

Aug. 14, 1962

L. L. CARNAHAN ET AL

3,049,115

OVEN DOOR MOUNTING MEANS

Filed Dec. 9, 1957

8 Sheets-Sheet 1

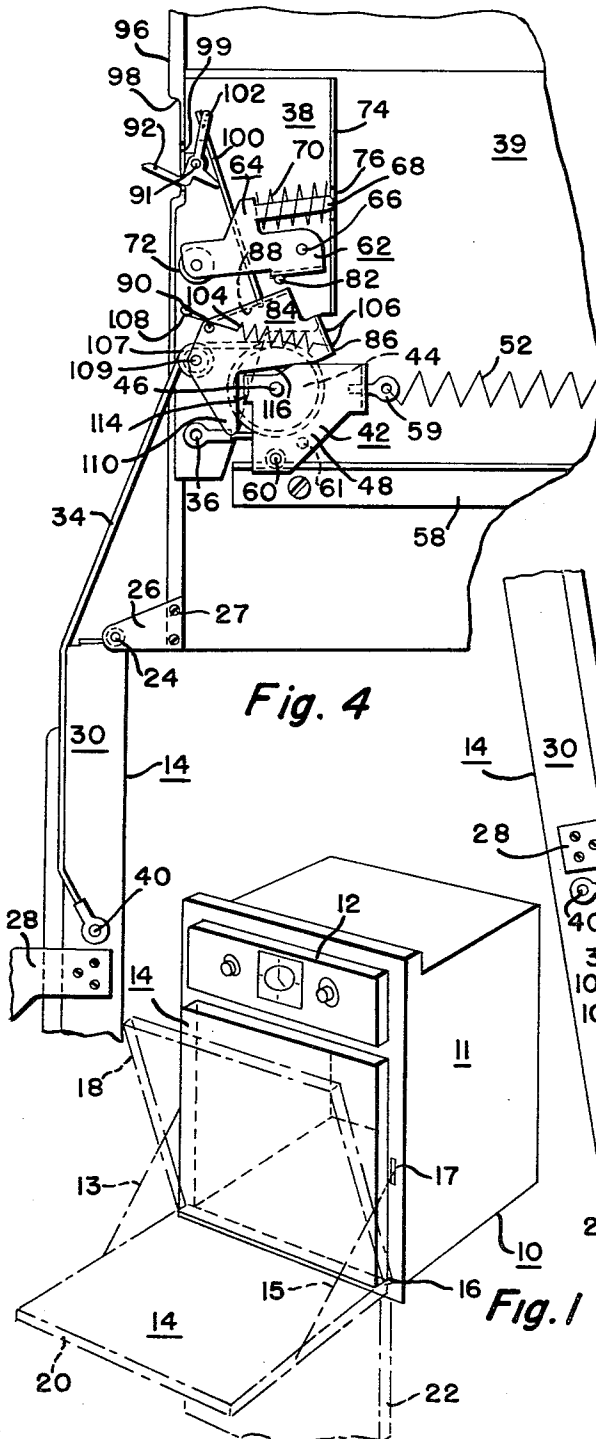


Fig. 4

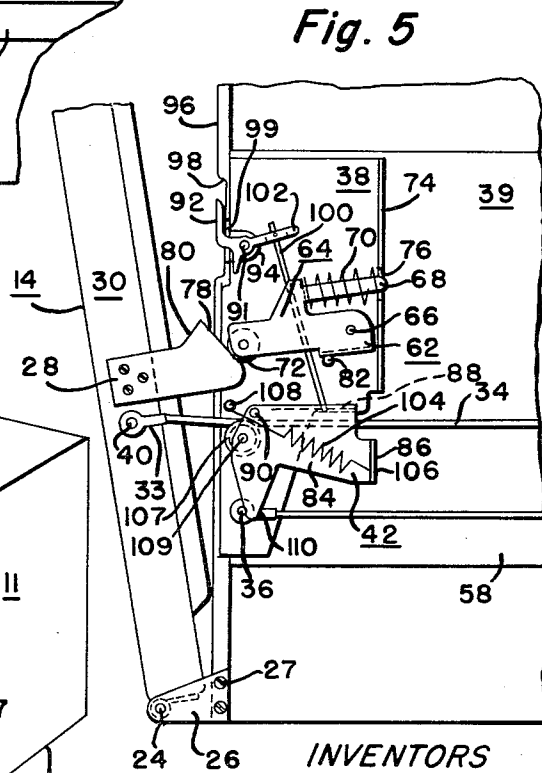


Fig. 5

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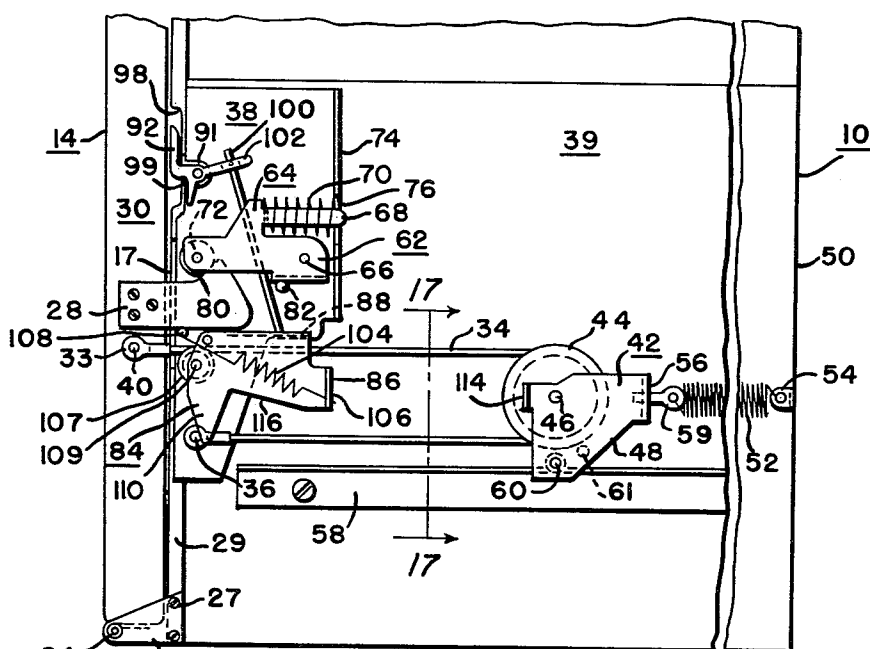
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OVEN DOOR MOUNTING MEANS

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26 *Fig. 2*

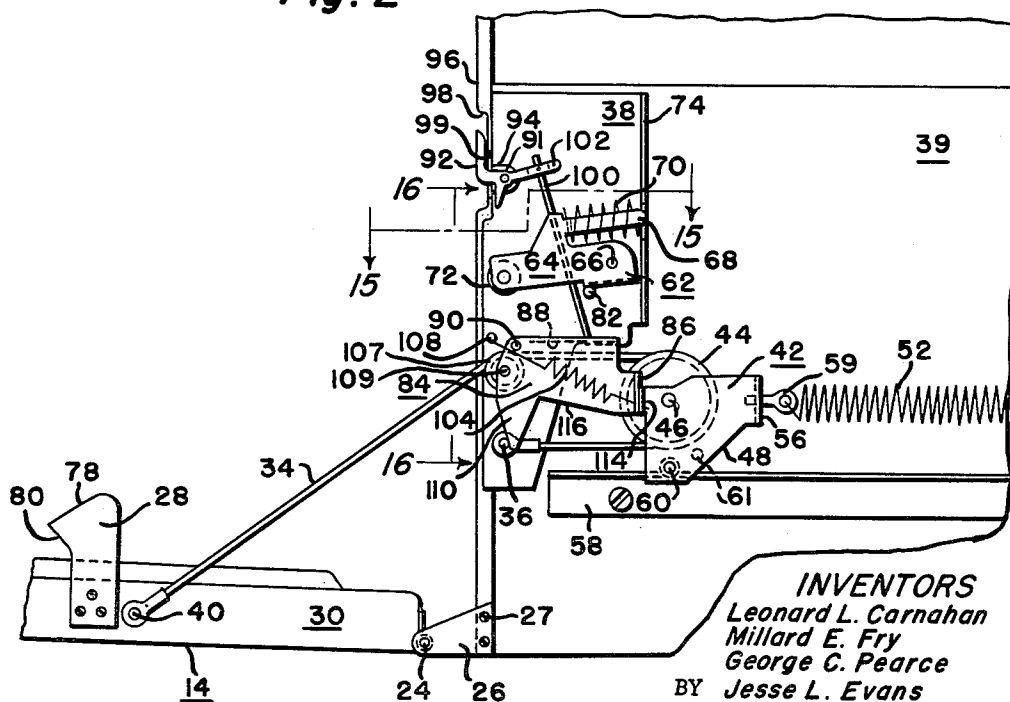


Fig. 3

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8 Sheets-Sheet 3

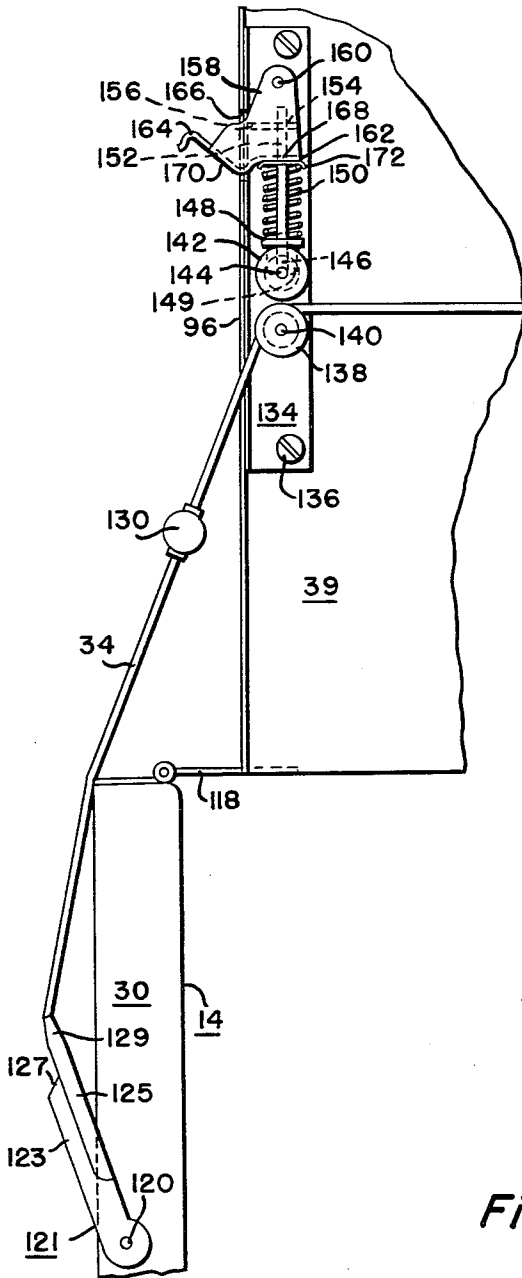


Fig. 6

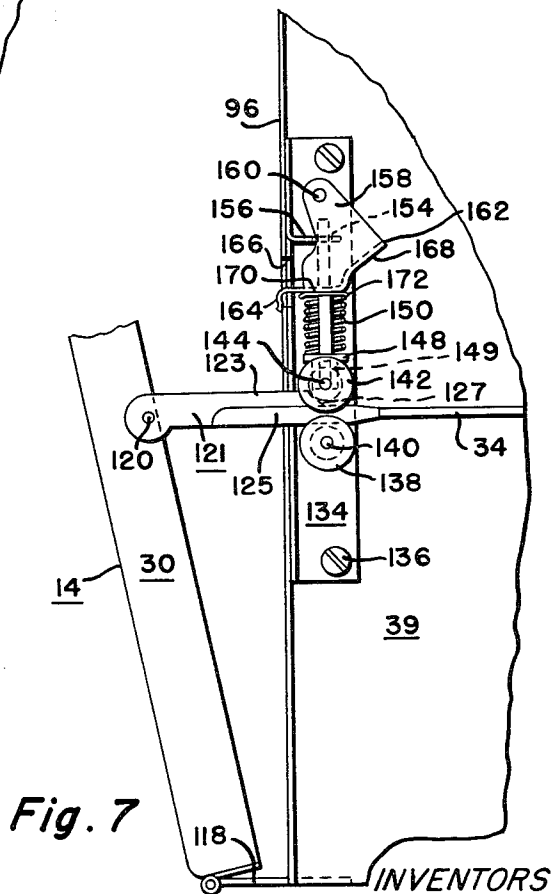


Fig. 7

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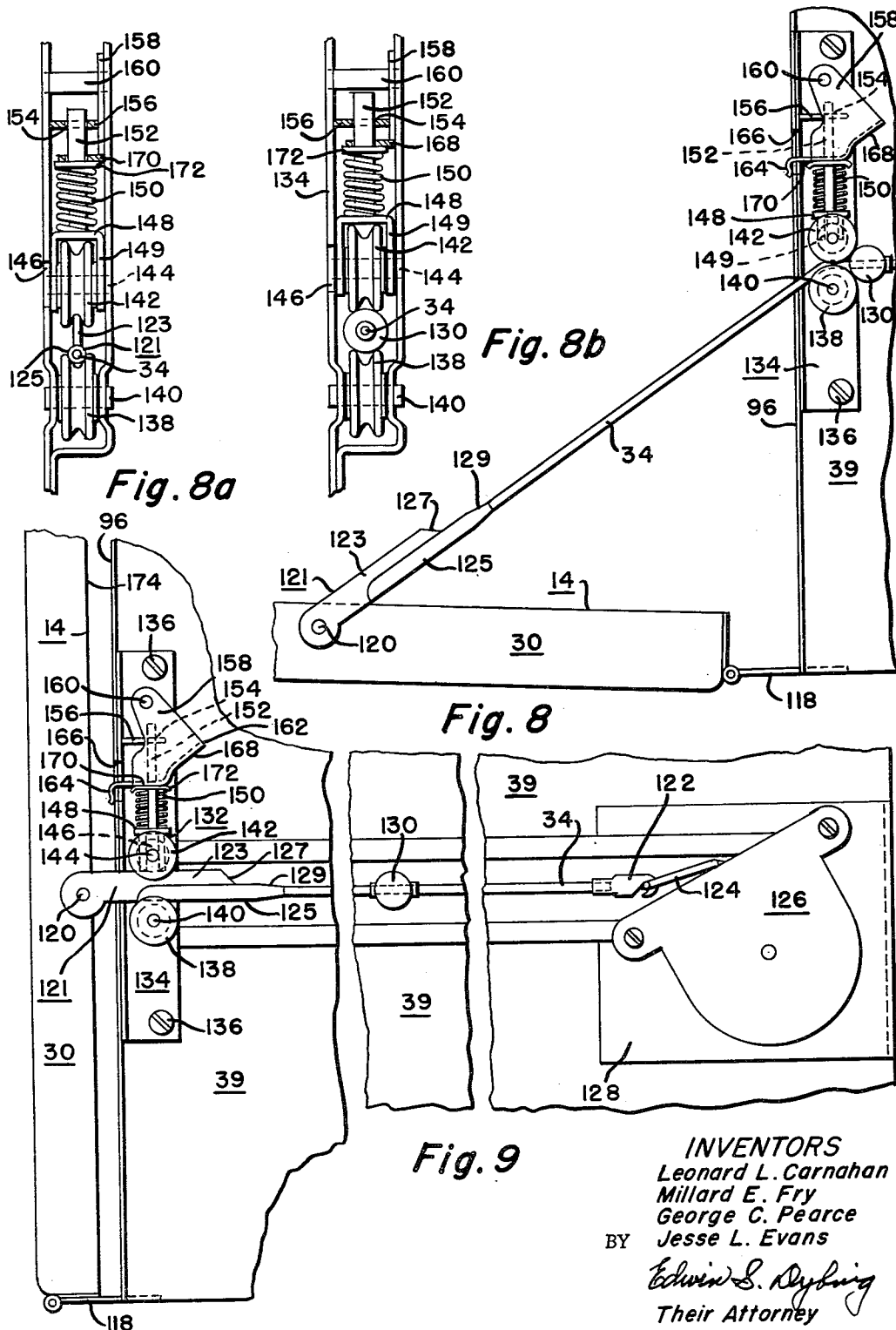
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8 Sheets-Sheet 4



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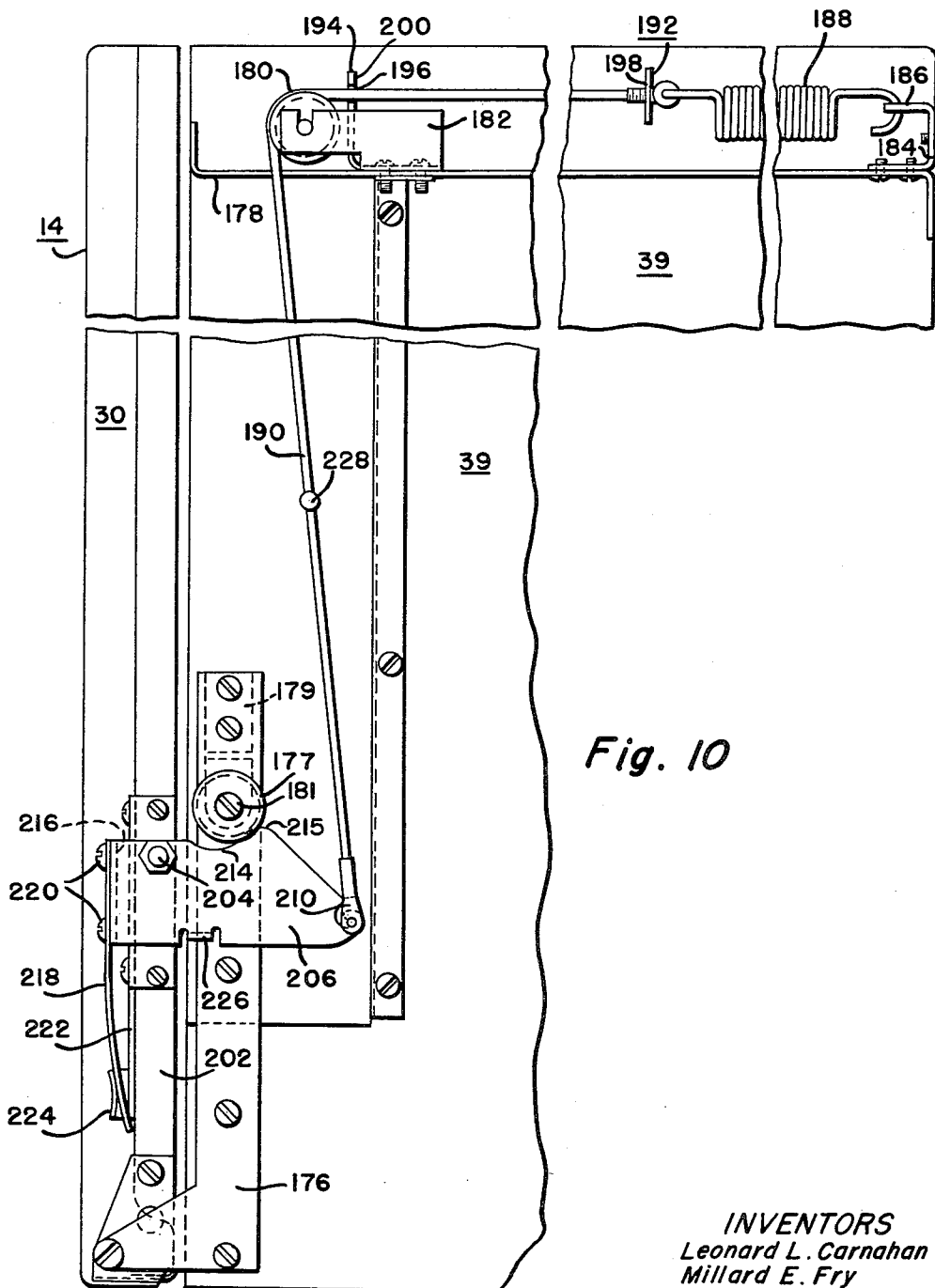
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8 Sheets-Sheet 5



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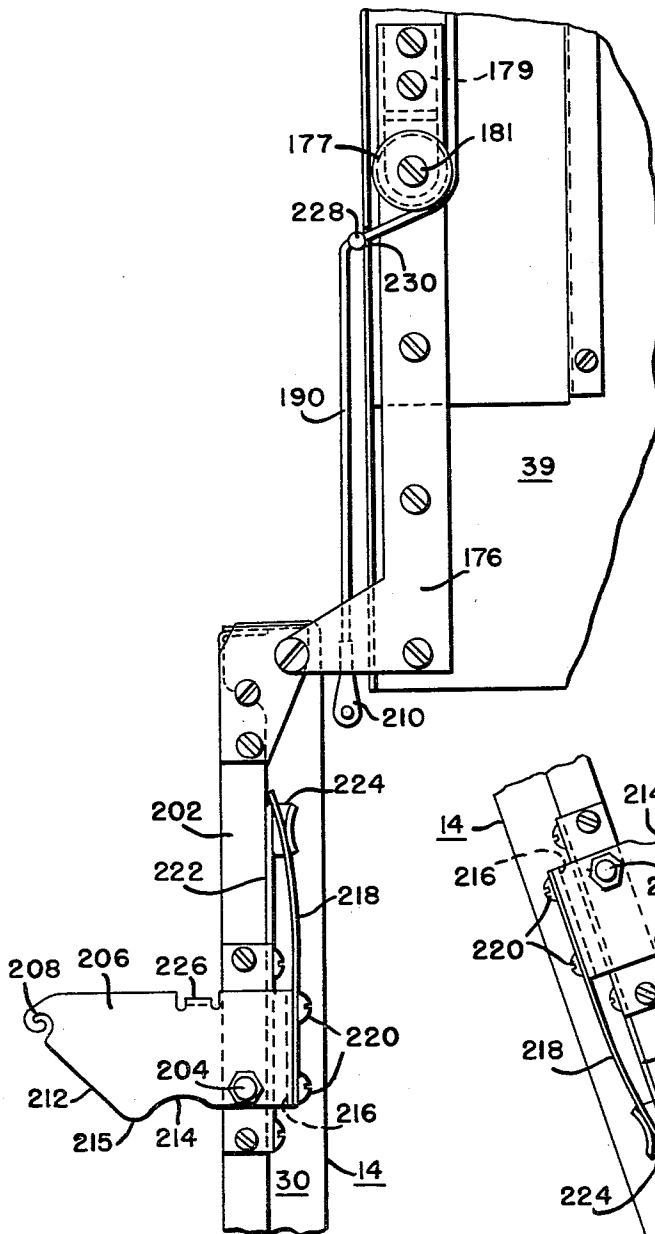


Fig. 13

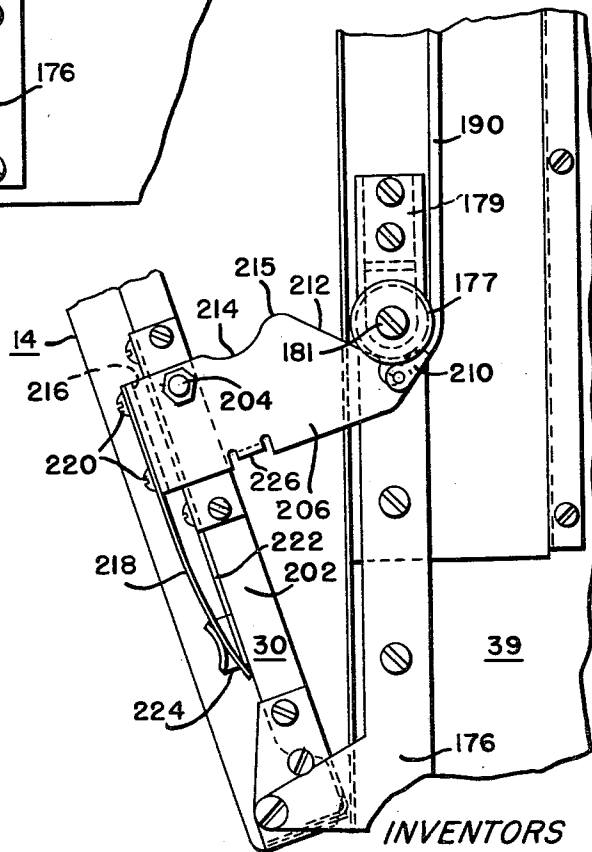


Fig. 14

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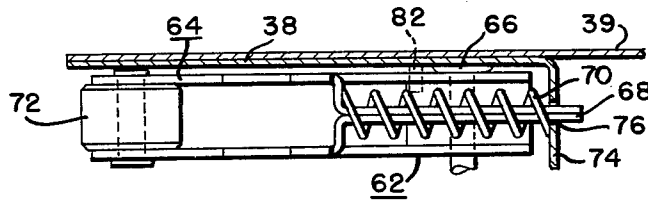


Fig. 15

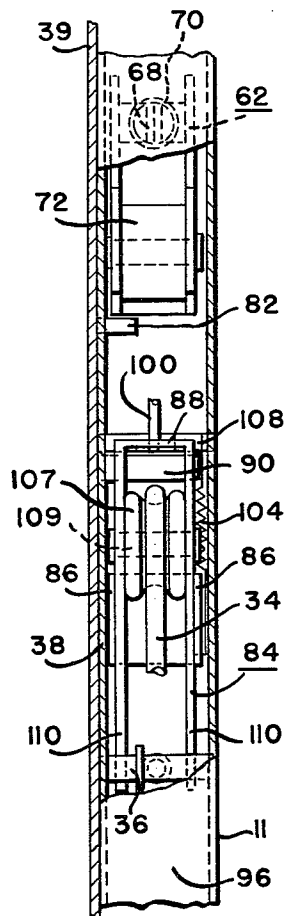


Fig. 16

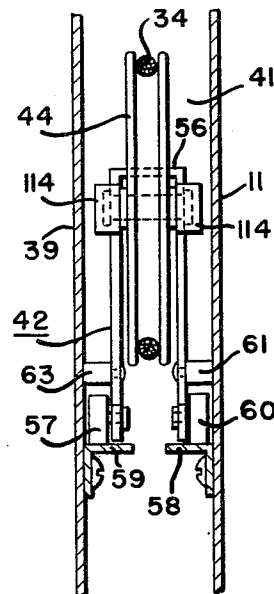


Fig. 17

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3,049,115

OVEN DOOR MOUNTING MEANS

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12 Claims. (Cl. 126—191)

This invention relates generally to oven doors of the "drop" type which are hinged along the bottom thereof and swing outwardly and downwardly from a vertical closed position to a substantially horizontal open position. More specifically, this invention relates to an oven door which may be swung downwardly to a vertical out-of-the-way position.

In the past, cleaning of ovens, either those in ranges or in the wall, has been a difficult and disagreeable task. The manner in which foods become burned on the hot surfaces of oven walls makes it difficult to keep the structures clean. Previously, efforts have been directed to making the oven door removable to facilitate access to the oven interior. However, this has not been completely satisfactory due to the complicated procedures involved in removing and replacing the oven doors. Persons using ovens equipped with removable doors are not generally inclined to make the mechanical adjustments necessary to the disassembly of the door from the oven. Hence, this feature is frequently ignored. This invention overcomes these objections and provides an oven door which may be placed in an out-of-the-way position without manually removing any of the oven parts.

Accordingly, it is an object of this invention to provide a range or wall oven with a "drop" type door which is supported by a novel flexible cable arrangement.

It is also an object to provide an oven door which has a closed position, a slightly open Broil position, a horizontal support position and a dropped out-of-the-way position.

An additional object is the provision of a single latch mechanism to accommodate the above positions, wherein a stop is adapted to limit the door travel in one position and a release manually operable, for permitting door travel to another position. In this regard it is also an object that such latch mechanism be adapted to reset automatically in a manner to similarly limit subsequent door travel in one position.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred form of the present invention is clearly shown.

In the drawings:

FIGURE 1 is a somewhat schematic perspective view of a wall oven incorporating the oven door of this invention;

FIGURES 2, 3, 4, 5, 15, 16 and 17 illustrate a preferred form of this invention wherein FIGURE 2 is a side view of the latch, with parts broken away, showing the oven door in closed position;

FIGURE 3 is a side view, with parts broken away, showing the oven door in horizontal support position;

FIGURE 4 is a side view, with parts broken away, showing the oven door in a dropped out-of-the-way position;

FIGURE 5 is a side view, with parts broken away, showing the oven door in a slightly open Broil position;

FIGURE 15 is a top view of the roller catch bracket taken along line 15—15 of FIGURE 3;

FIGURE 16 is a front elevation of the latch, with parts broken away, taken along line 16—16 of FIGURE 3;

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FIGURE 17 is a front elevation of the pulley bracket assembly taken along line 17—17 of FIGURE 2;

FIGURES 6, 7, 8, 8a, 8b and 9 illustrate another embodiment of the teachings of this invention wherein FIGURE 6 is a side view of the latch, with parts broken away, showing the oven door in a dropped out-of-the-way position;

FIGURE 7 is a similar side view of the latch mechanism, with the oven door in a slightly open Broil position;

FIGURE 8 is a similar side view of the latch mechanism with the door in horizontal support position;

FIGURE 8a is a fragmentary front view of the latch pulley mechanism in a closed door position such as FIGURE 9, with the latch pulleys partially separated to pass the door cable end piece;

FIGURE 8b is a fragmentary front view of the latch pulley mechanism with the latch pulleys fully separated to permit passage of the ball stop to the relationship of FIG. 6;

FIGURE 9 is a fragmentary side view of the latch, with parts broken away, showing the oven door in a closed position, and showing also the spring motor utilized in this embodiment to retain constant pressure on the door support cable;

FIGURES 10, 11, 12, 13 and 14 illustrate another embodiment of this invention wherein FIG. 10 shows the latch mechanism and spring biased cable support in side view, with parts broken away, the oven door being in closed position;

FIGURE 11 shows a similar side view of the latch mechanism and door support cable, the oven door being in a horizontal support position;

FIGURE 12 is a front view of the side panel of the oven taken along line 12—12 in FIGURE 11 and showing a notched aperture through which the door support cable projects;

FIGURE 13 is a side view of the latch and cable structure with the oven door in dropped position; and

FIGURE 14 is a side view of the latch with the oven door in a slightly open Broil position.

In accordance with my invention as shown generally in FIG. 1, a wall oven 10 having a side wall 11 and a control panel 12 is provided with an oven door 14 hingedly mounted at 16 for horizontally downwardly pivotal movement. The oven 10 is provided with a latch mechanism embodying the concepts of this invention which permits the oven door 14 selectively to assume a slightly open Broil position 18, a horizontal utensil supporting position 20 and a dropped position 22. In this arrangement cables 13, 15 support the door 14 throughout its movement, disappearing into the side wall of the oven through apertures 17 as the door is closed. Where access without obstruction is desired to the interior of the oven 10, door 14 may be dropped to position 22 in accordance with principles embodied in the latch mechanisms described hereinafter. Although the oven door here depicted is shown in connection with a wall oven 10, it is to be understood that the principles here advanced are equally applicable to such a door installed on free-standing ranges of conventional type. For reasons of convenience, the door 14 is shown as supported at both sides by cables 13 and 15, however, it has been found that either one of these cables is adequate to support all loads normally placed on oven doors.

A preferred embodiment will now be described with reference to FIG. 2 wherein a fragmentary side portion of an oven 10 is shown with the oven door 14 in closed, oven-sealing position. The door 14 is pivotally mounted on a pin 24 carried by a hinge bracket 26 secured as at 27 to the oven frame 29. A striker 28 is rigidly secured to a side panel 30 of the oven door and adapted to project into the latch mechanism through an opening 17 when

the door 14 is in closed position. Mounting the various elements of the latch mechanism is a latch support plate 38 which is secured in any suitable manner to a side panel 39 of the oven 10. The door 14 is supported in all of its positions by a cable 34 having its one end fastened at 36 to latch support plate 38 and having its other end fastened at 40 to side panel 30 of the oven door 14.

In order to maintain a continuous bias or tension on cable 34 and to provide increased cable travel without increasing cable storage problems, a novel adaptation of a movable pulley bracket assembly 42 has been provided to serve these needs. The assembly 42 installed in a side wall cavity 41 of oven 10, has a pulley 44 rotatably mounted at 46 on pulley bracket 48. The bracket 48 is biased toward the rear wall 50 (FIG. 2) of the oven 10 by a spring 52 which is secured to a bracket 54 affixed to the wall 50. The other end of the spring 52 is attached to an eye-bolt 59 which, in turn, is secured to a flange 56 of the pulley bracket 48. The tensioning applied by spring 52 to the pulley bracket and cable system has been found sufficient to support the system without sag. However, it is within the purview of this invention, as best seen in FIG. 17, to provide a track 58 attached to oven wall 11 on which a roller 60 may travel to give the roller bracket assembly additional support. For further support an identical track 59 may be attached to panel 39 and a roller 57 adapted to roll thereon. Where the tracks 58, 59 are omitted, the bracket 48 mounts rubber bumpers 61, 63 instead of rollers to preclude the possibility of scraping as the pulley bracket assembly 42 moves relative to the wall 11 and panel 39 of the oven (FIG. 2). The foregoing movable pulley and cable arrangement is thus seen to compact the door suspension system, cable end 40 having twice the travel as has pulley bracket 48. Additional features of this arrangement find a continuous oven door closing bias provided by spring 52 and a movable abutment or flange 114 on the bracket 48 cooperating with selectively fixed abutments or flanges 86 to limit oven door travel in a horizontal support position (FIG. 3).

To urge door 14 into a snugly fitting closed position, a roller catch assembly 62 is carried on latch support plate 38. The assembly is comprised of a roller catch bracket 64 pivoted on the plate 38 at 66 and having a finger portion 68 which mounts a bracket biasing spring 70. Carried also by the catch bracket 64 is a roller 72 made from any suitable material, nylon being particularly satisfactory in this regard. The support plate 38 is formed with a rear flange 74 with an aperture 76 adapted to accommodate one end of the finger portion 68. In this arrangement the spring 70 is forced against the flange 74 in a manner to cause the roller catch bracket 64 to pivot counter-clockwise to effect a door closing bias on cam surface 80 of striker 28. A stud 82 projects from plate 38 to limit the rotation of bracket 64.

The function of the latch mechanism during a door closing operation may best be understood with reference to FIG. 5 wherein the striker 28 is shown formed with a Broil stop cam surface 78 upon which roller 72 travels as the door is forced from the Broil position shown in FIG. 5 to the closed position of FIG. 2. As the door 14 is closed, striker 28 cams the roller catch bracket 64 in a clockwise position against the bias of spring 70. As the roller 72 moves onto the door-latched cam surface 80 of the striker 28, the spring 70 again urges the roller catch bracket 64 in a counter-clockwise rotation on cam surface 80 to hold the door snugly closed. To maintain the bracket 64 in correct door latching position as aforesaid, a stud 82 is secured to support bracket 38 and adapted to limit the rotational travel of bracket 64.

The horizontal stop and release mechanism adapted to permit the novel "drop" door feature of this invention will now be clearly described, reference being had primarily to FIG. 3 wherein the door 14 is shown supported

in horizontal position by cable 34. The stop and release mechanism is embodied in a stop bracket 84 having flanges 86 and 88 and pivotally mounted at 90 on latch support plate 38. A finger release lever 92 is pivotally secured at 91 to a bracket 94 which may be attached to the front panel 96 of the oven side wall. A depression 98 is made in the panel 96 to permit insertion of a person's finger behind lever 92 for actuating the lever and a cut-out 99 to recess the lever and to allow clearance therefor as the lever is pivoted. Any movement imparted to the lever 92 is transmitted through a link 100 to the flange 88 of the stop bracket 84. For this purpose the link 100 is loosely secured at its one end to bellcrank portion 102 of lever 92 and at its other end similarly secured to flange 88 of the stop bracket. Thus it is seen (FIG. 4) that any downward or counter-clockwise rotation of the lever will impart an upward and counter-rotational motion to the stop bracket 84. Yieldingly retaining stop bracket 84 in either its uppermost door release position (FIG. 4) or its lowermost horizontal door support position (FIG. 3) is an over-center spring 104 secured at 106 to the stop bracket 84 and by a pin 108 to support plate 38. Clockwise rotation of stop bracket 84 is limited by the projection of pin 36 in the rotational path of bracket tail-piece 110 (FIG. 5). A pulley 107 is rotatably mounted on a shaft 109 affixed to stop bracket 84 to guidably support cable 34. However, one end of shaft 109 may be secured as well to plate 38 and thus replace the pivot point for bracket 84 described above as pin 90. With shaft 109 acting as the bracket pivot, the over-center spring may be relocated accordingly.

The complete and varied functioning of the elements embodied in the latch mechanism of this invention as well as the advantages derived therefrom will now best be understood in connection with a complete sequence of door positioning. With the door 14 closed as in FIG. 2, an operator may grasp the door handle (not shown) and pull downwardly. In so doing, the roller 72 will be cammed upwardly on keeper surface 80 thereby pivoting roller catch brackets 64 in a clockwise direction about pivot 66 against the bias of spring 70. As the door 14 continues pivotally downwardly, the end piece 33 of cable 34, in response thereto, will move outwardly from an aperture such as 17 (FIG. 1) in panel 96 of the oven. Thus, the linear distance travelled will be twice as far for the end piece 33 as for the movable pulley bracket 42. This is particularly advantageous for it permits storage of the extra cable required for the "drop" door feature without increasing the space requirements of the latch and cable support system. Tension is maintained on the cable 34 by the spring 52 which resists the outward travel of the pulley bracket 42.

After roller 72 is over the high point of striker 28 (FIG. 5), the spring 70 biases the roller 72 in a counter-clockwise direction until bracket 64 rests on stud 82 with the roller 72 bearing against cam surface 78 of the keeper. With the door 14 in this position, the door will remain slightly ajar in what is commonly known as a Broil position. The opposed biasing effects of springs 70 and 52 will neutralize each other and maintain the door in this position.

The door may now be pivoted downwardly to the horizontal position shown in FIG. 3. In so doing, pulley bracket 48 will move toward the front of the oven to accommodate the extension of the cable 34. The door will be stopped in the horizontal position when the flange portion 86 of stop bracket 84 meets the flange portion 114 of the movable bracket 48 and thereby held at this position. It should be noted that the most effective support for door 14 requires that cable 34 be formed of a material which will not stretch substantially.

To release the door 14 for downward pivotal movement from a horizontal to an out-of-the-way position (FIG. 4), the lever 92 is pulled outwardly, while the tension on cable 34 is released simultaneously by slightly lifting door 14. The flanges 86 on bracket 84 through

link 100 are thus pivoted out of blocking engagement with flanges 114 on bracket 48. In this relationship the door may then continue its pivotal movement downwardly, bracket 48 moving toward the front of the oven an additional amount to the position shown in FIG. 4. The cut-out portion 116 of stop bracket 84 accommodates this movement. The door has now been moved from a position which obstructs one seeking access to the oven to a location which is out of the way. Access is now readily obtained to the interior of the oven for cleaning and any other process requiring close attention to the interior oven walls.

Upon completion of any oven procedure requiring the door 14 to be placed in its vertically downwardly disposed position, the door may be returned to its oven closing position, thereby automatically resetting the over-center spring biased stop bracket 84 and release lever 92 to the relationship depicted in FIG. 2. This is effected by way of a camming action imparted to the flange 88 of the pivotally raised stop bracket 84 (FIG. 4) by striker 28 as oven door 14 is closed. Since the release lever 92 is interconnected by link 100 with stop bracket 84, this lever will also return to a position whereby the latch is reset to prevent to the oven door from moving downwardly beyond its horizontal support position.

A second embodiment including the novel concepts of this invention is fully described in connection with FIGS. 6, 7, 8 and 9. Reference is now had in particular to FIG. 9 wherein an oven 10 is closed by a "drop" type door 14 pivotally mounted on a hinge 118. The door is supported in its pivotal movement by a cable 34 secured at one end in an end piece 121 pivotally mounted on a pin 120 to the side panel 30 of the door 14, and at the other end to a hook 122. The hook 122 is adapted to grip a link 124 of a spring motor 126. The spring, which continuously biases the door 14 in a closing direction, may be of any conventional type, however, a spring which provides a constant rate of pull is preferred. The spring 126 is mounted within a cavity such as 41 described hereinbefore in a side wall of oven 10 on a bracket 128 affixed to the panel 39 near the rear of the oven and located vertically in a manner to place the spring 126 and the latch mechanism shown generally at 132. At one point along the cable a ball stop 130 is attached, the function of which will be more fully described hereinafter.

A support plate 134 bolted at 136 to the side panel 39 of an oven 10 carries a cable support pulley 138 rotatably mounted on a pin 140 secured to the plate 39. The pulley 138 is in line with the cable 34 and provides a means for guiding the cable as it is pulled outwardly with the door 14. As best seen in FIGS. 8a, 8b, a keeper or latch pulley 142 is rotatably mounted on a pin 144 which rides in a slot 146 formed in the support plate 134. The slot 146 allows the latch pulley 142 a limited amount of vertical movement. A continuous bias of the pulley 142 in a downward direction is effected through a plate 148 having depending forked legs 149 which bear on top of the pulley shaft 144 and are biased downwardly by spring 150. To retain the latch in proper operating relationship, the spring 150 is slidably placed on rod 152 secured at its one end to plate 148 and adapted for limited vertical reciprocation through a port 154 in bracket 156.

A novel and functional configuration has been incorporated in the cable attached end piece 121 comprising a cylindrical portion 125 and a flat fin portion 123 integrally formed therewith. The cylindrical portion 125 is adapted to ride within the groove of pulley 138 and is tapered at 129 (FIG. 8) to form a smooth union where the end piece joins the cable 34. Likewise, the top of fin 123 rides in the groove of pulley 142 and is tapered along its trailing edge to form a cam surface 127. In addition to guiding the cable 34 between the pulleys 138 and 142, the end piece 121 provides the cam surface 127 for locating the door 14 in Broil position (FIG. 7).

A two-position release lever 158 is pivoted to the support plate 134 on a pin 160 and is formed with a flange 162 having an end portion 164 projecting through an aperture 166 in a front panel 96 of the oven side wall. The lever 158 has its flange portion 162 formed with two seats 168 and 170, the first, an unlatched position facilitating the release of the oven door to a position below horizontal, and the second, a latched position limiting the pivotal movement of the door at the horizontal position. The seat 168 is formed a sufficient distance from pin 160 to permit the pulley shaft 144 to rise to the top of slot 146 against the downward bias of spring 150 whenever ball stop 130 is pulled between the pulleys 138 and 142 as the door is lowered to its out-of-the-way position (FIG. 8b). The seat 170 is a greater distance from the pin 160 and therefore limits the upward travel of pulley shaft 144 to a point approximately half-way up the slot 146 (FIG. 8a), pulley travel below this point receiving a downward bias by the action of spring 150. With the pulley shaft 144 at this half-way point (FIG. 8a) a solid link is formed between the pivot pin 160 and the pulley 142, thus preventing a sufficient separation of the pulleys 138 and 142 to pass the ball 130. In the position of FIG. 6 the coils of spring 150 are seen to be sufficiently parted to yield an amount necessary to pass the ball stop 130 as in FIG. 8b. Similarly in FIG. 7, the spring 150 is disposed to pass the fin 123 (FIG. 8a) of the end piece 121 as the door 14 is moved. Similarly in FIG. 7, the spring 150 is disposed from the Broil position of FIG. 7 to the closed position of FIG. 9.

The operation of door 14 will best be understood with reference to a sequence of operations proceeding through a closed position, a Broil position, a horizontal support position and a dropped out-of-the-way position. In the closed position of FIG. 9 door 14 is urged continuously into a tight oven sealing condition by the spring biased pull of cable 34 on end piece 121. In this position the latch release lever 158 has its flange portion 170 forcing the spring 150 into a rigidly coiled relationship, thereby urging pulley 142 downwardly into a reasonably snug engagement with end piece 121. As the door 14 is opened, the top portion 123 of end piece 121 rides in the groove of pulley 142 (FIG. 8a). The bottom section 125 of end piece 121, in turn, rides in the groove of pulley 138. In response to door pivotal motion outwardly, the cam surface 127 of end piece 121 reaches a point adjacent the pulley 142 and the pulley 142 is biased downwardly by spring 150 to a position on the top of cable attachment section 129. In this relationship door 14 is now in a Broil stop position. Tension continues on the cable 34 (FIG. 7) but the resistance of pulley 142 against the Broil stop cam surface 127 is sufficient to offset the cable tension and the door is retained in a slightly open position. It should be noted that with the pulley 142 in its lowermost position and the door released lever 158 in its latched position, the spring coils are still slightly separated. This allows the door 14 to be closed from its Broil position—pressure merely being exerted on door 14 to cause Broil stop cam surface 127 to raise the pulley 142 to a position which will permit complete door closure.

As the door 14 is moved from closed to a horizontal support position (FIG. 8) the cable 34 continues to support the door in its movement. To effect a rigid stop for the door 14 in its horizontal position the ball stop 130, previously described, is utilized. Since the ball stop 130 is attached to the cable 34 it travels therewith until it reaches a position adjacent the pulleys 138 and 142. At this point the ball seeks to pass through the pulleys but is restrained thereby to effect a secure support position for the door 14. As aforesaid, pulley 138 is secured to support bracket 134, thus any yielding to pass the ball 130 must be provided through the vertical movement of pulley 142. To effect this operation release lever 158 has its finger portion 164 inwardly disposed against the front panel of the oven to place seat flange 170 over the

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spring 150. In this relationship a sufficient pressure is placed on the spring 150 to keep the coils thereof reasonably tightly together. In this fashion pulley 142 is permitted a sufficient rise to pass the large portion of the end piece 121 but not enough to pass ball 130 which is retained on the inboard side of the rollers 138, 142. Thus, door 14 is securely held and adequately supported to retain any normal weights placed thereon during kitchen operation.

It is frequently desirable to gain access to the interior of the oven 10 but door 14, in its horizontally disposed position, presents an obstacle to this desire. Therefore, this embodiment also contemplates the release of the door 14 from its horizontal position and means whereby the door can be dropped to an out-of-the-way position. FIGS. 6 and 8 are helpful in presenting latch functioning directed to this end. The door 14 is raised slightly from its horizontal position to relieve some of the tension on spring 150 imposed by the bias of ball 130. The finger portion 164 of release lever 158 is grasped and pulled outwardly to the position shown in FIG. 6. Spring 150 is thus permitted to move slightly upwardly and thereby release its rigid backing of pulley 142. The ball stop 130 is now free to move through the pulleys 142 and 138 to a position on the outside of the oven. In this manner, an additional amount of cable 34 is available to permit the door 14 to pivot downwardly to its out-of-the-way position.

At the conclusion of any operations involving close scrutiny of the interior of the oven, the door 14 is raised to its closed position. This automatically resets the latch mechanism for all normal operations including closed, Broil and horizontal positions. The release lever 158 is automatically reset by the closing action of the door 14. As the door is being closed, the inside edge 174 of the door 14 abuts the extended finger portion 164 of release lever 158 as it is shown in FIG. 6. Release lever 158 is thus forced to pivot inwardly in a counter-clockwise rotation to the horizontal door latched position of FIG. 8. In so doing, the spring retainer disc 172 is repositioned from its location on flange 168 to flange 170, thus tightening the tension on the spring. Of course, the release lever 158 may be reset by hand to effect the same operating principles.

A third embodiment of the novel concept advanced in this invention is seen in FIGS. 10, 11, 12, 13 and 14. Referring generally to FIG. 10, an oven 10 is closed by a door 14 pivotally mounted on a combination hinge and roller catch support bracket 176. The bracket 176 is supported at the front of and near the bottom of the side panel 39 of oven 10. A catch roller 177 is rotatably carried on a pin 181 extending between and secured to the bracket 176 and a parallel bracket 179 spaced from the first said bracket. At the top portion of the side panel 39 a bulkhead 178 serves to support the cable pulley and tensioning means. A pulley 180 is pivotally carried by a pulley bracket 182 secured to the bulkhead 178 near the front of the oven. At the rear of the oven a spring bracket 184 is similarly secured to the bulkhead 178 and has a ported flange portion 186 for retaining one end of a cable tensioning spring 188. A cable 190 is fitted at one end with a cable stop 192 adapted to receive the other end of the tensioning spring 188. Attached to the bulkhead adjacent the pulley 180 is a catch bracket 194 having an aperture 196 through which the cable 190 is caused to pass. The bracket 194 cooperates with the cable stop 192 and provides the means whereby the cable travel is limited, the flange surface 198 abutting surface 200 of bracket 194 to effect this stop.

With reference now to FIG. 11, the side panel 30 of oven door 14 is shown mounting a latch support bracket 202. Carried on the bracket 202 and pivotally mounted on a pin 204 is a latch plate 206. The latch plate is formed with a hook 208 adapted for attachment of a U-shaped bracket and pin arrangement 210 securely fastened to the cable 190. The latch plate is formed with a Broil

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stop cam surface 212 and a curved notch latch portion 214. At one end of the latch plate 206 a flange 216 is formed to carry a latch biasing band spring 218 secured thereto at 220. In order to place the spring 218 in latch actuating position, a bracket 222 is bolted to the side of latch support bracket 202 and formed with a hooked flanged portion 224 which engages one end of the spring 218. In this relationship it may thus be seen that latch plate 206 is adapted for rocking movement about pin 204, a latch plate flange 226 abutting support bracket 202 to limit rotation in one direction and the resiliency of band spring 218 urging the latch plate to rotate in the opposite direction. The ball stop 228 is rigidly attached to the cable 190 at a point which will permit its engagement in a notch 230 along one side of an aperture 232 through which the cable 190 issues to support the door 14 (FIG. 12). The utilization of this ball stop 228 in connection with the door release feature of this invention will be described more fully hereinafter.

Various facets of this particular embodiment will now be explained in connection with a sequence of door operations including a closed position, a Broil position, a horizontal support position and a dropped out-of-the-way position. With reference to FIG. 10, the oven door 14 is urged into a snug fit with oven 10 by the combined biasing effects of the spring 188 maintaining tension on cable 190 and the band spring 218 urging the latch plate 206 into engagement with roller catch 177. In this regard the cam surface of latch plate notch 214 aids in maintaining a tight seal between the juxtaposed surfaces of door 14 and oven 10.

As the door 14 is pulled outwardly and downwardly, the latch plate 206 is caused to pivot slightly in a clockwise direction as the hump portion 215 of the latch plate passes under the roller 177. After the door opens slightly, the bias of band spring 218 returns the latch plate 206 to its normal position perpendicular to the surface of the oven door 14. In this relationship (FIG. 14) a Broil stop position is attained with the combined tensioning of springs 218 and 188 sufficient to retain latch plate 206 in a position adjacent the roller catch 177 and thus the door 14 in a slightly open position.

When it is desired to open the door 14 to a position which will accommodate the support of cooking utensils or other objects, the pivotal motion of the door 14 is continued to the relationship shown in FIG. 11. As the door moves from a vertically upward to a horizontal position, the cable stop 192 moves from a position adjacent the rear of the oven 10 to a position abutting stop bracket 194. In response to this operation, the spring 188 is expanded and thereby imposes an opposing bias to this travel. At the point where cable stop 198 abuts the bracket 194 the oven door 14 is securely retained in its horizontal position. As the end section 210 of the cable follows the door outwardly, the cable 190 rides over pulley 180 in the top of the oven and roller catch pulley 177 adjacent the aperture 232. The ball stop 228 is sized in a manner that it will not throw the cable from the groove of pulley 177 and will pass through the aperture 232. However, the ball stop 228 must be larger than the notch 230 for the purpose next described.

Where it is desired to release the door 14 for downward pivotal movement the cable 190 is forced sideways into the notch 230, as suggested in FIG. 12. With the cable in this position the oven door 14 is lifted slightly to permit ball stop 228 to bear snugly against the front surface of notch 230. The ball stop 228 will remain engaged in the notch 230 due to the tension retained on the cable by spring 188. The end piece 210 is then removed manually from the hook portion 208 of the latch plate 206 and the oven door 14 lowered to its out-of-the-way position, as best seen in FIG. 13. The end of the cable 190 on the outboard side of the ball stop 228 will hang loosely at the side of the oven 10. When it is desired to place the oven door again in operative position,

the door is raised to a position wherein cable end piece 210 may again engage the hook 208 of the latch plate. The door 210 is allowed to move downwardly so that the ball stop 228 may be pulled from its position in the notch 230. The oven door and latch mechanism is now in normal operative condition and the oven may be closed as per previously described operations.

While the form of embodiment of the invention as herein disclosed constitutes a preferred form, it is to be understood that other forms might be adapted, as may come within the scope of the claims which follow.

What is claimed is as follows:

1. In combination a range having an oven, a door for said oven, means including an unobstructing hinge for supporting said door for pivotal movement throughout substantially 180° while said door is connected to said hinge, and means connected to said door throughout all of said pivotal movement for retaining said door in a closed position, a partly open broil position, a support position and an out of the way position.

2. In combination, an oven having a frame; a door on said frame; a striker on said door; means for supporting said door for pivotal movement throughout substantially 180° including a flexible bond connected to said door and carrying an enlarged portion; means for selectively latching said door comprising a support plate, a spring biased keeper pivotally mounted on said plate for engaging said striker in a first position to close said door and in a second position to hold said door slightly open, a stop bracket pivotally mounted on said plate for cooperating with said enlarged portion to limit the pivotal movement of said door at a third position, and a release lever connected to said stop bracket to prevent said bracket from cooperating with said enlarged portion thereby to release said door for pivotal movement beyond said third position; said stop bracket having a portion in the path of said striker when said door is closed, thereby to adapt said stop bracket for automatic return to a cooperating relationship with said enlarged portion.

3. In combination, an oven having a frame; a door on said frame; means for unobstructingly supporting said door for pivotal movement throughout substantially 180° while said door is connected to said frame and including a flexible bond connected to said door and having an enlarged portion positioned thereon; means for latching said door comprising a plate on said frame having a slot therein, a bond support pulley rotatably mounted on said plate, a rotatable latch pulley relatively slidably mounted adjacent said bond support pulley in said slot in said plate to form with said bond support pulley a restricted passage for passing the bond and selectively restricting the enlarged portion, a spring for yieldingly biasing said latch pulley in said slot toward said bond support pulley, and means cooperating with said spring to selectively limit the movement of said latch pulley in said slot thereby to retain said enlarged portion when said door is in a horizontal position.

4. In combination, an oven having a frame; a door on said frame; a striker on said door; means for supporting said door for pivotal movement throughout substantially 180° including a flexible bond connected to said door and carrying an enlarged portion; means for selectively latching said door comprising a support plate, a spring biased keeper pivotally mounted on said plate substantially coplanar with said striker for engaging said striker in a first position to close said door and in a second position to hold said door slightly open, a stop bracket pivotally mounted on said plate substantially coplanar with said enlarged portion and having a stop portion for cooperating with said enlarged portion to limit the pivotal movement of said door at a third position, and a release lever connected to said stop bracket to pivot said stop portion out of cooperating relationship with said enlarged portion thereby to release said door for pivotal movement beyond said third position.

5. In combination, an oven having a frame member; a door member on said frame member; a striker on one of said members; means for supporting said door for pivotal movement throughout substantially 180° including a flexible bond connected to said door and carrying an enlarged portion; means for selectively latching said door comprising a support plate on the other of said members, a spring biased keeper mounted on said plate substantially coplanar with said striker for engaging said striker in a first position to close said door and in a second position to hold said door slightly open, a stop bracket mounted on said plate substantially coplanar with said enlarged portion and having a stop portion for cooperating with said enlarged portion to limit the pivotal movement of said door at a third position, and a release lever connected to said stop bracket to pivot said stop portion out of cooperating relationship with said enlarged portion thereby to release said door for pivotal movement beyond said third position.

6. In combination, an oven having a frame; a door on said frame; means for supporting said door for pivotal movement throughout substantially 180° including a flexible bond connected to said door and carrying an enlarged portion; means for selectively latching said door comprising a support plate, a spring biased keeper mounted on said plate coplanar with a portion of said door for cooperating with said door portion in a first position to close said door and in a second position to hold said door slightly open, a stop bracket mounted on said plate substantially coplanar with said enlarged portion and having a stop portion for cooperating with said enlarged portion to limit the pivotal movement of said door at a third position, and a release lever connected to said stop bracket to pivot said stop portion out of cooperating relationship with said enlarged portion thereby to release said door for pivotal movement beyond said third position.

7. In combination, an oven having a frame, a door on said frame, striking means on said door, means for mounting said door for pivotal movement throughout substantially 180° while said door is connected to said frame and including a flexible bond connected to said door and retractable within said frame and having an enlarged portion, means on said frame for tensioning said bond, and means for selectively latching said door comprising, means substantially coplanar with said striking means for engaging said striking means in a first position when said door is closed and in a second position to hold said door slightly open, means substantially coplanar with said enlarged portion for limiting the pivotal movement of said door in a third position by selectively blocking said enlarged portion, and means for rendering said limiting means ineffective.

8. In combination; a frame defining an oven compartment and a control compartment overlying said oven compartment and having a side wall and a front wall; said front wall defining an access opening to said oven compartment, port means laterally adjacent to said access opening, and a recess having a release port above said port means; a door on said front wall; hinge means for mounting said door for pivotal movement throughout substantially 180° from a raised position to a dropped position while said door is connected to said front wall and including a flexible bond connected at one end to said door and retractable through said port means; a coil spring on said frame for tensioning said bond and extending parallel to said side wall behind and generally in line with said port means; and means for selectively latching said door comprising, a support bracket secured to said frame behind and in line with said port means and supporting the other end of said flexible bond, a U-shaped stop bracket pivotally mounted on said support bracket and having a top flange from each side of which depends a stop flange, a pulley between said stop flanges for guiding said bond, a release lever for pivoting said stop

bracket, said release lever secured to said top flange and extending to said release port to receive a manually operable actuator, said actuator adapted to be positioned in said recess when said door is in said raised position and outside of said recess when said door is in said dropped position, and a movable pulley bracket assembly having a pair of abutment flanges substantially coplanar respectively with said stop flanges and joined along one edge thereof to form a U-shaped pulley bracket, a pulley between said abutment flanges for receiving a portion of said flexible bond intermediate said ends and means for connecting said pulley bracket to said coil spring at said jointure of said abutment flanges, whereby said stop flanges engage said abutment flanges when said actuator is in said recess to limit the pivotal movement of said door in an intermediate position, and whereby said stop flanges disengage said abutment flanges when said actuator is operated out of said recess to facilitate pivotal movement of said door to its dropped position.

9. In combination, an oven having a frame; a door on said frame; a striker on said door; means for supporting said door for pivotal movement throughout substantially 180° including a flexible bond connected to said door and carrying an enlarged portion; means for selectively latching said door comprising a support plate, keeper means mounted on said plate substantially coplanar with said striker for engaging said striker in a first position to close said door and in a second position to hold said door slightly open, a stop bracket pivotally mounted on said plate and having a stop portion substantially coplanar with said enlarged portion for cooperating with said enlarged portion to limit the pivotal movement of said door at a third position, and a release lever connected to said stop bracket to pivot said stop portion out of cooperating relationship with said enlarged portion thereby to release said door for pivotal movement beyond said third position; said stop bracket having means actuated by said striker to automatically return said stop portion to a cooperating relationship with said enlarged portion.

10. In combination, an oven having a frame; a door on said frame; means for unobstructingly supporting said door for pivotal movement throughout substantially 180° while said door is connected to said frame and including a flexible bond having one end connected to said door throughout all of said pivotal movement and its other end connected to said frame adjacent said door, bracket means resiliently connected to said frame remote from said door and having a pulley for receiving a portion of said bond between the ends thereof; means for latching said door comprising a striker on said door and a keeper on said frame; a restraining means on said frame cooperating with said bracket means for limiting the pivotal movement of said door at a predetermined position, and means including a release lever on said frame to release said restraining means from engaging said bracket means

to permit pivotal movement of said door beyond said predetermined position.

11. In combination, an oven having a frame, said frame having a front wall defining an opening to said oven, a door on said frame for selectively covering said front wall, a striker pivotally mounted on said door, means for mounting said door for pivotal movement throughout substantially 180° including a flexible bond connected to said striker and carrying an enlarged portion, means for tensioning said bond, and means for selectively latching said door comprising a support means, a roller on said support means adjacent said flexible bond, yielding means for urging said striker and said roller into engagement in a first position to close said door and in a second position to hold said door slightly open, a latch flange pivotally mounted on said support means for cooperating with said enlarged portion to limit the pivotal movement of said door at a third position, and means for releasing the limiting effect resulting from the cooperation of said enlarged portion and said latch flange thereby to release said door for pivotal movement beyond said third position, said releasing means including a release lever accessibly positioned on said front wall and connected to said latch flange.

12. In combination, an oven having a frame, said frame having a front wall defining an opening to said oven, a door on said frame for selectively covering said front wall, a striker pivotally mounted on said door, means for mounting said door for pivotal movement throughout substantially 180° including a flexible bond connected to said striker and carrying an enlarged portion, means for tensioning said bond, and means for selectively latching said door comprising a support means, a roller on said support means adjacent said flexible bond, yielding means for urging said striker and said roller into engagement in a first position to close said door and in a second position to hold said door slightly open, a latch flange pivotally mounted on said support means for cooperating with said enlarged portion to limit the pivotal movement of said door at a third position, and means for releasing the limiting effect resulting from the cooperation of said enlarged portion and said latch flange thereby to release said door for pivotal movement beyond said third position, said releasing means being adapted to automatically reestablish the limiting effect resulting from the cooperation of said enlarged portion and said latch flange when said door is returned to said first position.

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