May 31, 1960 D. SAPONARA 2,938,516

OVEN DOOR HINGE

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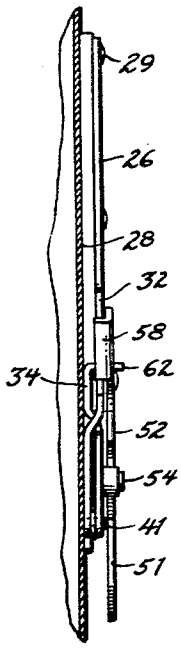


Fig. 3.

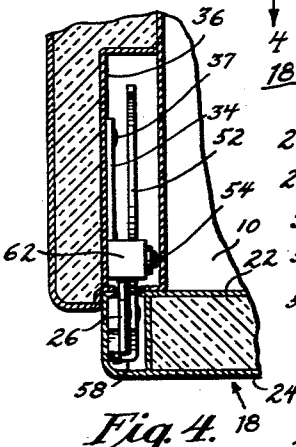


Fig. 4.

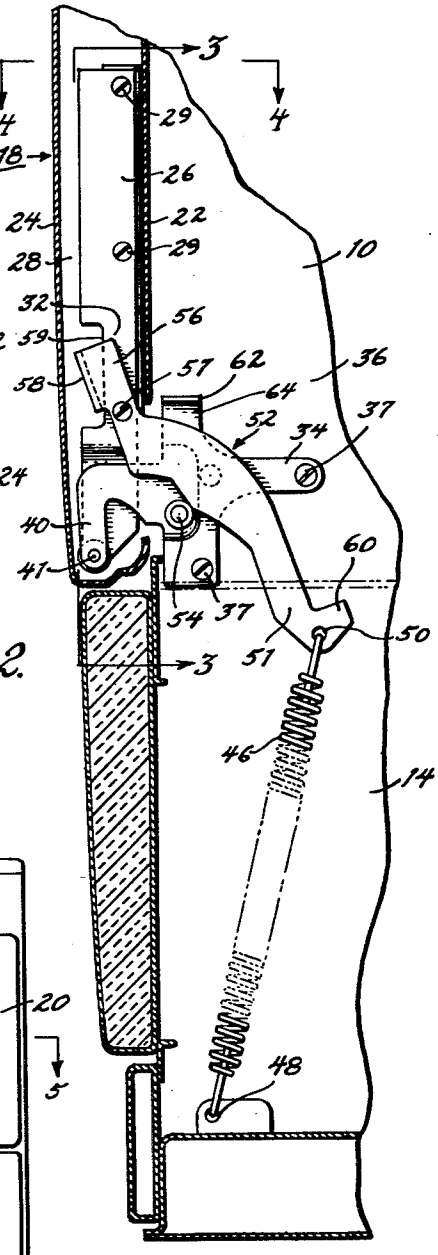


Fig. 2.

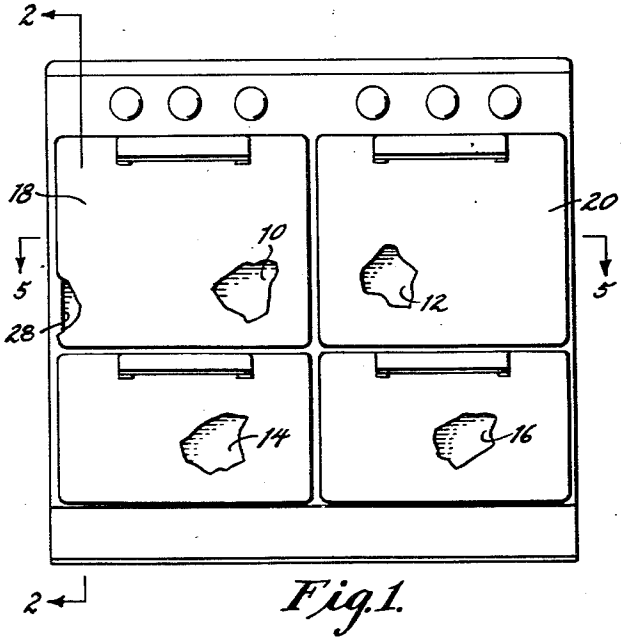


Fig. 1.

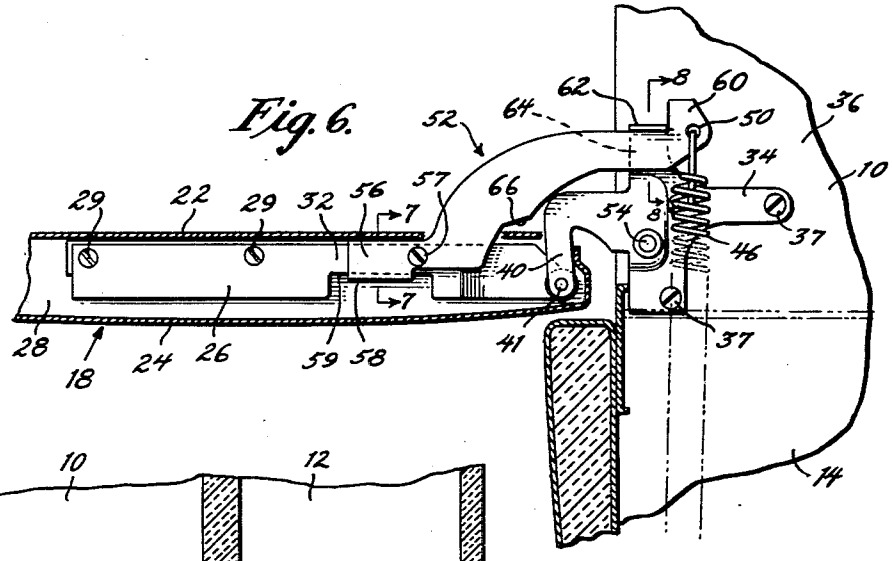
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Fig. 6.



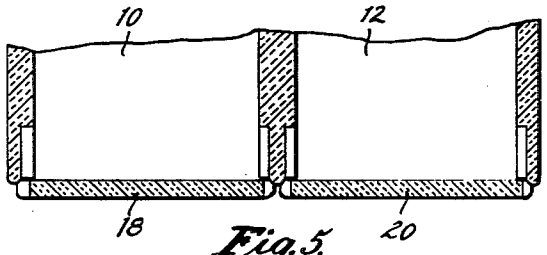


Fig. 5.

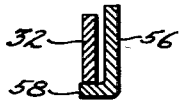


Fig. 7.

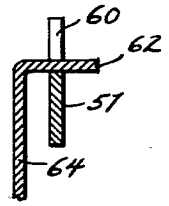


Fig. 8.

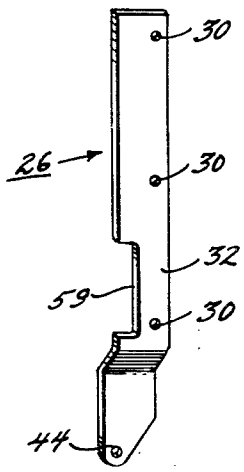


Fig. 9.

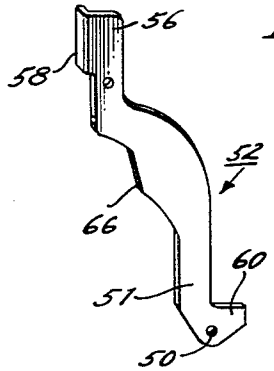


Fig. 10.

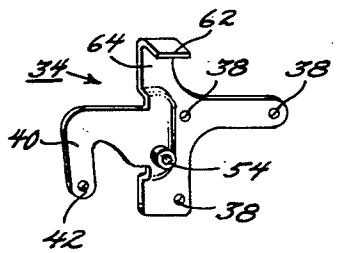


Fig. 11.

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OVEN DOOR HINGE

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1 Claim. (Cl. 126—191)

My invention relates to a hinge construction for connecting a door to a frame defining an opening adapted to be closed by said door. More particularly, my invention is adapted for use in connection with the door of an oven compartment which forms part of a conventional cooking stove or range.

In order not to lose heat and, in order not to heat the kitchen, or other room, where the stove is used, it is necessary that the door of the oven close tightly and, to this end a tension spring is used for constantly biasing the door towards its closing position. The door of an oven is formed of spaced panels of sheet metal with insulation therebetween and conventionally is hinged to the bottom oven so that the door is opened by being rotated, in counterclockwise direction from a substantially vertical, or full closing, position to a substantially horizontal, or full open, position. Also, to facilitate handling the door assembly is usually provided with a counterbalancing spring. Because the amount of force needed to maintain the door in its vertical position increases progressively as the door moves from full closing to full open position, the balancing of the tension of the spring against the progressively increasing turning movement of the door, presents a difficult problem. This is due to the fact that, if the spring is made strong enough to insure tight closing of the door, it makes opening the door correspondingly difficult. Furthermore, a strong spring tends to close the door with a bang, especially if the door is released, or is not properly restrained, after it has reached any point within 45° of the vertical plane of the face of the oven.

After considerable investigation, I came to the conclusion that, to insure sufficient tension to maintain the door in tight closing position, and to do so without making the spring too strong, it will be necessary to devise ways and means of increasing the tension of the spring after the door has reached its full closing position.

One object of the invention is to produce an improved spring loaded hinge construction in which the tension of the spring on the door is increased after the door has been moved to its fully closed position so as to insure tight closing of the door without the need of a very strong spring.

For initially introducing and for removing cooking utensils from the oven compartment, the oven door is usually opened to the full extent in which it assumes a substantially horizontal position. At other times, as for inspection of the food, or for stirring it, or for basting it, etc., it is not necessary fully to open the door, and since it is desirable that the hands remain free, the door should be automatically retained in partly open position to which it is moved within 45° of the vertical plane of the face of the oven.

A further object of the invention is to produce an improved hinge construction which, in addition to accomplishing the first object above set forth, also serves to maintain the door in any partly opened position to which

it is adjusted within a range of about 45° from the plane of the face of the stove.

The weight of the door when it is in its horizontal fully opened position, alone or together with the weight of a loaded cooking utensil placed thereon, places a substantial strain on the hinge mechanism.

A still further object of the invention is to produce an improved hinge mechanism which, in addition to accomplishing the objects above set forth, also provides strong and rigid suspension sufficient to enable the door to withstand all strains to which it will be normally subjected during normal use without increasing the size of the hinge connections.

A still further object of the invention is to produce an improved hinge construction which, in addition to accomplishing the foregoing objects, is enclosed within the insulated door and within the insulated walls of the range so as to be protected from excessive heat and so as not to mar the appearance of the stove.

These and other objects are attained by my invention as set forth in the following specification and the accompanying drawings in which:

Fig. 1 is a diagrammatic front elevational view of a household gas burning cooking stove.

Fig. 2 is a fragmentary enlarged sectional view taken on line 2—2 of Fig. 1 with the oven door shown in the fully closing position.

Fig. 3 is a sectional view taken on line 3—3 on Fig. 2.

Fig. 4 is a sectional view taken on line 4—4 on Fig. 2.

Fig. 5 is a fragmentary and diagrammatic sectional view looking in the direction of line 5—5 on Fig. 1.

Fig. 6 is similar to the upper portion of Fig. 2, but it shows the door in fully open position.

Fig. 7 is a sectional view taken on line 7—7 of Fig. 6 showing details of construction.

Fig. 8 is a sectional view taken on line 8—8 on Fig. 6 showing details of construction.

Figs. 9, 10 and 11 are perspective views showing some of the parts used in carrying out the invention.

The stove illustrated in Fig. 1 is provided with two upper compartments 10 and 12 and two lower compartments 14 and 16, said compartments being in the nature of baking ovens or of broilers or for storage compartments. Compartments 10 and 12 are closed by doors 18 and 20 which are provided with a hinge mechanism embodying the invention. Doors 18 and 20 are identical in structure and in operation, and, since Fig. 2 is taken on line 2—2 on Fig. 1, only the structure and operation of door 18 is shown and described in detail.

As best shown in Figs. 2 and 6, door 18 is formed of an inner panel 22 and an outer panel 24 with suitable insulation therebetween. In order to mount the hinge mechanism of my invention, I secure a bracket 26, such as that shown in Fig. 9, to each of the opposite end walls 28 of the door by means of screws 29 or the like, passing through openings 30. Each bracket 26 is provided with an offset portion 32 which will be hereinafter further referred to. Co-acting with brackets 26 are brackets 34, one of which is shown in Fig. 11 which are secured to each of the opposite side walls 36 of the oven compartment by means of screws 37 or the like passing through holes 38. Each bracket 34 is provided with an outwardly projecting pendent arm 40 which is secured to the lower end wall of the door by means of a pivot bolt 41 passing through opening 42 in extension 40 and through opening 44 in the lower end of bracket 26 and engaging the door itself. By this arrangement, door 18 is hingedly connected to the oven compartment and is rotatable about the axis of openings 42 and 44 from the vertical position of Fig. 2 in which the oven compartment is fully closed, to the horizontal position of Fig. 6 in which the oven compartment is fully open.

In order to counterbalance the door so that it may remain in any position to which it is moved within about 45° from the vertical plane of the front wall of the oven compartment, I provide tension spring **46** which is anchored at **48** to the bottom frame of the stove and the upper end of which is engaged with opening **50** in the inner end **51** of arm **52**. Arm **52** is mounted for free rotation about pin **54** which projects inwardly or towards the center of the oven from each of brackets **34**. The outer end **56** of arm **52** is pivoted to the door by means of a bolt **57** and is provided with a flange **58** which, when the door is in the fully opened horizontal position of Fig. 6, fully engages the edge **59** of offset portion **32** of bracket **26**. It will be noted that, in the fully open position of Fig. 6, angle portion **60** at the inner end **51** of arm **52**, engages flange **62** which projects from the upper extension **64** of bracket **34**. In other words, when the door is in its fully open position, it is supported by engagement of flanges **58** with edges **59** of brackets **26** and by engagement of angle members **60** of arms **52** with flanges **62** of brackets **34**. This provides a rigid and strong support which prevents the door being sprung or being moved beyond its horizontal position and gives a margin of safety to take care of extra weight such as when a heavy pot or pan is placed on the door when the latter is in its horizontal position.

Engagement of angle member **60** with flange **62** also prevents overstretching of spring **46** which is calibrated to counter-balance the weight of the door as long as the outer wall of the door forms an angle of 45° or less with the face of the oven compartment so that the door will remain in any intermediate position to which it is moved. When the door is moved to a point beyond 45°, its turning movement will be enough to overcome the tension of the spring, and, if unrestrained, the door will move, slowly to its horizontal position.

As long as the door is partly, or fully opened, it is counterbalanced altogether by spring **46** and the side of arm **52** which faces pin **54**, is at all times out of engagement with said pin. But, when the door reaches its vertical, or full closing, position, cam **66**, on the adjacent side of arm **52**, rides on pin **54**, thus pushing arm **52** in a generally upward direction, as viewed in Fig. 2 and correspondingly stretching spring **46** to exert increased pull on arm **52**. Arm **52** now is urged in clockwise direction and the door is pressed against the front wall of the oven compartment with more force than would be the case if cam **66** were eliminated. In other words, the net effect of the engagement of cam **66** with pin **54** is equivalent to shortening the spring, or increasing its tension, after the door is closed, more tightly to press the door against the frame defining the compartment opening.

What I claim is:

The combination with an oven compartment having vertical side walls and having its front end open, and a door for closing said front end, of a pair of mounting means for hingedly connecting the opposite sides of said door to said side walls, each of said mounting means including a lever, a first means pivotally connecting said lever, at a point inwardly of its outer end, to a side of said door, a first bracket carried by the respective side wall of the compartment and including a pendent, outwardly projecting arm, a second means pivotally connecting said pendent arm to said side of said door near the bottom edge thereof, a second bracket carried by said side of said door and including an offset portion, a flange located between the outer end of said lever and said first pivot means and engageable with said offset portion of said bracket when said door is in open position to support the door in its open position, a spring connected to the inner end of said lever and biasing said door to its closed position, a roller carried by said second bracket below said lever, and a cam projecting downwardly from said lever, said cam being spaced inwardly from said first pivot means and said roller being so located relative to said lever that said cam rides on said roller and raises the inner end of said lever to increase the tension of said spring only when said door is in full closed position, the underside of said lever being concaved on both sides of said cam so as to be out of engagement with said roller in all other positions of said door.

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