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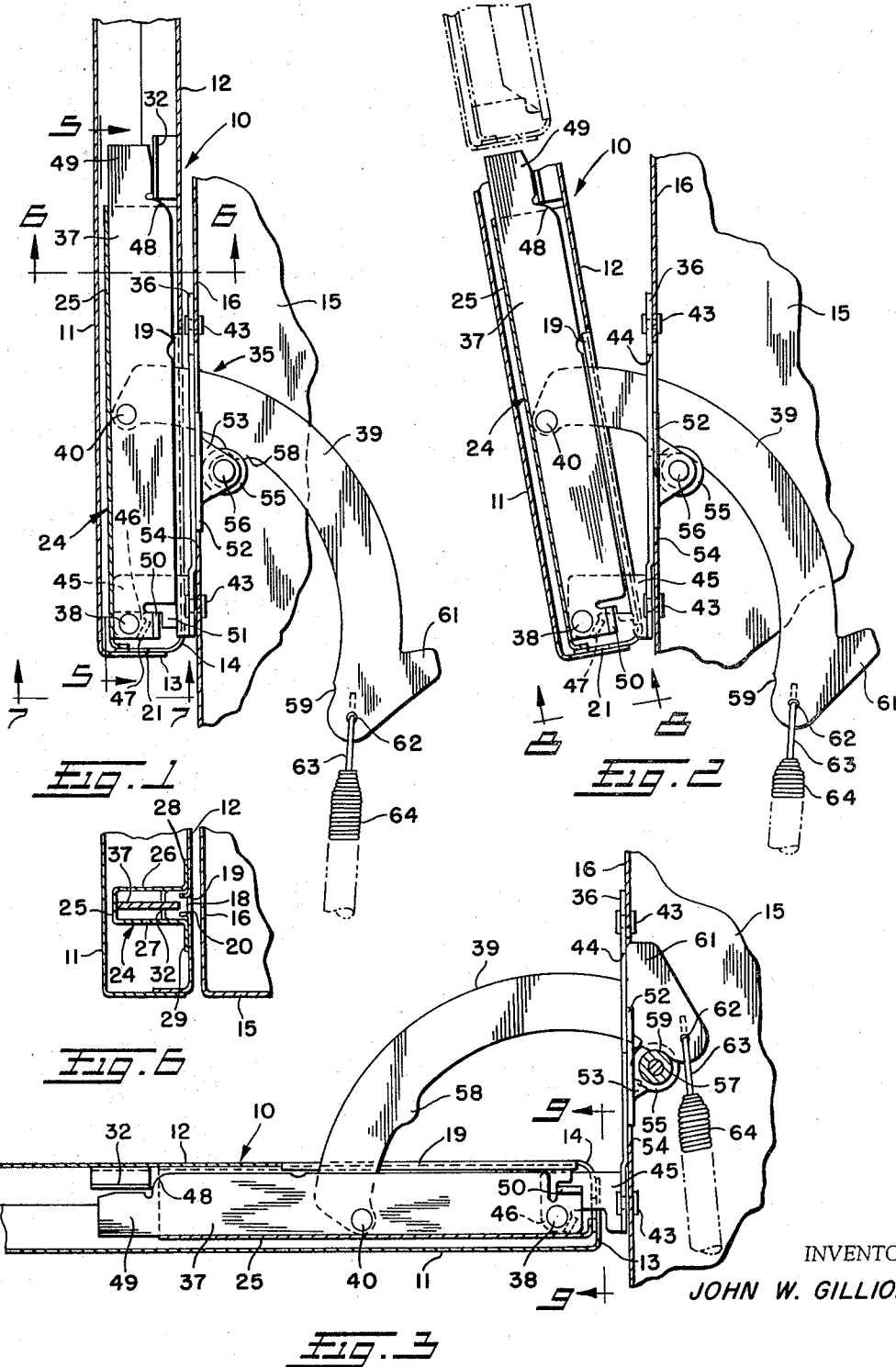
J. W. GILLIOM

3,304,932

REMOVABLE OVEN DOOR

Filed Oct. 15, 1965

2 Sheets-Sheet 1



INVENTOR

JOHN W. GILLIOM

BY

Oberlin, Maky & Donnelly
ATTORNEYS

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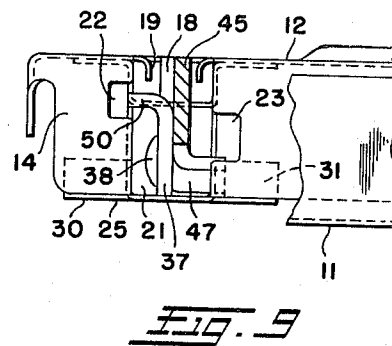
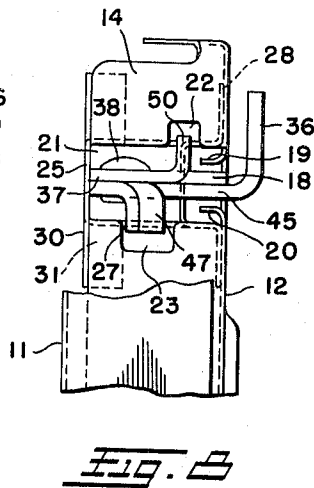
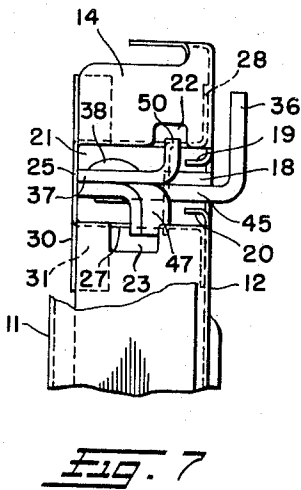
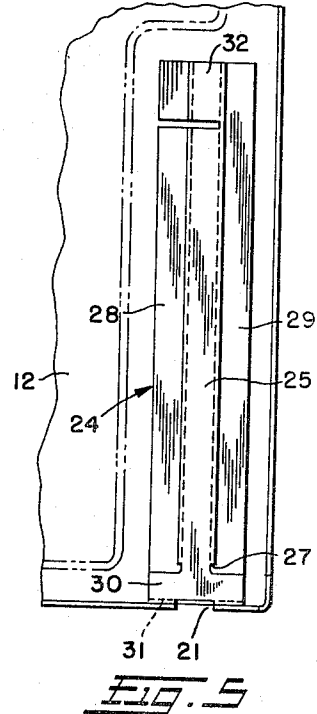
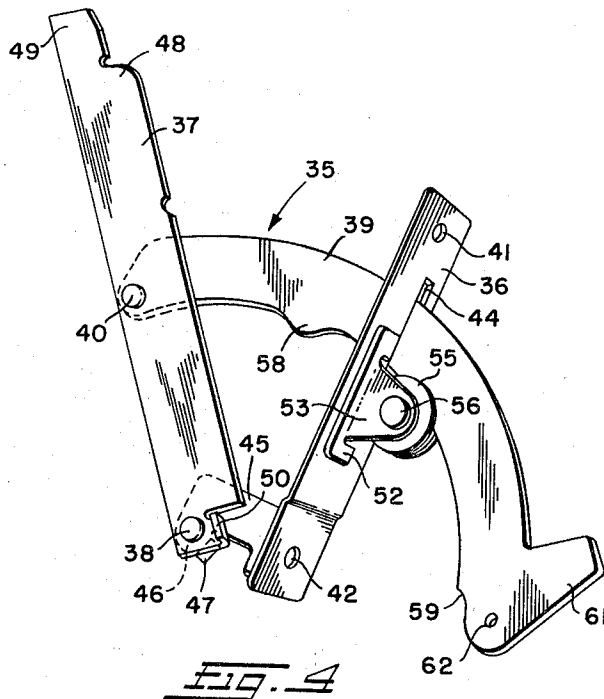
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BY

Oberlin, Maky & Donnelly
ATTORNEYS

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REMOVABLE OVEN DOOR

John W. Gilliom, Mansfield, Ohio, assignor to The Tappan Company, Mansfield, Ohio, a corporation of Ohio

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3 Claims. (Cl. 126-194)

The present invention relates as indicated to a removable oven door for cooking ranges.

In the typical domestic cooking range, the oven cavity is adapted to be closed by a normally bottom-hinged door movable between vertical closed and substantially horizontal open positions for selectively closing the oven cavity or gaining access thereto. To clean the walls of the oven cavity of grease and deposited food particles the oven door must of course be opened and in such position presents a significant obstacle to the housewife who has to reach into the oven cavity a substantial distance for cleaning the side and rear walls of the oven. As a result, it has become rather common to removably mount the oven door to permit the housewife to completely remove the same from its mounting on the range frame to provide more convenient access to the walls of the oven cavity. In present mechanisms for removably mounting oven doors, it is common practice to provide latching means or the like on the bottom on the inside door liner which can be selectively moved to a predetermined position for conditioning the hinging mechanism to permit removal of the oven door. Since the door is hinged at both sides of the bottom, two such latching devices are provided which must be moved by the housewife before the door can be removed. Thus, in order to remove the oven door, the housewife must both know the direction of movement of the latching mechanisms and perform the relatively awkward task of bending over and manually moving the same. This procedure is a decided inconvenience and must, moreover, be reversed when the thus removed door is replaced in hinged position on the door frame.

With the above in mind, a primary object of the present invention is to provide an oven door which can be simply and quickly removed by the housewife from its hinged mounting to facilitate cleaning of the oven interior.

A more specific object of the present invention is to provide such a removable door which can be removed merely by withdrawing the same upwardly when the door has been moved to a predetermined position of movement, with no further effort insofar as mechanism adjustment is concerned being required.

A further object of the present invention is to provide a removable oven door in which the operating mechanism is constructed and arranged to permit the same force counterbalance spring to be used for oven doors of varying weight. In the past it has been common practice to either employ different strength springs or to variably adjust the counterbalance springs provided to accommodate oven doors of different weights used with different range models.

A still further object of the present invention is to provide a removable oven door the operating parts of which are economical to manufacture and easy to mount on the range frame.

These and other objects and advantages of the present invention will become apparent as the following proceeds.

To the accomplishment of the foregoing and related ends, the invention, then, comprises the features hereinafter fully described and particularly pointed out in the claims, the following description and the annexed drawings setting forth in detail certain illustrative embodiments of the invention, these being indicative, however, of but a few of the various ways in which the principle of the invention may be employed.

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In said annexed drawings:

FIG. 1 is a fragmentary, vertical section of the oven door mounted on the hinge assembly of the present invention, with the oven door being shown in a vertical, closed position;

FIG. 2 is a fragmentary, vertical sectional view similar to FIG. 1, showing, however, the oven door slightly ajar and in position for removal thereof, with the oven door being shown removed in dashed lines;

FIG. 3 is a fragmentary, vertical sectional view of the oven door in a horizontal open position;

FIG. 4 is a perspective view of the hinge assembly itself;

FIG. 5 is a fragmentary sectional view taken on line 5-5 of FIG. 1, with the hinge assembly being omitted;

FIG. 6 is a sectional view taken on line 6-6 of FIG. 1;

FIG. 7 is an enlarged, bottom plan view looking in the direction indicated by line 7-7 of FIG. 1;

FIG. 8 is an enlarged, bottom plan view taken on line 8-8 of FIG. 2, and

FIG. 9 is an enlarged sectional view taken on line 9-9 of FIG. 4.

Referring now in more detail to the drawings, wherein like parts are indicated by like reference numerals, the application drawings illustrate the oven door and hinge assembly therefor at the lower right front corner of the range. It will be understood that the lower left-hand corner mounting of the oven door is exactly the same and that the following description is applicable to both corner mountings of the oven door.

The oven door is generally indicated at 10 and includes outer and inner liners 11 and 12, respectively, formed in the usual manner with opposed and overlapping peripheral flanges 13 and 14, respectively, which can be spot welded or otherwise secured for forming the oven door.

The range frame includes side liners 15 formed with laterally directed front flanges 16. Although not shown, it will be understood that a suitable oven door seal is provided, mounted either on the adjacent face of the door liner 12 or the flanges 16 for sealing the oven door when closed, with the seal of course also being mounted similarly at the top of the oven cavity for sealing the same. The description thus far relates to conventional range construction and has been described only to the extent required to afford a full understanding of the present improvements.

The inside liner 12 is formed with a pair of elongated slots 18 relatively adjacent each side of the liner which extend upwardly from the bottom flange 14 thereof, with the sides of each slot 18 being defined by inwardly turned flanges 19 and 20 to provide a smooth slot edge. The bottom flange 14 of the inner liner is formed with an irregular shaped opening 21 below and communicating with the slot 18, with such opening, referring to FIGS. 7-9, including openings or recesses 22 and 23 at opposite sides of the opening 21 for a purpose to be hereinafter explained.

A retainer channel generally indicated at 24 is mounted on the inside liner 12, with the channel including, as best seen in FIG. 6, a bottom or base 25, opposed side portions 26 and 27 which form with the bottom a generally U-shaped channel, and laterally directed front flanges 28 and 29. The latter preferably extend the entire length of the channel 24 and are disposed contiguous the adjacent face of the inner liner 12 for mounting thereto by spot welding or the like. The channel 24 further includes a bottom flange section 30 in the plane of the base 25, with the flange being inwardly bent at its bottom to provide flange tabs 31 which can be attached to the inner liner 12 on both sides of the slot 21. The base 25 of the retainer is inwardly offset relatively adjacent its upper end

as indicated at 32, with the offset portion serving a stop or limiting function as will be hereinafter described.

The hinge assembly for mounting the oven door 10 is generally indicated at 35 and comprises a mounting bracket 36, a cam lever 37 pivotally connected at 38 to the mounting bracket, and a cam arm 39 pivotally connected at 40 to the cam lever 37.

The mounting bracket 36 is formed with top and bottom openings 41 and 42, respectively, through which suitable fasteners such as rivets or the like commonly designated at 43 extend for rigidly mounting the bracket 36 to the front flange 16 of the oven liner 15. The mounting bracket is formed with a vertically elongated slot 44 adapted to receive the cam arm 39, and is formed adjacent its bottom with a flange 45 formed at right angles to the plane of the bracket and extending outwardly therefrom. The flange 45 is formed with a downwardly extending ear 46 to which the cam lever 37 is pivotally connected as above described and indicated at 38. A tab 47 extends laterally from the ear 46 and is, when the door is in a vertical, closed position as shown in FIG. 1, generally above but slightly vertically disaligned with the recess 23 formed in the bottom flange 14 of the inner liner 12.

The cam lever 37 is formed generally adjacent the top thereof with a shoulder 48 and a reduced top portion 49, the latter being adapted to extend upwardly between the main base 25 and the offset base portion 32, as seen in FIGS. 1-3, with the vertical downward movement of the door being arrested through engagement of the portion 32 with the shoulder 48 thereby to accurately vertically position the oven door when mounted.

The cam lever 37 is formed at its opposite end with a laterally directed tab 50 which extends normal to the plane of the cam lever and generally vertically above, and in alignment with, the recess 22 of the bottom flange 14. When the oven door is mounted, the tab 50 lies closely adjacent or abuts downwardly extending shoulder 51 formed in the side 27 of the channel retainer 24 at the bottom thereof thereby to closely space and thus stabilize the hinge assembly front to rear in the oven door when the latter is mounted.

The mounting bracket 36 carries on the inner side thereof a plate 52 having a rearwardly directed flange 53. The front flange 16 of the oven liner member 15 is formed with a suitable sized opening or slot 54 to accommodate the plate 52 as well as the cam arm 39.

The flange 53 mounts a cam roller 55 by means of a pin or rivet 56, with the cam roller being formed with groove 57 which is adapted to receive and support the inner cam surface of the cam arm 39, such surface being formed with a shoulder 58 which serves to automatically retain the door in a position for removal as will be hereinafter described. The cam arm 39 is further formed with a notch or recess 59 relatively adjacent the bottom thereof on the same inner cam surface to maintain the oven door in its horizontal, FIG. 3 position.

The cam arm is formed relatively adjacent the bottom thereof with a shoulder 61 which is adapted to engage the inner face of the mounting bracket 36 when the door 10 has been moved to horizontal position, FIG. 3, thereby serving to limit such movement. The cam arm 39 is additionally formed with a circular opening 62 relatively adjacent the bottom thereof for receiving the end 63 of a counterbalancing spring 64 the opposite end of which is connected in a conventional manner (not shown) to the side liner 15. The counterbalance spring 64 thus continuously biases the cam arm 39 into engagement with the cam roller 55 and the oven door to a closed, vertical position.

During normal use of the oven door, the same is swung between its vertical, closed and horizontal, open positions and is supported at all times by the hinge assemblies 35 at opposite sides of the range frame, each cam lever 37 of which is received as described in the retaining channel

24. The opening movement of the door is limited by the shoulder 61 of the cam arm as described, and when the door has been moved to its open position, FIG. 3, the notch or recess 59 biasingly engages the bottom of the roller groove 57, with such engagement serving to maintain the door in an open position against the bias of the spring 64. By means of such arrangement, the same strength spring can be employed regardless of the weight of the oven door, a significant advantage over present arrangements. Presently, as well understood to those skilled in the art, different weight oven doors used with various range models require various strength springs, or force adjustment means if a single spring is used, to provide the desired counterbalancing action. For example, a relatively heavy door requires a relatively strong spring to provide for return of the door, with the same strong spring, however, being excessive for relatively light doors and not permitting the same to remain, unattended, in an open position. The notch 59, on the other hand, retains the oven door in an open position, overcoming, in effect, the spring bias, with the door automatically closing following slight upward movement of the same to move the notch 59 from the roller groove.

The door 10 can be removed in the following manner. Assuming the door is in its closed, FIG. 1 position, the same is moved to the position shown in FIG. 2 and retained therein by the shoulder 58 which is in biased engagement with the cam roller groove 57. This position might also conveniently constitute the position of the oven door for broiling when the door is mounted for use on an electric range. As can be seen in FIG. 8, when the door 10 has been moved to its FIG. 2 position, the tab 47 of the bracket flange 45 is aligned with the slot 23 formed in the bottom flange 14 of the oven door liner 12, thereby permitting the door 10 to be removed from its mounting as shown in FIG. 3 simply by lifting up the same at opposite sides thereof.

When the door is moved in either direction from its FIG. 2 position, the tab 47 is not registered with the recess 23 whereby the door 10 cannot be removed. FIGS. 7 and 9 show the relative positions of the tab 47 and recess 23 when the door is fully closed and open, respectively, and the disalignment will be clearly noted.

To mount or replace the oven door 10, the respective cam levers 37 are moved to their FIG. 2 position, if not already in such position and are retained in such position by the shoulders 58. The door 10 can then be merely dropped down in place, with the bottom opening 21 and slot 18 at each side of the inner liner 12 being aligned with the respective cam levers 37. The downward movement of the door 10 will be arrested when the bottom of the channel base portion 32 of the retainer channel 24 contacts the shoulder 48 of the cam lever. When thus replaced, the door can be moved to an open or closed position, with the door pivoting about pivots 38, and the tabs and recesses 23 when thus disaligned prevent the door from being removed during normal operation.

It will thus be seen that the removable oven door 10 of the present invention provides numerous advantages over present removable oven doors. To remove the door, the same need merely be moved to a predetermined, retained position and lifted upwardly away from the hinge assembly. Thus, the housewife need not be troubled with manually operated latching or releasing mechanisms as in present arrangements. To replace the door the same minimum effort is required, with the door merely being aligned with the cam levers and dropped in place. The operating mechanism itself is simple in construction and can be manufactured at relatively low cost.

Other modes of applying the principle of the invention may be employed, change being made as regards the details described, provided the features stated in any of the following claims or the equivalent of such be employed.

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I therefore particularly point out and distinctly claim as my invention:

1. In a cooking range having a front range frame defining an oven cavity, an oven door for selectively closing and exposing said oven cavity, said door being formed relatively adjacent each side thereof with an elongated slot communicating with an opening formed in the bottom of said door, channel means mounted interiorly of said door adjacent each of said slots, a hinge assembly for mounting said oven door comprising a mounting bracket mounted on said front frame relatively adjacent each side thereof, a cam lever pivotally mounted on each of said brackets and extending upwardly into the associated channel means for pivotally mounting said door, a cam arm pivotally attached to each of said cam levers and extending through aligned slots formed in said bracket and said front frame, cam roller means mounted on each of said brackets, spring means operatively connected to said cam arms for continuously biasing said cam arms into contact with said cam roller means thereby biasing said door to a closed position, first means on each of said cam arms for frictionally engaging the associated cam roller means thereby to overcome the bias of said spring means and retain said door in a predetermined, slightly open position, second means on each of said cam arms for frictionally engaging the associated cam roller means thereby to overcome the bias of said spring means and retain said door unattended in a fully open position, each

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of said mounting brackets being formed with a forward flange portion carrying a laterally bent tab, said tabs being fully registrable with portions of the associated openings in said bottom wall of said oven door when said door is in such slightly open position thereby to permit upward withdrawal and removal of said door only when in such position.

2. The combination of claim 1 wherein said first means on said cam arms comprise shoulders relatively adjacent the pivoted end thereof and said second means on said cam arms comprise recesses formed in said cam arms relatively adjacent the free ends thereof, said spring means being operatively connected to said cam arms at such free ends thereof thereby to continually bias said door to a closed position.

3. The combination of claim 1 wherein each of said cam levers is formed at the bottom thereof with laterally extending tab means adapted to be disposed closely adjacent a portion of said channel means when said door is mounted to limit the movement front to rear of said cam levers in said channel means.

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KENNETH W. SPRAGUE, *Primary Examiner*.