Nov. 25, 1941. L. S. WEIMER ET AL 2,264,059

OVEN CONSTRUCTION

Filed Dec. 12, 1938

Fig. 1

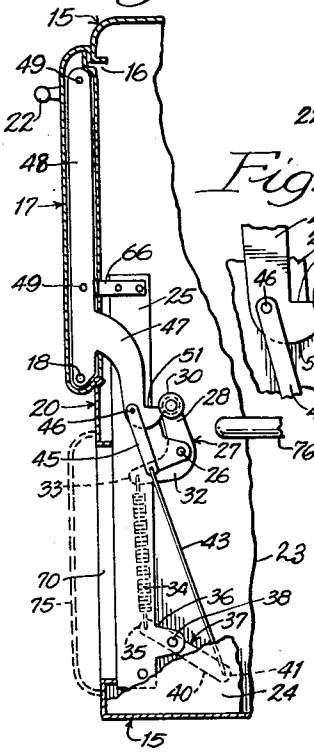


Fig. 2

Fig. 4

Fig. 5

Fig. 3

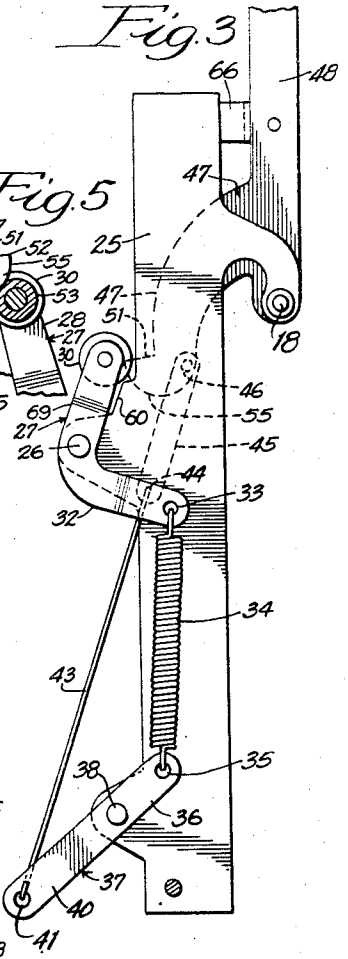


Fig. 8

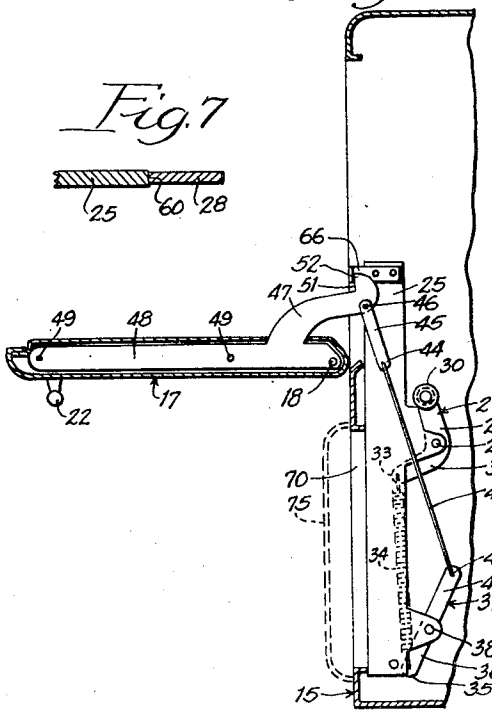
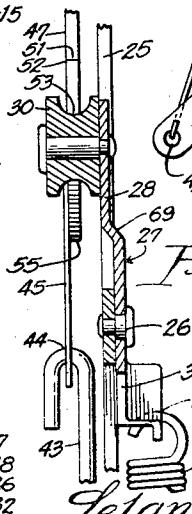


Fig. 7

Fig. 6



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OVEN CONSTRUCTION

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7 Claims. (Cl. 126—191)

This invention relates to doors, and is concerned more particularly with door hinge construction for ovens and other devices.

A further object of our invention is to provide a door hinge mechanism adapted to securely though releasably maintain a door ajar.

It is another object of our invention to provide an oven construction wherein the oven door opening may be employed as a vent for broiling purposes.

A further object is to provide an improved door hinge mechanism for releasably maintaining the door selectively open, closed and ajar.

It is also an object to provide oven door hinge construction which is arranged so as not to interfere with insertion and removal of food and other articles.

Further objects and advantages of the invention will appear as the description proceeds.

The invention will be better understood upon reference to the following description and the accompanying drawing, in which:

Fig. 1 is a fragmentary vertical section-elevation of a stove casing provided with a door hinge toggle mechanism, with the oven door closed.

Fig. 2 is an enlarged fragmentary elevation showing details of the toggle arrangement of Fig. 1.

Fig. 3 is an enlarged fragmentary elevation of the hinge structure in the arrangement of Fig. 1, but viewed from the opposite side.

Fig. 4 is a view similar to Fig. 1 but with the door ajar.

Fig. 5 is an enlarged fragmentary elevation showing details of the toggle arrangement of Fig. 4.

Fig. 6 is an enlarged fragmentary sectional view taken substantially as indicated by the line 6—6 in Fig. 4.

Fig. 7 is an enlarged fragmentary sectional view taken as indicated by the line 7—7 in Fig. 4.

Fig. 8 is a view similar to Fig. 1 but with the door fully open.

Referring now more particularly to the drawing, in which, for exemplary purposes only, we have chosen to illustrate one embodiment of our invention, there is shown an oven casing 15 having a door opening 16 adapted to be covered by a door 17 which may be hinged as at 18 to the casing front 20 and provided with a suitable handle 22.

In accordance with the present invention, there is preferably provided at each side wall 23 of the casing an oven lining 24 between which and each wall 23 is mounted a strap 25 to which is pivoted as at 26 a bell crank lever 27 having on one arm 28 a freely rotatable wheel 30. The other arm 32 of the lever is connected at 33 to an end of a spring 34 whose other end is connected at 35 to an arm 36 of a lever 37 pivoted at 38 to the strap 25. The other arm 40 of the lever 37 is connected at 41 to a link 43 connected at 44 to a second link 45 pivoted at 46 to an arm 47 of a bracket 48 mounted as at 49 on a side edge wall or other suitable part of the door 17. The bracket arm 47 has a dog 51 which may be pointed as at 52 for engagement with the recessed periphery 53 of the wheel 30. At one side of the point 52, the dog 51 has a preferably curved cam surface 55 adapted to have rolling contact with the wheel 30.

The mechanism thus far described is adapted to be so related that when the door 17 is closed, as shown in Fig. 1, the point 52 of the dog 51 is engaged with the periphery 53 of the wheel 30 below the dead center position relative to said wheel, i. e., below the arc of rotation of the center of said wheel about the pivot 26, and the spring 34 is under tension and is pressing the wheel counter-clockwise against the point 52 so as to have a cam effect tending to rotate the bracket 48 clockwise about the door pivot 18 and thus urge the door 17 to the closed position shown in Fig. 1. The door is thus maintained in that position by the spring 34 acting through the wheel 30 on the bracket point 52 and through the linkage 37, 43 and 45 acting upon another part of the bracket.

Ovens heretofore in use have been provided with a special opening providing secondary air and/or a flue for the products of combustion of the broiler burner. In accordance with the present invention, the oven door is made to serve that purpose. To this end, it will be observed that the door 17 may be released from the closed position of Fig. 1 to an ajar position, suitable for broiling, as shown in Fig. 4, by a moderate pull on the handle 22 until the point 52 of the dog 51 has passed beyond dead center relative to the wheel 30, i. e., to a point above the arc of rotation of the center of the wheel 30 about the pivot 26, the wheel riding along the dog surface 55 until the lever 27 is stopped by engagement with the stop 60 on the strap. During the opening movement of the door, the spring 34 is expanded by the action of the linkage 37, 43 and 45, and it is in expanded condition when the lever is stopped as just stated and the wheel 30 is in engagement with the dog surface 55. Acting directly through the linkage 37, 43, 45

and arm 47, the spring tends to return the door to closed position, but this movement is successfully opposed by the spring acting on the lever 27, because the torque of the spring and arm 47 to turn the door clockwise about its pivot 18 is less than the torque of the spring and wheel 30 acting in the opposite direction against the dog 51. The wheel thus serves as a stop against which the spring holds the dog 51, so that the door is yieldably held in the ajar position against movement in either direction. The spring counterbalances the force of gravity on the door 17 in all other positions of the door.

To move the door 17 from the ajar position of Fig. 4 to the closed position of Fig. 1 requires exertion of a moderate manual thrust because, although such movement by the door results in a relaxing of the spring in so far as the linkage 40, 43 and 45 is concerned, the lever 27 is caused by the dog surface 55, acting upon the roller 30, to move clockwise, referring to Fig. 4, so as to increase the tension of the spring. When the point 52 is at dead center with respect to the wheel 30, the door is still slightly open, and when the point 52 has been thrust to a position slightly below the dead center position, the wheel 30 is swung inward by the spring so as to exert a pressure on the dog 51 urging the same to move clockwise about the pivot 18, thereby cooperating with the aforesaid linkage and spring, without manual assistance, in giving the door 17 a final thrust to closed position, where it is maintained yieldably by the spring, as shown in Fig. 1.

In order to prevent slamming of the door, a suitable stop 66 may be mounted on the strap 25 at each side of the door opening, for engagement with the brackets 48 as shown in Figs. 1 and 3.

The portion of the bell crank lever 27 supporting the wheel 30 is preferably offset as shown at 69 to engage the stop surface 60 on the strap or bracket 25. Thus it will be observed from Fig. 4 that the bell crank lever 27 occupies an extreme position beyond which it cannot turn clockwise.

By the exertion of moderate effort on the handle 22, the operator may swing the door 17 either from the fully closed position of Fig. 1 or the broiling position of Fig. 4 to the fully open position of Fig. 8, where the dogs 51 engage the stops 66 to prevent the oven door from gravitating further. Inasmuch as the bell crank lever reaches the extreme position in its clockwise movement when the door reaches its ajar or broiling position, it is evident that as the door is moved open from the ajar position the bell crank lever is stationary so that the linkage 40, 43 and 45 is operated upon by the bracket 48 to stretch the spring 34, and this increased tension of the spring substantially counterbalances the weight of the door 17 so that when the door reaches its fully open position it is substantially counterbalanced and only slight force is exerted between the dogs 51 and the stops 66.

Due to the counterbalancing of the door by the spring 34 in the horizontal position of the door, the closing movement of the door from that position requires only slight exertion, and the final closing movement of the door may be effected without slamming. As the door is swung toward the closed position, the linkage is reversely moved to occupy the same corresponding relations as when the door is opened.

The oven may be provided with a drawer opening 70 adapted to receive a drawer, the front panel of which is shown in dotted lines at 75, said drawer being adapted to support foodstuffs to be broiled by the broiling burner 76.

It is evident from the foregoing that the mechanism is extremely simple, involving a minimum of parts which are not likely to get out of order, and may be manufactured and assembled at low cost, which requires no attention, and which is out of the way so as not to interfere with any use of the interior of or the appearance of the oven.

Various changes coming within the spirit of the invention may be suggested by those skilled in the art, and hence we do not wish to be limited to the specific forms shown or uses mentioned, except to the extent indicated by the appended claims, which are to be interpreted as broadly as the state of the art will permit.

We claim:

1. In a casing member having a door opening, a door member movably mounted adjacent said opening, means yieldably urging said door member in one direction, and a yieldable stop provided on one of said members and actuated by said means and displaced by a part provided on the other member upon application of manual force on said door member in said direction, to overcome said stop.

2. A casing having a door opening, a door movably mounted adjacent said opening, means associated with said casing and operative upon said door to at all times urge said door in a given direction with respect to said opening, and mechanism including the first means and operative when said door is in one position to oppose movement of said door in said direction and when the door is in another position to assist movement of said door in said direction.

3. A casing having a door opening, a door movably mounted adjacent said opening, mechanism including parts mounted within said casing adjacent said opening and a part projecting from the rear face of said door, for controlling the position of said door relative to said opening, said mechanism comprising spring-influenced means urging the door to one extreme position, and toggle means included in said mechanism and operative selectively to assist and, when said door is ajar, to oppose movement of said door to said position.

4. A casing having a door opening, a door movably mounted adjacent said opening, means including a spring exerting a torque for urging said door toward one extreme position relative to said opening, yieldable means exerting a greater torque than the first means and including said spring and operative when said door is ajar for overcoming the first means to prevent movement of said door by said first means.

5. In an oven casing including a broiler burner, a door opening and a door pivotally mounted adjacent said opening, interengaged bearing members pivotally mounted on said casing and door, means including a spring and spaced stops for maintaining engagement between said members at points at opposite sides of dead center relative to one of said pivots, said spring and bearing members being operative at one of said points to oppose closing movement of said door and at the other point to assist closing movement of said door, and means on said members for resisting relative movement of said members from each point to the other.

6. A casing having a door opening, a door hinged to the casing adjacent said opening and

swingable to open and closed positions relative to said opening, a spring tending to counterbalance said door, means including said spring for yieldably urging said door toward closed position, and means including said spring and operative, when said door is in one of its open positions, to counteract the counterbalancing tendency of said spring.

7. A casing having a door opening, a pivotally mounted door for said opening, a lever mounted on said casing and linked to said door, a second lever mounted on said casing and operative to urge said door selectively toward and away from closed position, and a spring connected to said levers and operative through the first lever to urge said door to closed position and through said second lever selectively to assist and prevent closing of said door.

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