 22 has aligned and flanged openings therein for receiving the pins 28 and 29 to pivotally support the doors 14 and 15 adjacent

the oven access opening for horizontal swinging movement relative to the front of the range. A resilient gasket 31 (see Fig. 6) is held in place in any suitable or desirable manner and extends along the vertical inner edge of door 15 to sealingly engage the inner vertical edge of door 14 when both doors are closed for preventing the escape of hot air from the oven through the clearance space between the side-by-side doors. It is to be understood that gasket 31 may be secured to either of the doors 14 and 15. Gasket 31 may be formed of any suitable heat resistant material and is preferably formed of a silicon and rubber composition.

In accordance with my invention the oven doors 14 and 15 are swung horizontally about their vertical pivot mountings, pins 28 and 29, simultaneously when a horizontal swinging movement is imparted to one of the doors. For this purpose I provide a movable connection between the doors 14 and 15 in the form of a device which is located outside the oven liner 13 and below the insulation 23 along the bottom wall of the oven. This device includes a guide in the form of a round rod 36 stationarily mounted in holes provided in end upwardly flanged portions 37 of a plate 38 (see Figs. 2 and 8). Metal plate 38 is welded, bolted or otherwise suitably secured to the front panel 27 and to a rear panel 41 of the range structure. The device also includes an element 44, having cam surfaces 46 and 47 formed thereon (see Fig. 8), slidably mounted on rod 36 for movement back and forth therealong. A first arm 48 and a second arm 49 have their one end 51 and 52 respectively pivotally attached to the slidable element 44 as by bearing forming studs or screws 54. The other ends 55 and 56 of arms 48 and 49 respectively are pivotally connected to the doors 14 and 15. The front end portion 55 and 56 of arms 48 and 49 respectively extend through elongated openings or slots 53 provided in the front panel 27 below the oven access opening to permit connection thereof to the doors 14 and 15. The arms 48 and 49 are disposed one above the other and connected to slidable element 44 in like fashion to more evenly distribute force to element 44 and prevent binding thereof on rod 36. A U-shaped member 58 on each door 14 and 15 has the ends of legs of the U bent outwardly and secured to the inner door pan 21 by screws or the like 59 (see Fig. 4). A stud or pin 61 passes through suitable openings provided in the legs of the U-shaped member 58 and through an opening in the one end 55 and 56 of arms 48 and 49 respectively to pivotally connect these arms to the doors 15 and 14. Thus a movable tie or the like connection is provided between each door 14 and 15 of the type that will cause simultaneous movement of the doors about their vertically disposed hinge pins 28 and 29 to cause horizontal swinging thereof.

I also provide means for simultaneously biasing or urging both of the oven doors 14 and 15 into their closed position after they have been moved into such position so as to prevent opening of the same accidentally and only when they are intended to be opened. This biasing means prevents the oven doors 14 and 15 from opening should the range not be properly leveled or during the occurrence of undue vibrations in the vicinity of the range. I have herein shown a substantially U-shaped spring member 66, associated with the movable connecting device for the doors 14 and 15, and adapted to cooperate with the tapered cam surfaces 46 and 47 on slidable element 44 (see Fig. 2). U-shaped spring member 66 has the base of the U thereof secured to the rear end flange 37 on plate 38 by bolts or the like 67 (see Fig. 8). The end of the legs of the U-shaped spring member 66 are bent and curved as at 68 (see Fig. 2) to provide relatively hook-like portions disposed in the path of movement of cams 46 and 47, on slidable element 44, for a purpose to be more fully described hereinafter.

The hook-like portions 68 of U-shaped spring member 66 normally engage the inclined cam surface 46, on slidable, element 44, as shown in Fig. 2 of the drawings, to bias or maintain the range oven doors 14 and 15 in closed position. When the knob or hand hold 16 is grasped by the hand of the user of the range and pulled forwardly of the front thereof a horizontal swinging movement is imparted to door 15. This initial movement of door 15 causes the slidable element 44, due to the connection of arm 49 with door 15 and to this element, to slide toward the front of the range. During initial movement of door 15 and consequently simultaneous movement of door 14, due to the connection of arm 48 to element 44 and to door 14, the hook-like portions 68 of spring member 66 ride over the inclined cam surface 46 on element 44 to release the doors from the biasing means. Continued horizontal swinging movement imparted to door 15 simultaneously moves or swings both doors 14 and 15 into a wide open position as shown in Fig. 3 of the drawings to uncover the oven access openings. During this further or continued simultaneous movement of doors 14 and 15, the front portion of arms 48 and 49 move laterally away from one another about their pivot studs or screws 54, within the elongated slots 53, and the element 44 on guide rod 36 slides therealong toward the front of the range. When a horizontal swinging force is imparted to door 15, or to door 14, in an opposite direction to that for opening the doors, both doors will be simultaneously returned to their closed position to cover the oven access opening. This return horizontal swinging movement of the doors causes the arms 48 and 49 to slide element 44, upon guide rod 36, toward the rear of the range whereupon the inclined cam surface 47 on element 44 engages and spreads the hook-like portions 68 of spring member 66 outwardly away from one another. These hook-like portions 68 ride upwardly over cam surface 47 and over the intermediate part of member 44, between the cam surfaces 46 and 47, to engage or bear against the cam surface 46 to again urge or bias both doors 14 and 15 into their closed position.

Having described the construction and operation of the structure disclosed it should be apparent that I have provided an improved door arrangement for ovens of cooking ranges. My improved door arrangement when opened, in the manner herein described, uncovers the oven access opening and permits the housewife or user of the oven to stand directly in front of the same and closely adjacent the range to thereby facilitate the placing of pans into or removal of the same from the oven. By providing an oven range with side-by-side horizontally swinging doors which are tall and narrow, the doors, when swung open, occupy much less space in front of the range than a single vertically swinging door that moves into a horizontal plane when opened. The improved door arrangement also eliminates the hazard of conventional vertically swingable range oven doors hereinbefore described.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adopted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. An electric range comprising, a cabinet having outer metal walls and an inner metal liner spaced therefrom and providing walls of an oven in said cabinet, insulating material disposed in the space between said walls, said oven having an access opening at the front thereof, a heating element within said oven, means normally closing said oven access opening, said means including two doors each pivotally mounted upon said cabinet at opposite sides of said oven for horizontal swinging movement, a device within said cabinet wholly outside of said oven and located below the bottom thereof for causing a horizontal swinging force imparted to one of said doors to simultaneously swing the other door to open said oven access opening, said device including a guide extending from the front of said cabinet a substantial distance rearwardly therein, an element slidable along said guide, a first arm and a second arm, said arms having their one end pivotally connected to said slidable element and having their other end pivotally connected to said doors respectively, said element having a cam thereon, and said device also including a spring stationarily mounted upon said cabinet adjacent the rear end of said guide and engageable with said cam on said element upon moving the doors into closed position for biasing the same against said cabinet to seal the access opening of said oven.

2. An oven comprising, a cabinet having outer metal walls and an inner metal liner spaced therefrom and providing walls of an oven in said cabinet, insulating material disposed in the space between said walls, said oven having an access opening at the front thereof, a heating element within said oven, means normally closing said oven access opening, said means including two doors each pivotally mounted upon said cabinet at opposite sides of said oven for horizontal swinging movement, a device within said

cabinet wholly outside of said oven and located below the bottom thereof for causing a horizontal swinging force imparted to one of said doors to simultaneously swing the other door to open said oven access opening, said device including a guide extending from the front of said cabinet a substantial distance rearwardly therein, an element slidable along said guide, a first arm and a second arm, said arms having their one end pivotally connected to said slidable element and having their other end pivotally connected to said doors respectively, said element having first means thereon, and said device also including spring means stationarily mounted upon said cabinet adjacent the rear end of said guide and engageable with said first means on said element upon moving the doors into closed position for biasing the same against said cabinet to seal the access opening of said oven.

References Cited in the file of this patent

UNITED STATES PATENTS

544,773 Schill ---------- Aug. 20, 1895
835,984
1,398,010
1,478,856
1,641,160
1,804,231
1,827,634
1,873,088
1,886,999
1,900,901
2,101,465
2,122,220
2,273,594
2,405,305
2,408,295
2,465,555
2,598,814

Reis ---------- Nov. 13, 1906
Eisman ---------- Nov. 22, 1921
Hockenberry ---------- Dec. 25, 1923
Fredrick ---------- Sept. 6, 1927
Rantz ---------- May 5, 1931
Winegar ---------- Oct. 13, 1931
Wilde ---------- Aug. 23, 1932
Wilson ---------- Nov. 8, 1932
Bagley ---------- Mar. 14, 1933
Beers ---------- Dec. 7, 1937
Turner ---------- June 28, 1938
Rich ---------- Feb. 17, 1942
Hennessy ---------- Aug. 6, 1946
Cossin ---------- Sept. 24, 1946
Smith ---------- Mar. 29, 1949
McAfee ---------- June 3, 1952

FOREIGN PATENTS

13,602 Great Britain ---------- July 4, 1901