June 3, 1958 H. M. REEVES 2,837,080

OVEN DOOR SPRING MOUNTING

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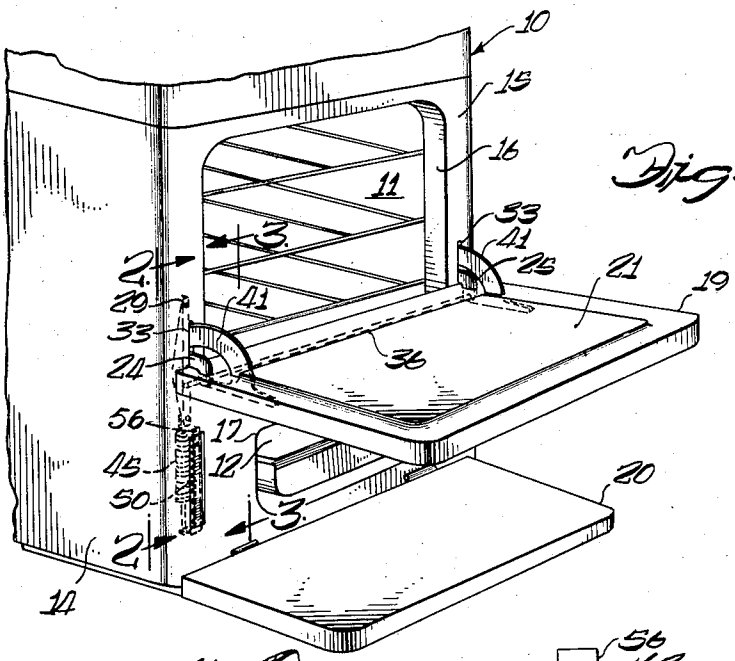


Fig. 1.

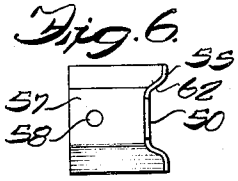


Fig. 6.

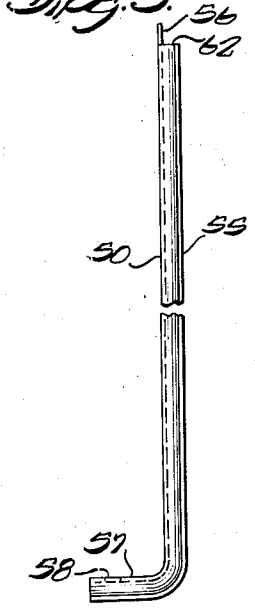


Fig. 4.

Fig. 5.

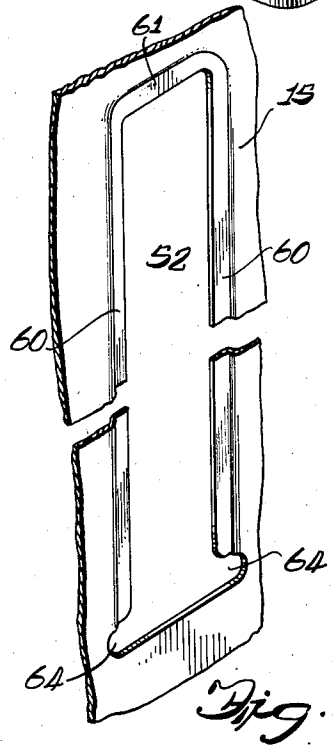


Fig. 7.

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Fig. 2

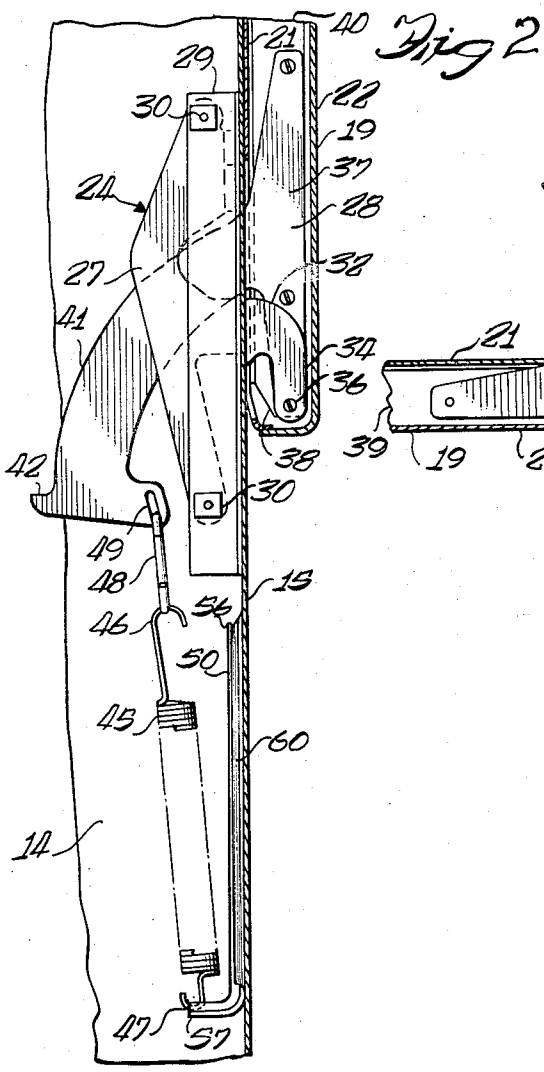


Fig. 3

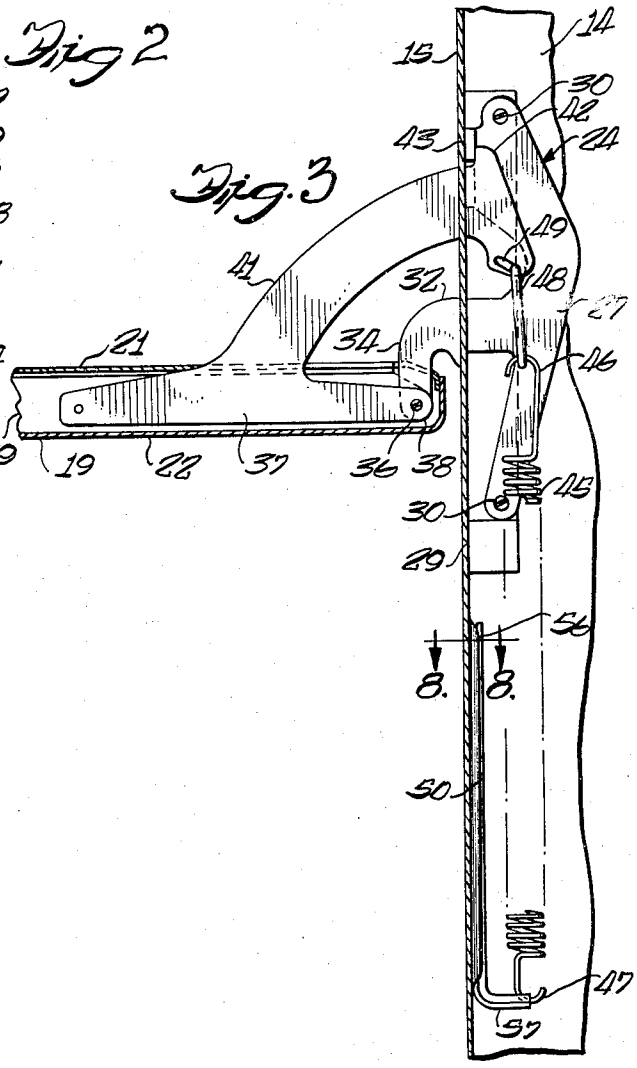
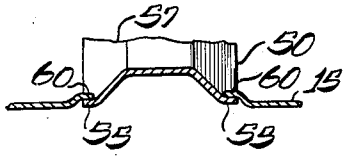


Fig. 8.



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OVEN DOOR SPRING MOUNTING

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7 Claims. (Cl. 126—191)

The present invention relates generally to counterbalance spring mounting means for hinged doors and more particularly to counterbalance spring mounting means for front opening oven doors for cook stoves.

Present-day cook stoves are commonly provided with over doors which are hinged to swing forwardly and downwardly and are counterbalanced so that the door will remain in any desired positions to which it may be moved. Tension springs usually in the form of a coil spring are provided to counterbalance the weight of the door for this purpose. Experience has shown that such counterbalance springs may deteriorate or break after periods of use due to the heat to which they are subjected, general wear, or other causes. It has been found that replacing such a counterbalance spring has been a tedious and time-consuming job, in some instances requiring special equipment and particular skill.

It is an object of the present invention to provide counterbalance spring mounting means which permits access to and replacement of the counterbalance spring with a minimum of effort and time.

A related object is to provide a spring supporting means of the foregoing type which permits the spring to be replaced without the necessity of obtaining access to the rear of the stove. In other words, it is an object of the present invention to provide a structure which permits replacement of the counterbalance spring from the front of the stove.

Another object of the present invention is to provide a counterbalance spring supporting means allowing the spring to be replaced without the necessity of the resort to special tools or equipment.

It is also an object of the present invention to provide the foregoing type of counterbalanced spring mounting means without detracting from the appearance of the front of the stove.

Other objects and advantages of the present invention will become apparent from the following detailed description of the preferred embodiment of the invention illustrated in the accompanying drawings in which:

Fig. 1 is a fragmentary perspective of an illustrative cook stove embodying the present invention.

Fig. 2 is a partial vertical section of a hinge and counterbalance mechanism embodying the present invention taken along the lines 2—2 of Fig. 1 and showing the door in closed position.

Fig. 3 is a partial vertical section similar to that of Fig. 2 taken along the lines 3—3 of Fig. 1, showing the oven door in open position.

Fig. 4 is a front elevation of a mounting bracket for the counterbalance spring supporting means of Fig. 1.

Figs. 5 and 6 are a side elevation and a top view, respectively, of the bracket shown in Fig. 4.

Fig. 7 is a fragmentary perspective of the front panel of the stove of Fig. 1 showing the same adapted to receive the mounting bracket of Fig. 4.

Fig. 8 is a partial horizontal section of the mounting

bracket and front panel of the stove taken along the line 8—8 of Fig. 3.

While the invention is susceptible to various modifications and alternative construction, there is shown in the drawings and will be described in detail herein the preferred embodiment, but it is to be understood that it is not the intention to limit the invention to the specific forms disclosed, but, on the contrary, the intention is to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

For purposes of illustration, the present invention is shown in the drawings embodies an illustrative cook stove 10 having a pair of ovens 11, 12 arranged one above the other. In the well-known manner, the stove is of the enclosed type having surface burners on a top panel (not shown), and side and front panels 14, 15. The front panel 15 has suitably positioned first and second openings 16, 17 to form the entrance to the ovens which, in the stove of Fig. 1, are arranged such that the upper opening 16 leads to a baking oven 11 and the lower opening 17 to a broiler oven 12.

Each of the ovens 11, 12 has a vertically swinging door closure 19, 20 which moves forwardly and downwardly to open, and upwardly and rearwardly to close, the oven. The doors 19, 20 are preferably of the flush type having inner and outer spaced panels, indicated by the reference numerals 21, 22 in the upper oven door, and are substantially larger and wider than the oven openings to provide a marginal overlap with the front panel 15. The present embodiment of the invention is illustrated particularly with respect to the upper or baking oven door 19, which will be described in some detail.

Supporting the baking oven door 19 is a pair of spaced hinges 24, 25 which are arranged to support the door adjacent its lower edge on the stove. The hinges may be mounted on the stove frame, or as in the present instance, may be mounted on the front panel 15 which surrounds and forms the opening 16 to the oven 11.

In more detail, each of the door hinges 24, 25 comprises a stationary part 27 and a movable part 28. The stationary part 27 is fixed to the inner side of the front panel 15 of the stove, being bolted or otherwise fastened to a vertically positioned angle iron 29 which in turn is fastened, as by spot welding, to the inner side of the panel 15. The stationary part 27, itself, is a sheet metal stamping fastened by bolts 30 at its upper and lower ends to the angle iron 29, and has a forwardly projecting arm 32 which extends through an alined vertical slot 33 in the front panel 15 of the stove. The front portion 34 of the stationary hinge arm projects downwardly and is spaced a short distance from the front side of the stove panel 15. Supported in apertures in the lower end portion 34 of the stationary hinge arm 33 is a hinge pin which, in the present embodiment comprises a rod 36 extending transversely through the lower portion of the door between the door panels 21, 22, and supported at its opposite ends by the stationary hinge members 27.

Cooperating with each stationary hinge member 27 is a movable member 28 which has an elongated base 37 dimensioned to lie between the inner and outer panels of the door. The lower or inner end 38 of the base portion of the movable hinge member 27 is apertured to receive the hinge pin 36. In the exemplary construction the base 37 of the stationary member 27 is fastened to the door 19 by a reinforcing angle iron 39 which in turn is spot welded or otherwise fastened to the inside of one or the other of the door panels.

Projecting upwardly and rearwardly from the movable hinge member 28 is an arcuate arm 41 which projects rearwardly through the upper portion of the vertical slot

33 in the front panel of the stove. To limit the downward postion of the door, the arm 41 has an upwardly extending projection 42 at its rear end portion. As shown in Fig. 3, this projection engages the inside face of the front panel 15 when the door 19 is in its lowermost position, thereby limiting further movement of the door and holding it in a more or less horizontal position. To take the shock and prevent damage to the front panel when the oven door is abruptly stopped at its lower position, a strip of metal 43 of rather heavy cross-section may be interposed between the rear of the front panel and the stop abutment. In the illustrative construction of the drawings, this reinforcing or contact piece 43 is formed as a transversely extending leg on the upper end portion of the fixed hinge member 27.

Although only one of the hinges 24, 25 has been described in detail, it will be appreciated that the remaining one of the pair of hinges is preferably of the same construction. One of the hinges will, of course, be a right hand hinge and the second will be a left hand hinge to provide a symmetrical construction.

In order to counterbalance the weight of the oven door, both to hold the door in closed position and, if desired, in any of its angular open positions, a resilient biasing means is provided which, in the present instance, is a pair of tension coil springs 45. Each spring is suitably attached to the rear portion of the arcuate arm 41 on the respective movable hinge members 28 and arranged to exert an upward pull on the oven door 19. More specifically, each counterbalance spring 45 has at its ends attaching hooks 46, 47. One of these hooks 46 is connected by means of a C-shaped wire link 48 to an aperture 49 in a depending portion of the inner end of the arcuate arm 45. The second of the hooked ends 47 of the counterbalance spring 45 is mounted or attached to the frame of the stove. The counterbalance springs 45 are selected to have a resilient force sufficient to counterbalance the weight of the particular door with which they are to be used.

In accordance with the present invention, means are provided for mounting or anchoring each counterbalance spring to the stove frame such that the resilient force of the spring maintains the mounting means in its normal anchored position and such that upon manipulation of the supporting means against the force of the spring the supporting means is released completely from its anchored position to allow the spring to be removed.

For this purpose a slidable connection between the second end of the counterbalance spring 45 and the stove is provided. This connection is arranged so that it has limited sliding movement generally in the direction of the resilient force exerted by the spring and upon sliding movement in a direction against the force of the spring, the connection becomes free to move in a lateral direction to release the spring completely.

With reference to the drawings, the novel mounting means of the present invention is illustrated in the form of an anchor plate or slider bracket 50 and an aperture 52 having guide means, positioned at the side of the broiler oven opening 17 in the front panel 15 of the stove. The bracket 50 is formed of a sheet metal stamping having edge portions forming forwardly offset lateral flanges 55. At the upper end of the bracket 51 is a locking tongue 56 formed by an integral projection on the upper end of the slider. At the lower end of the slider is a rearwardly projecting section 57 having an aperture 58 for receiving the hooked end 47 of the counterbalance spring 45.

Cooperating with the lateral flanges 55 of the slider bracket are the vertical guide strips 60 forming outwardly facing guide surfaces. Preferably the guide strips 60 are rearwardly or inwardly offset portions of the front panel 15 which project over the marginal edge portions of the opening 52. To present a flush surface on the front panel, the guide strips are offset an amount equal to or slightly greater than the thickness of the sheet material forming the lateral flanges of the slider bracket 50. The vertical edge portions 60 of the front panel are substantially parallel, and are spaced from each other a distance less than the width of the slider bracket so that upon insertion of the latter into the opening, the edge portions or offset strips 60 and the lateral flanges 55 on the bracket overlap in sliding engagement. The lower edge of the slider opening 52 is free of any offset edge portion, being defined by a straight edge lying in the plane of the front panel. By this arrangement the slider bracket 50 may be moved vertically upwardly along the inside of the front panel over the opening 60 with its flanges 55 positioned against the outer faces of the offset edge portions 60 at the sides of the slider opening, and is thus held both against edgewise movement and against sidewise movement toward the inside of the stove.

As shown in the drawings, the slider opening 52 is disposed below the rearwardly projecting portion of the arcuate arm 41 of the movable hinge member 28 so that upon attaching the counterbalance spring 45 to the movable hinge member 28 and to the rearward projection 57 on the slider bracket 50, the latter is resiliently forced toward the upper end of the opening. In addition, the opening 52 is wider than the bracket 50 so that the force of the spring also tends to swing or rock the bracket forwardly about its lower end. To limit movement of the slider under the resilient force of the spring and to lock the slider against forward rocking and further upward movement the axially projecting lock abutment or tongue 56 on the slider bracket is positioned to engage the rear face of a horizontal offset strip portion 61 covering the top end portion of the slider opening 52.

With this arrangement it will be seen that the lock abutment 56 upon engaging the cooperating horizontal strip or limit member 61 prevents forward swinging movement of the top of the slider bracket 50 through the panel opening and, at the same time, abutting engagement between end faces 62 of the bracket 50 and edge of the limit member 61 limits the upward movement of the bracket. It will thus be seen that the force of the spring 45 serves to lock itself and the slider bracket in place.

To release the slider bracket to obtain access to the spring for inspection or removal, a slight downward movement of the bracket 50 equal to the length of the projecting lock abutment 56, frees the abutment 56 from the upper edge 61 of the panel opening 52 and permits the body of the bracket 50 to tilt or rock forwardly. This movement causes the rearwardly projecting section 57 to swing upwardly releasing tension on the counterbalance spring 45 and permitting detachment of the counterbalance spring. It will be noted that not only is the counterbalance spring released to permit its replacement, but in addition the slider opening which previously was completely covered by the slider bracket is now open for access to the spring.

To facilitate the insertion of the slider bracket 50 into the opening and additionally to permit complete removal of the slider from the stove panel, the extreme lower portion of the slider opening 52 is preferably enlarged laterally, as at 64, beyond each side of the major portion of the opening to form a horizontal slot wider than the width of the bracket 50. The vertical guide strips 60 terminate at their low ends immediately above the horizontal slot. This permits the bracket 50 to be slipped forwardly and rearwardly through the enlarged portion of the opening 52 and makes the connection of the spring 45 to the slider bracket a simple matter.

To further facilitate the operation of the spring mounting means, a small aperture or hole 65 is formed in the central body portion of the slider bracket 50 preferably adjacent its upper end. By the provision of this aperture or hole 65 the slider 50 may be locked or unlocked merely by the insertion of a small round instrument such

as an ice pick, pointed nail, or similar pointed implement therein to permit the upper end of the slider **50** to be pressed inwardly and upwardly when engaging or locking the slider into position. Conversely, the ice pick or nail inserted into the aperture **65** is pressed inwardly and downwardly against the holding force of the spring **45** to release or unlock the slider **50** whenever it desires to uncover the slider opening and to inspect or replace the counterbalance spring.

It will be seen from the foregoing that a simple and improved mounting means for the coil spring has been provided which is easily operated from the front of the stove and at the same time does not protrude or otherwise disfigure the appearance of the front stove panel. As shown in Fig. 1, the counterbalance spring mounting means may be completely hidden from view under the overlapping end portions of the broiler door, such that mounting means is completely hidden from view when the oven doors are closed, but at the same time the counterbalance spring is promptly accessible without disconnecting or moving the stove and without use of any tools beyond that of a simple pointed ice pick or similar tool.

I claim as my invention:

1. In a cook stove the combination comprising, a panel defining an opening, a door hingedly mounted to close the opening, spring means releasably connected to said door for biasing said door to closed position, said panel defining a second opening, inwardly offset guide members at two opposed sides of said second opening forming a guide slot extending generally in the direction of movement of said spring means in closing said door, a slider movable in said guide slot and releasably connected to said spring means, and means for preventing movement of said slider out of said slot under the force of said spring means, said guide slot being formed to permit manual movement of said slider against the force of said spring means to release said slider from said slot so that said second opening is uncovered to permit access to said spring means for connecting and disconnecting the same from said door and said slider.

2. In a cook stove, the combination comprising, wall panels forming an enclosed space and defining an opening for an oven in one of said panels, said panels also defining a second opening, movable closure means for said oven opening hinged to said one panel for vertical swinging movement to open and closed positions, spring means in said enclosed space for biasing said closure means toward closed position, said spring means being releasably connected at one end portion to said closure means, and means for releasably supporting the other end portion of said spring means to said stove, said last named means including a slider and slider guides on said one panel at the sides of a second opening for receiving said slider, said slider being releasably connected to said spring means, said slider and guides being arranged to permit limited movement of said slider under the force of said spring means into locked position and to permit movement of said slider against the force of said spring to unlock said slider from said guides for connecting and disconnecting said spring means from said closure means and supporting means.

3. In a cook stove, the combination comprising, a wall panel defining a first opening, a door hingedly mounted to said panel for vertical swing to close said opening, spring means releasably connected to said door for biasing said door toward closed position, said panel defining a second opening downwardly and laterally offset from said first opening, a pair of inwardly offset vertical guide members at opposed sides of said second opening, said guide members extending generally along the line of force of said spring means, an inwardly offset horizontal abutment member between the top end portion of said guide members, and a slider in sliding engagement with the forward faces of said guide members and having an endwise projection engaging the rear face of said abutment member for restraining said slider from forward rocking movement and limiting upward sliding movement thereof, said slider being detachably connected to said spring means so that the force of said spring maintains said slider in engagement with said guide and abutment members but permits said slider to be slid manually against the force of said spring to release said slider from said guide and abutment members, said guide members projecting over the sides of said opening so that upon release of said slider from said abutment member the slider may be rocked forwardly to relieve the force of said spring means and uncover said opening to permit access to said spring means for connecting and disconnecting the same from said door and said slider.

4. In a cook stove, the combination comprising, a wall panel defining an opening, a door hingedly mounted to close the opening, a spring releasably connected at one end to said door for biasing said door toward closed position, said wall panel defining a second opening, a slider covering said second opening but movable forwardly therefrom, rearwardly offset guide members at two opposed sides of said second opening forming a guide slot extending generally in the direction of movement of said spring and adapted to limit said slider to endwise movement and forward movement from said second opening, means including an endwise projecting tongue on said slider adapted to engage the rear face of said panel for limiting endwise movement of said slider and preventing forward movement thereof out of said slot when in its limit position, said slider being detachably connected to the second end of said spring so that said slider is urged toward its limit position by said spring but is manually movable against the force of said spring to release said slider from said slot so that said second opening is uncovered to permit access to said spring means for connecting and disconnecting the same from said door and said slider.

5. In a cook stove, the combination comprising, wall panels forming an enclosed space, one of said panels having a first opening, and a second opening below and at one side of said first opening, a door for said first opening hingedly mounted for vertical upward swing to close said first opening, an arm connected to said door for said first opening and projecting inwardly through said one of the panels in general vertical alinement with said third opening, inwardly offset guide members fixed to said one of the panels adjacent the side edges of said second opening arranged to form parallel, vertical outwardly facing guide surfaces over the marginal side portions of said second opening, an inwardly, offset limit member adjacent the upper end of said second opening, a slider bracket having a size substantially equal to that of said second opening and positioned thereover for slidable bearing engagement with the outer surfaces of said guide strips, an inwardly extending projection fixed on the lower end portion of said slider bracket, a contractile spring releasably connected at its ends to said arm and said inwardly extending projection respectively for yieldably counterbalancing the door for said first opening and resiliently forcing said slider bracket upwardly to cover said second opening, and an endwise projecting tongue on the upper end portion of said bracket positioned for slidable bearing engagement with the inner surface of said limit member for locking said slider bracket over said second opening when in its uppermost position but releasing said slider bracket upon downward manual movement against the force of said spring to permit forward rocking movement thereby uncovering said second opening and releasing the tension of said spring.

6. In a cook stove, the combination comprising, a wall panel having a first opening, a second opening directly below said first opening, and a third opening at one side of said second opening, a first door for said first opening hingedly mounted for upward swinging movement to

close said first opening, a second door for said second opening having a marginal edge portion overlying said third opening and thereby covering said third opening from view, an arm connected to said first door and projecting inwardly through said one of the panels in general vertical alinement with said third opening, a pair of parallel, inwardly offset guide strips fixed to said panel adjacent the side edges of said third opening and positioned to cover the vertical marginal side portions of said opening, an inwardly, offset limit strip interposed between the upper end portions of said guide strips, the lower ends of said guide strips terminating short of the lower edge of said third opening, an anchor plate having a width less than that of said third opening and positioned therein, said plate having forwardly offset lateral flange in bearing engagement with the outer surfaces of said guide strips, a longitudinally extending tongue on the upper end portion of said anchor plate in bearing engagement with the inner surface of said limit strip, and an inwardly extending projection having an aperture and fixed on the lower end portion of said anchor plate, a contractile spring having a hook on each of its ends for releasable connection to said arm and said inwardly extending projection respectively for yieldably biasing said front door toward closed position, said anchor plate having an aperture therein to permit manipulation of the latter downwardly against the force of said spring to release said tongue from behind said limit strip and thereby allow the upper portion of said anchor to swing forwardly giving access through said third opening and releasing the force of said spring for connecting and disconnecting the latter.

7. In a cook stove, the combination comprising, a wall panel having a first opening, a second opening directly below said first opening, and a third opening at one side of said second opening, a first door for said first

opening hingedly mounted for upward swing to close said first opening, a counterbalance tension spring detachably connected at one end to said door, rearwardly offset guide strips fixed to said one of the panels adjacent the side edges of said third opening and positioned to form a vertical guide slot, a rearwardly offset limit strip interposed between the upper end portions of said guide strips, a slider having a width slightly smaller than said third opening and positioned thereover, said slider having forwardly offset lateral flanges in sliding engagement with the outer surfaces of said guide strips, a tongue on the upper end portion of said slider extending endwise therefrom and in sliding engagement with the inner surface of said limit strip, a rearwardly extending means on said slider for detachable connection to the second end of said spring for connecting said spring to said stove, said slider having an aperture therein to permit manual movement of said slider downwardly against the force of said spring to release said tongue from behind said limit strip and thereby allow the upper portion of said slider to swing forwardly giving access through said third opening for connecting and disconnecting said spring, and a door for said second opening having a marginal edge portion overlying said third opening to conceal said slider and said third opening.

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