

[54] LATCH FOR MICROWAVE OVEN

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[22] Filed: May 23, 1974

[21] Appl. No.: 472,544

[52] U.S. Cl. 126/197, 126/191, 292/48, 292/DIG. 69, 219/413

[51] Int. Cl. F23m 7/00

[58] Field of Search 126/190, 191, 197, 192, 126/198; 292/47, 48, 221, 222, 223, 53, DIG. 69; 219/412, 413

[56] References Cited

UNITED STATES PATENTS

2,199,467	5/1940	Saunders.....	292/48
3,049,115	8/1962	Carnahan et al.	126/191
3,099,471	7/1963	Scott et al.....	292/7
3,648,011	3/1972	Holtkamp	219/413
3,757,084	9/1973	McLean et al.....	219/413

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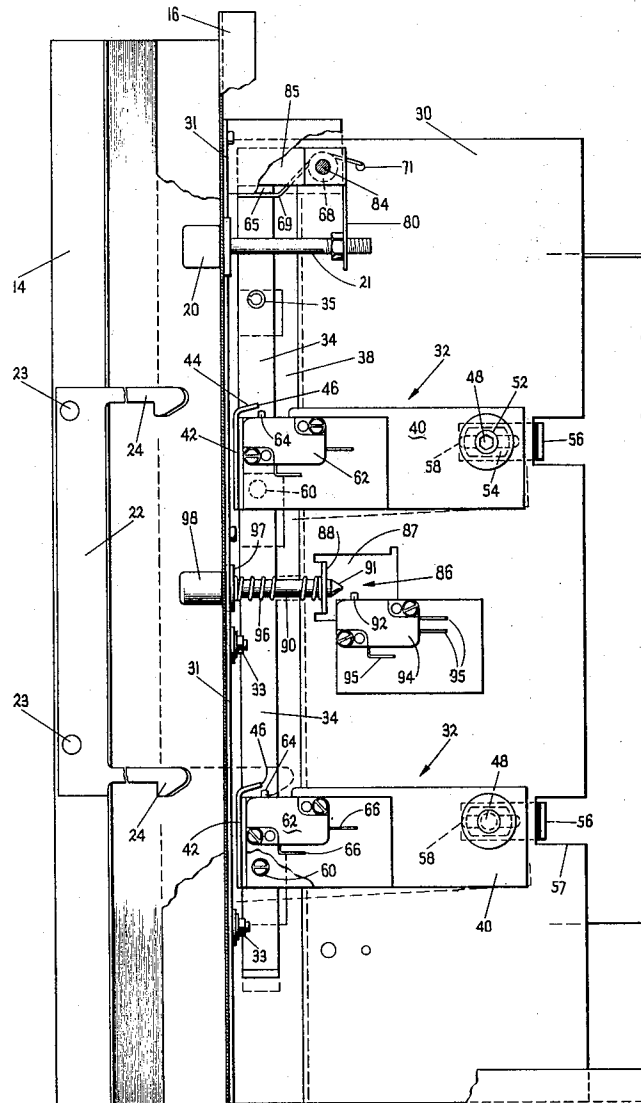
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[57] ABSTRACT

A door latch assembly for a microwave oven having a latch plate mounted on the microwave oven door, said oven also including means on the front face of the oven for receiving the latch. A switch holder or plate assembly and an actuatable slide bar are disposed behind the face wall of the oven. The switch holder assembly is basically stationary whereas the slide bar is actuatable by means of an actuating bar or button accessible on the front side of the face wall of the oven. For engagement with each latch, there is provided a latch receiving element which is pivotally supported intermediate the switch holder assembly and the actuating slide bar so that when the oven door is closed and the slide bar is actuated against its normally upwardly biased position the latch receiving element pivotally disengages from the latch and the door is permitted to open. A separate opening bias means may be provided.

10 Claims, 3 Drawing Figures



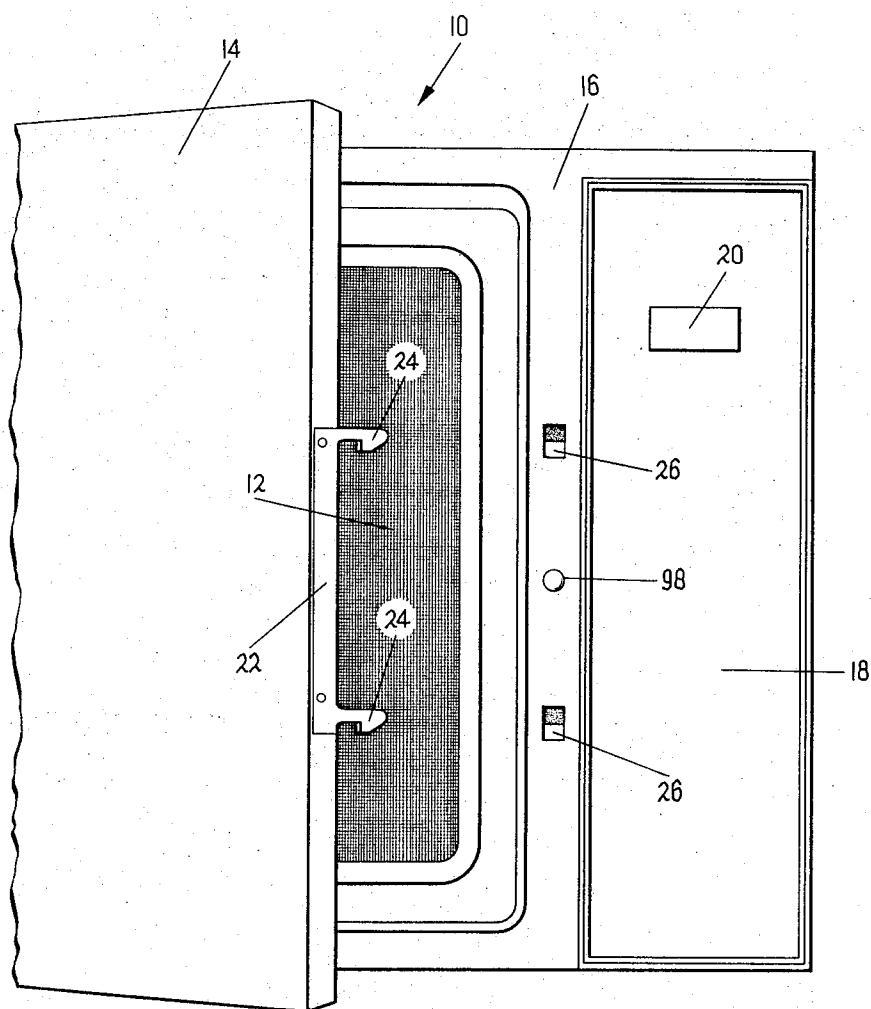
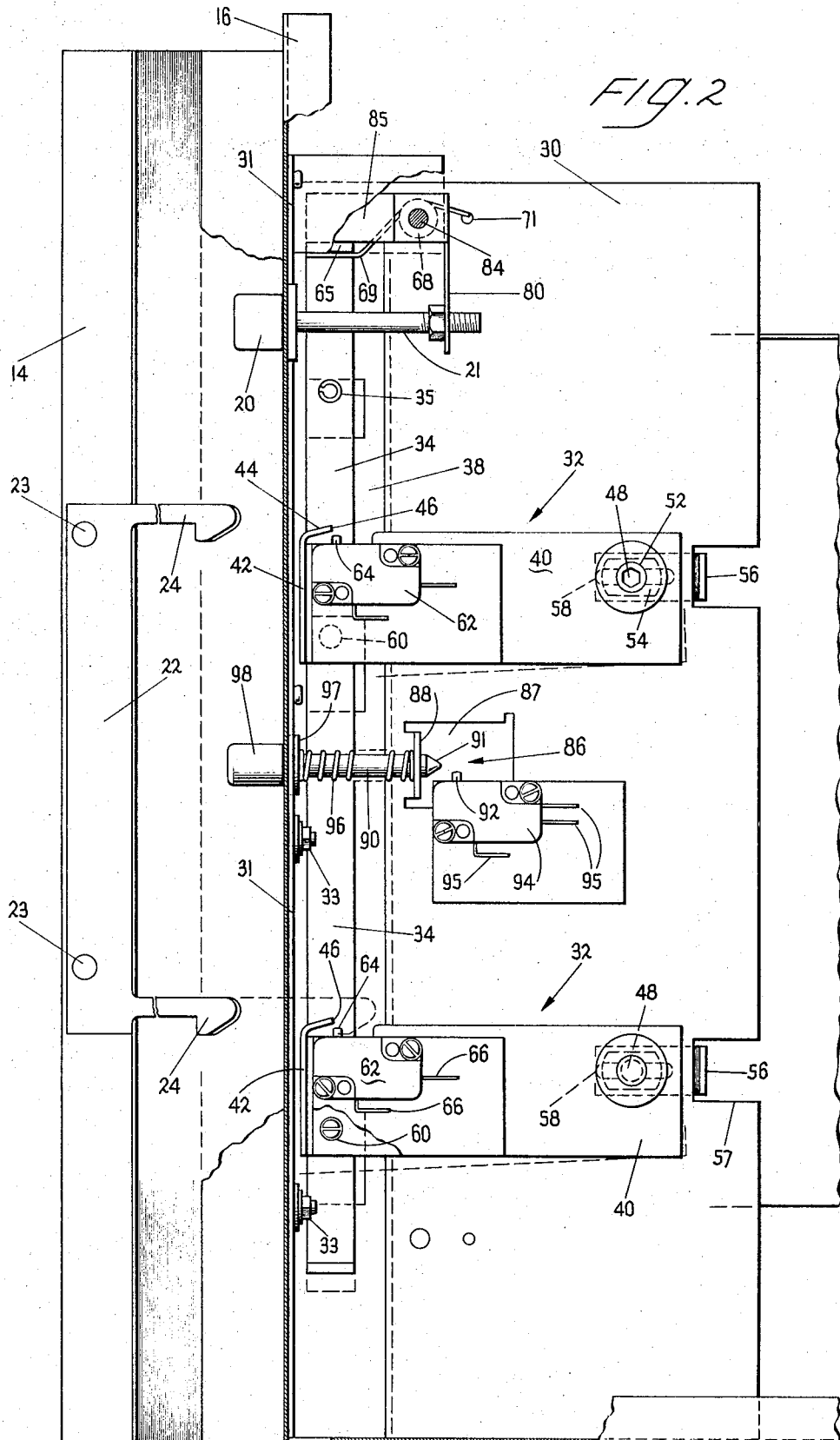


FIG. 1



LATCH FOR MICROWAVE OVEN

BACKGROUND OF THE INVENTION

The present invention relates to a novel latching mechanism for use with a microwave cooking oven.

One object of the present invention is to provide an improved latching mechanism for a microwave cooking oven.

Another object of the present invention is to provide a latching mechanism that preferably employs at least two latches each preferably having a switch means associated therewith. It is also a purpose of the present invention to provide a further switch associated with the means for biasing the door to an open position.

Another object of the present invention is to provide a latching mechanism readily adjustable so that the door can be secured in its closed position with varying degrees of tightness. After some use of the oven this adjusting means can also be used to readjust the door so that it is maintained tightly closed when in the closed position.

SUMMARY OF THE INVENTION

To accomplish the foregoing and other objects of this invention there is provided a latch assembly for securing a microwave oven door to the face of the microwave oven. This assembly generally comprises a part that is affixed to the door and a second part for engagement with the first part and that is disposed behind the face of the oven. The means that are fastened to the cantilevered end of the oven door include at least one latch. The face of the microwave oven has at least one aperture to receive this latch. Disposed on the backside of the face of the microwave oven is a latch receiving means which includes means defining an edge for engagement with the latch when the door is closed. This latch receiving means is pivotally supported with the edge disposed intermediate the oven face and the pivot point. The latch assembly further comprises a sliding element arranged to move in a generally vertical direction and means freely securing the latch receiving means to the sliding element so that as the sliding element moves the latch receiving means is free to pivot about the pivot point. The sliding element is biased to a position wherein the latch and the latch receiving edge are in engagement when the door is closed. To open the door means are provided accessible from the front of the oven for actuating the sliding element to cause the latch to disengage from the latch receiving edge.

In the preferred embodiment there is provided a pair of hooked-shaped latches which engage with a pair of latch receiving edges. Switch means are provided associated with each of the latch receiving means and each switch means is engageable with the latch for actuating the switch when the door is closed. The latch receiving means is preferably adjustable by movement of its pivot point which in turn adjusts the position of the latch receiving edge relative to the latch. Biasing means is also shown in the preferred embodiment for forcing the door to an open position once the latch has been disengaged.

BRIEF DESCRIPTION OF THE DRAWINGS

Numerous other objects, features and advantages of the invention should now become apparent upon a

reading of the following detailed description taken in conjunction with the accompanying drawings, in which:

FIG. 1 is a partial front view of a microwave oven constructed in accordance with the principles of the present invention and showing the microwave oven door partially opened;

FIG. 2 is a cut-away side view of the latch assembly of the present invention;

FIG. 3 is a rear view of a slightly alternate arrangement to that shown in FIG. 2.

DETAILED DESCRIPTION

FIG. 1 shows a portion of the microwave oven 10 including an oven cooking cavity 12, oven door 14, front face wall 16, and front panel 18. The panel 18 may contain controls for the microwave oven which are not shown in FIG. 1. However, FIG. 1 does show the actuating button 20 of panel 18 which is operable to open the microwave oven door when it is closed.

For securing the door 14 in a closed position there is provided a latch plate 22 having latches 24 extending therefrom. FIG. 1 also shows the apertures 26 in the front face 16 for receiving the latches 24.

FIG. 2 also shows the latch plate 22 which has the hook-shaped latches 24 extending therefrom. The plate 22 may be secured to the door 14 in any suitable manner such as with the use of the rivets 23 shown in FIG. 2 or by means of screws. FIG. 2 also shows the actuating button 20 which couples by way of shaft 21 to the rear of the front face wall 16 of the microwave oven.

The major portion of the latch assembly of this invention as shown in FIGS. 2 and 3 is disposed inside the housing of the oven and includes a stationary holder 30, a pair of latch receiving means 32, and a vertically movable slide bar 34. The slide bar 34 may be actuated for vertical movement at virtually any point therealong. In the embodiment shown in FIG. 2 the slide bar is actuated at the top and in the embodiment shown in FIG. 3 the slide bar may be actuated at either the top or bottom as discussed in more detail hereinafter.

The stationary holder 30 has a front flange 31 which is secured by a plurality of fasteners 33 or the like to the rear of the front wall 16. The holder 30 may also be secured at other points within the housing of the microwave oven. The holder 30 also has a slightly recessed channel 38 that extends vertically and accommodates the sliding bar 34.

The latch receiving means 32 comprises a substantially flat holding plate 40 having a flanged end 42 that terminates in a slanted bearing surface 44 and edge 46.

The plate 40 is pivoted at point 48 by means of a bolt and nut arrangement. As shown in FIGS. 2 and 3 this bolt and nut arrangement includes a socket head cap screw 52 that mates with a nut 54 which is secured to a tab member 56 the end of which is locked within recess 57 of holder 30. The holder 30 is also provided with an elongated slot 58 which permits movement of the pivot point in the direction of the longitudinal slot. When the pivot point is located properly then the socket head cap screw can be secured to hold the plate 40 in that position yet permitting pivotal movement of the plate 40 relative to the stationary holder 30.

The movement of the plate 40 is provided by employing an intercoupling member 60 which may be a nut and bolt arrangement which couples between plate 40 and an aperture in sliding bar 34. Thus, as the sliding

bar 34 is caused to move longitudinally in a vertical direction this likewise causes the plates 40 to pivot therewith. The sliding bar 34, as depicted in FIG. 3 may be limited in its vertical movement by means of a post 35 which extends through an aperture in holder 30.

The plate 40 also has secured thereto a switch 62 which has an actuating button 64. The switch is disposed so that the actuating button 64 is positioned just below the edge 46 a sufficient distance to contact the hook-shaped end of the latch 24 when the latch is engaged with the edge 46. The switch 62 may be of conventional design and is shown in the drawings as including output terminals 66. The switch 62 may be insulatedly supported from the plate 40 especially if the plate 40 is metallic.

The slide bar 34 has a top horizontal projection 65 which is normally biased upwardly by spring 68 but which may be urged downwardly when the door is closed to cause downward pivoting of plate 40 to cause disengagement between the latch and edge 46. This operation is provided by a slide bar actuating mechanism which includes actuating button 20 and associated shaft 21 referred to hereinbefore, support bracket 80, pivot bar 82, common shaft 84, and biasing spring 68. Upon actuation of the button 20 the shaft 21 moves rearwardly. The shaft 21 is affixed to the support bracket 80 and upon movement of the shaft 21 the bracket 80 pivots about shaft 84. Shaft 84 extends through an aperture in the supporting lip 81, through an aperture in an in-turned flange 83 of pivot bar 82, through an opposite in-turned edge of pivot bar edge 82 and through an aperture in the holder 30. The second in-turned flange 85 of pivot bar 82 contacts the end 65 of the slide bar 34. Normally, the spring 68 has one end 69 which fits under the slide bar end 65 and has its other end coupled through aperture 71 and about the end of shaft 84 to cause an upward biasing of the slide bar 34.

Upon actuation of the button 20 and pivoting of the pivot bar 82, the flange end 85 pivots, as shown in FIG. 2 downwardly against the upper surface of end 65 to thereby cause a downward pivoting of the bearing surface 44. Upon sufficient downward movement of a slide bar the latch 24 is disengagable from the edge 46.

FIG. 2 also shows a biasing means 86 disposed intermediate the two plates 40. This biasing means 86 is for biasing the door to an open position once latch 24 has disengaged from the latch receiving member. For this purpose there is provided a stationary bracket 87 having a flanged end 88 having an aperture therethrough for accommodating sliding plunger rod 90 which has a conical end 91 that is engagable with the actuating button 92 of switch 94. The switch 94 is suitably fastened preferably to the stationary holder 30. This switch 94 has electrical contacts 95 and may be used for controlling operation of certain of the circuitry associated with the microwave oven. A spring 96 is disposed about rod 90 and extends between flange 88 and an enlarged retaining flange 97. On the other side of the flange 97 there is an actuating button 98 which is engagable by the door and is pushed inwardly to cause the rod 90 to contact the switch 94 when the door is closed. When the door is to be opened and as soon as the latch disengages from the latch receiving means, the force of the spring 95 is transmitted to member 98 which forces the door 14 towards its open position.

FIG. 3 also shows in addition to the top slide bar actuating mechanism also a bottom mechanism 100 which may be substantially identical to the top mechanism and includes a support bracket 101, a common shaft 102, a biasing spring 104, and a pivot bar 106. The mechanism 100 operates in the same manner except that the flange at the end of pivot bar 106 acts upon the top surface 108 of a bottom extension 109 of the slide bar.

One of the important features of the present invention is concerned with the pivotal latch receiving means and the ease with which this may be adjusted to provide secure latch engagement. This type of an arrangement also provides a secure latching with a relatively simple construction. Having described one embodiment of the present invention it should now be apparent to those skilled in the art that there exists numerous other embodiments and modifications of the ones disclosed herein, all of which are contemplated as falling within the spirit and scope of the present invention.

What is claimed is:

1. A latch assembly for securing a microwave oven door to the face of the microwave oven comprising: means fastened to the cantilevered end of the oven door for securing the door to the oven face and including at least one latch, said face having at least one aperture to receive the latch, a latch receiving means including means defining an edge for engagement with the latch when the door is closed, means for pivotally supporting said latch receiving means with said edge disposed intermediate the oven face and the pivot point, a sliding element arranged to move in a generally vertical direction, means freely securing said latch receiving means to said sliding element so that as said sliding element moves said latch receiving means is free to pivot about the pivot point, means for biasing the sliding element to a position wherein the latch and latch receiving edge are in engagement when the door is closed and means accessible from the front of the oven for actuating the sliding element to cause the latch to disengage from the latch receiving edge.
2. The latch assembly of claim 1 wherein said means defining an edge includes a rearwardly turned lip having a bearing surface over which the latch is permitted to slide and terminating in the edge.
3. The latch assembly of claim 1 wherein said means for pivotally supporting said latch receiving means includes a stationary plate and a pivot member secured between the plate and latch receiving means.
4. The latch assembly of claim 3 wherein said plate has a longitudinal slot for accommodating the pivot member and permitting adjustment of the edge relative to the latch.
5. The latch assembly of claim 4 wherein the pivot member includes a bolt and nut having a tab member to prevent rotation thereof.
6. The latch assembly of claim 1 including an electrical switch having an actuating means disposed adjacent said edge.
7. The latch assembly of claim 6 wherein the actuating means is disposed just below said edge.
8. The latch assembly of claim 1 wherein said means

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for securing the door includes a pair of spaced latches.

9. The latch assembly of claim 8 including means for forcing the door open when the door is disengaged.

10. The latch assembly of claim 1 wherein said means for actuating the sliding element includes a pivot mech-

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anism having a shaft, and said means for biasing includes a spring disposed about the shaft and contacting the sliding element.

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