ABSTRACT OF THE DISCLOSURE

A counterbalanced hinge for a range door which is hinged at the bottom end of a hinge arm detachably secured to the range. A cam link is pivotally secured to the hinged arm above the door hinge and extends generally between the walls of the door and is connected at its other end to a tension spring connected to the door. The cam link carries a cam surface which contacts a roller secured to the door to move along the cam surface as the door opens to regulate the counterbalance force of the spring and by engagement with detents on the cam surface holds the door in a pre-selected position.

This invention relates to hinge means for oven doors, and the like and more particularly to counterbalanced hinge means with intermediate and terminal stops incorporated therein.

The weight of an oven door and the need for a reasonably light closure requires good spring tension in the counterbalancing mechanism but not such as presents any problem to the average housewife. It is also desirable that there be an intermediate stop position, to hold the oven door partially open, and a terminal stop for full open positions of the oven door. In these two respects, the spring tensioning means and the stops are at cross-purposes and are usually provided separately. This requires two sub-assembly operations and an added manufacturing expense.

It is an object of this invention to provide a counterbalanced hinge arm arrangement to assist in closing oven doors and which has incorporated therein the stop means, as a part thereof, for greater simplicity and savings in manufacturing and assembly.

The above and other objects of the invention will appear more fully from the following more detailed description, and from the drawings wherein:

FIGURE 1 is a front view of the range.

FIGURE 2 is a section taken substantially along line 2-2 of FIGURE 1.

FIGURE 3 is a section taken substantially along line 3-3 of FIGURE 2.

FIGURE 4 is an enlarged, partly in section, door opened to broil position.

FIGURE 5 is an enlarged, similar to FIGURE 4, door fragment fully opened for access to the oven, and

FIGURE 6 is a section taken substantially along line 6-6 of FIGURE 4.

Referring now to the drawings, the numeral 10 designates a range having an oven chamber 11 closed by a door 12. The door is movably attached to the range 10 by means of a pair of opposed hinge arm members 13. The arms are provided on either side of the oven door, within brackets 15, and each includes a tab 14 received in a slot 16 in the housing brackets to form a latch preventing unintentional removal of the door; but permitting removal as desired.

Hinge arm 13 is formed with a portion thereof turned downwardly, as at 17, to form a right angle. The door 12 is pivotally connected to the lower portion 17 of hinge arm 13 as by pivot pin 18. The pivot pin 18 passes through a U-channel housing member 19 which is part of the door structure and is located within the door 12, one on each side thereof.

A cam surfaced link member 20, may be a single unit or paired as shown, and is pivoted to hinge arm 13, by means of a pivot pin 21. The upper end of the link 20 has a coil spring 22, secured thereto by means of a pin 24 and is in turn connected by a hook end 23 to the door channel 19. The upper end of spring 22 may be relocated by use of different receptive openings 27 in channel 19 adapted to receive the hook end 23 to make the spring more taut, or loose, as desired.

A roller 28 is provided, the same being rotatable mounted by means of pin 29, FIGURE 3, in a stationary position between the opposed walls of U-channel 19, and is designed to contact one side of link 20. The link 20 is curved on its inner side, next to the roller 28, and is formed to ride in a manner, a cam surface held against the roller 28 by the spring 22. The link is also formed to include a terminal stop 30, best shown as used in FIGURE 5, and an intermediate stop 31, shown as used in FIGURE 4.

A handle 32 is provided on the oven door 12, to open and close it, in the usual manner.

From the foregoing it will be seen that the channel members 19, with the rollers 28, and the links 20, springs 22, and hinge arms 13 may be readily provided as a simple sub-assembly in the manufacturing of the oven door 12, or separate therefrom and later installed.

The operation of an oven door with the proposed innovation is as follows:

The door 12 is pivotal between the vertical closed position, shown in FIGURES 1 and 2, and the horizontal open position shown in FIGURE 5; and through the partly open position shown in FIGURE 4.

The door may be quickly disengaged and withdrawn from the oven opening by simply lifting the door upwardly. This disengages tabs 14 from slots 16 and enables the hinge arms 13, which in turn support door 12, to be pulled forward and out of engagement from arm housing brackets 15. To return or hang the door to brackets 15 again, the hinge arms 12 are inserted and tabs 14 locked into engagement in slots 16. The oven door then appears as is shown in FIGURES 1 and 2 fully closing the oven chamber 11.

When one wishes to open door 12, to what is known as "broil position," shown best in FIGURE 4, the handle 32 is pulled outwardly and down. This causes the door to move in a downward arc on door pivot 18 which is on the lower portion 17 of hinge arm 13. As the door moves outwardly, the cam link member 20, pivoted at 21, to hinge arm 13, also starts to move outwardly and down. As the door is opened, the remote location of the pivot connection 21 for arm 20, on the hinge arm 13, as compared to that for the oven door 12, at 18, causes the roller 28 to move relatively down the link 20. It rides over the intermediate stop 31 and may there be used, on the other side of the stop, to hold the door partially open.

It will be appreciated that as the oven door is opened, the distance between the door hinge connection 18 and the spring end of link 20 becomes less, due to the different pivot points of each, and the spring 22 is tensioned more and more.

However, as the intermediate position, the weight of the door is still carried principally on the hinge connection 18, and the spring is not tensioned much. Consequently, the spring effort which holds the link 20 against the roller 28 is not enough to override the stop 31 and the partially open position of the door is easily attained.

To fully open the oven door 12, to the substantially horizontal position shown by FIGURE 5, the handle 32
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is pulled out and down, just as before, but through a farther and greater arc. This causes the roller 28 to ride over the stop 31 and the arm 20 to be pivoted substantially more than before, through a greater arc itself, and until the roller engages the stop 30.

At this terminal position FIGURE 5 for the door 12, the spring 22 is fully extended or tensioned. By proper adjustment, however, the spring tension is made less than enough to counterbalance the full weight of the door and so it stays open. The spring effort is at the same time greatest at this time and holds the links 20 tightest against the roller 28 and most securely in the final stop position.

While the weight of the door 12, overpowering the tension of spring 22, holds it open, the spring tension remains a counterbalancing force for when the door is to be closed. Because the hook end 25 connection of spring 22 and the pivotal connection of link 20 at 21, are aligned over the roller 28, the spring exerts a lifting effort on the roller and assists in the closing of door 12.

To close the door 12, from either the intermediate or fully opened positions, the door is moved by either the handle, or pushing against it, towards the closed position. The link 20 moves through its tension-relieving arc as the door swings on its pivot 18 and the intermediate stop 31 is passed over without other than normal effort. In the course of such movement, the spring works as mentioned to counterbalance the major weight of the door and to assist in the closing.

From the foregoing it will be appreciated that use of the link 20 as a cam-surface member enables it to serve a dual purpose and avoids the need for a separate cam track. Also, the roller 28 which serves as the cam surface follower, may be mounted in a fixed location rather than on a movable part where it is harder to assemble and is more subject to mishap. By having the link include the cam surface and move relative to the fixed roller, great economy in manufacturing and assembly are realized and a better operating mechanism is provided.

While the present invention has been described in connection with the details of an illustrative embodiment thereof, it should be understood that these details are not intended to be limiting of the invention.

1 claim:
1. A counterbalance hinge for mounting a double wall range oven door on a range having an oven opening therein comprising a hinge arm secured to the range adjacent the lower portion of said oven opening, said hinge arm having a vertically extending portion extending outside adjacent the lower end of said door, pivot means securing the lower end of said door to the lower end of said vertically extending portion, an elongated cam link generally disposed within said door between said double walls, means pivotally connecting the lower end of said cam link to said vertically extending portion above the pivotal connection between said door and said vertically extending portion than the distance between the pivotal connection between said door and said vertically extending portion and the pivotal connection between said cam link and said vertically extending portion and spring means secured at one end to said door above the upper end of said cam link and secured at the lower end to the upper end of said cam link, said pivot points and said cam link and said spring being arranged to hold said cam surface in contact with said roller member over the normal range of movement of said oven door.

2. A counterbalance hinge structure as set forth in claim 1 wherein said cam link has a stop adjacent the upper end thereof adapted to cooperate with said roller member to limit the opening movement of said door.

3. A counterbalance hinge as set forth in claim 1 wherein said cam link on said cam surface has an intermediate stop engageable by said roller member to hold said door in a position intermediate the open and closed positions.

4. A counterbalance hinge as set forth in claim 1 wherein said hinge arm includes a portion detachably secured to said range whereby removal of said hinge arm from said range removes said counterbalance hinge assembly as a unit with said door.

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