Nov. 22, 1966 W. F. HOPPE 3,286,706

DETACHABLE OVEN DOOR

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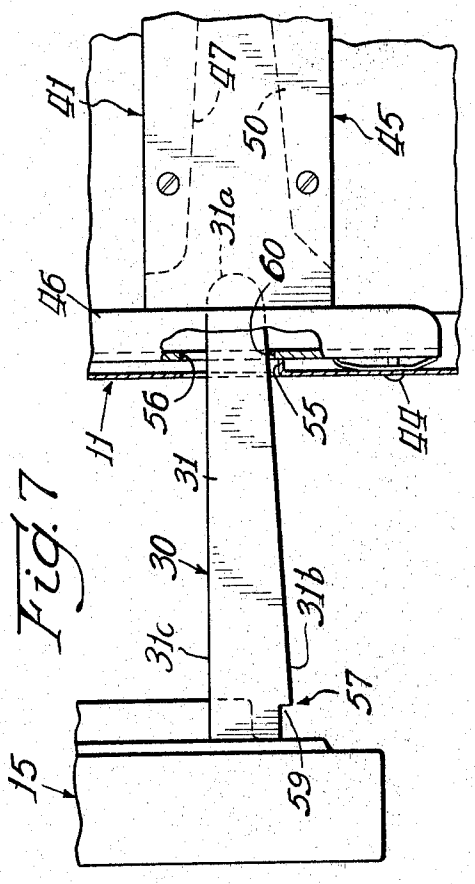


Fig. 7

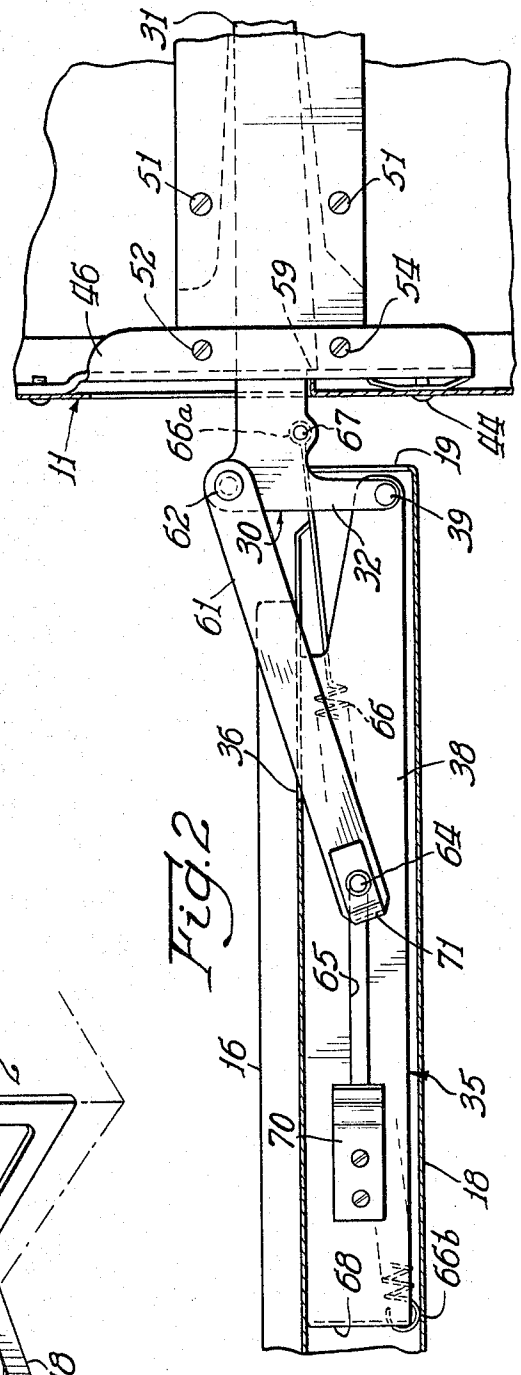


Fig. 2

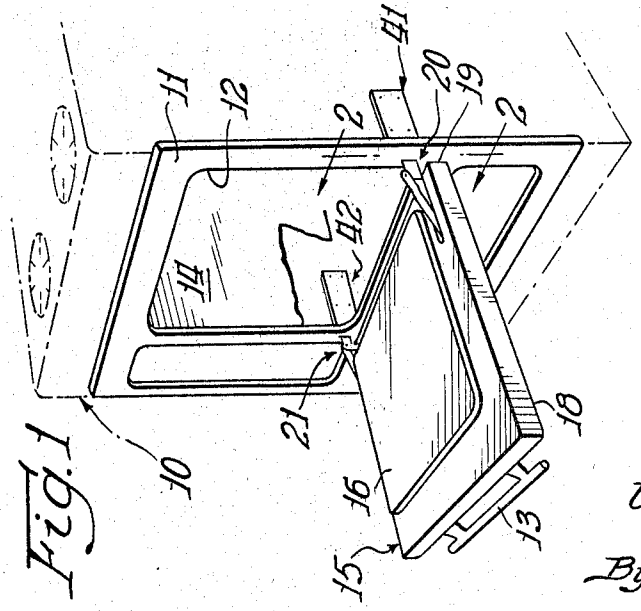


Fig. 1

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Fig. 3

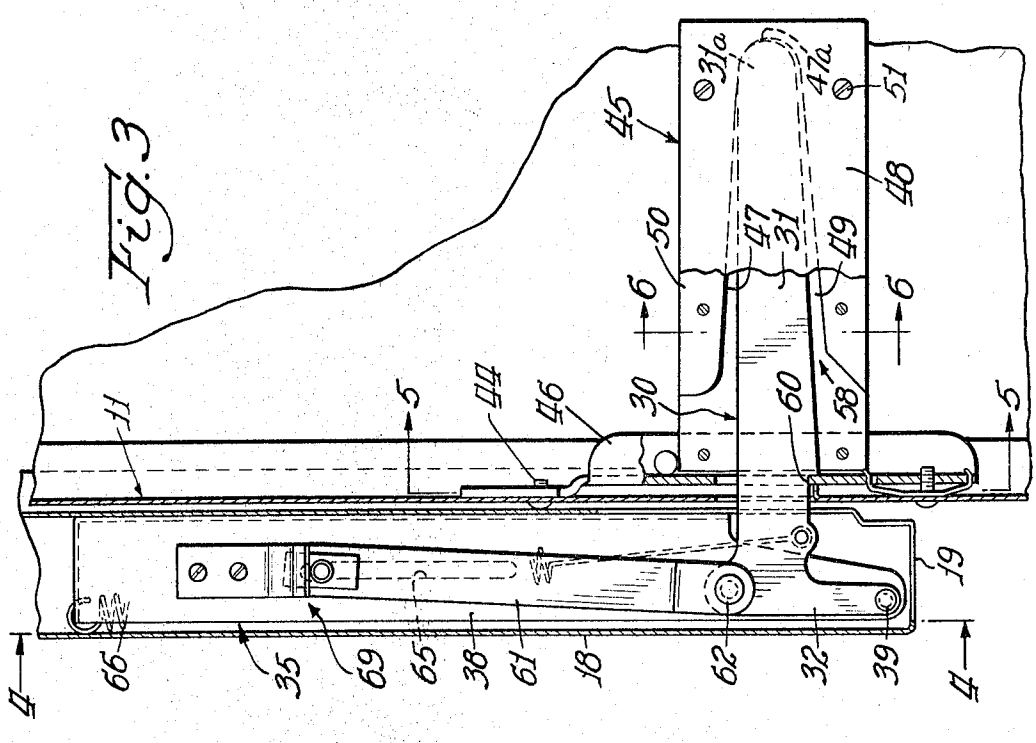


Fig. 4

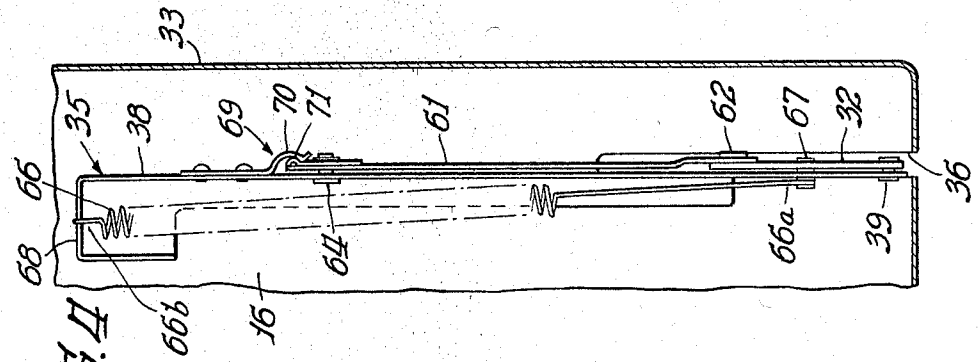


Fig. 5

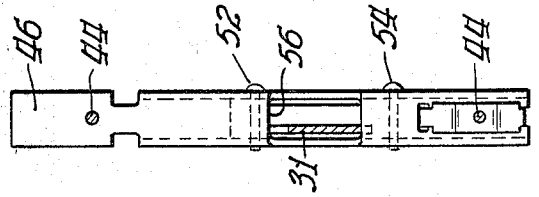
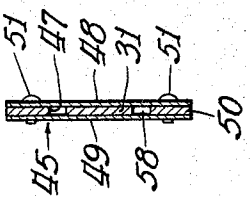


Fig. 6



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DETACHABLE OVEN DOOR

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The present invention relates to doors as used with cabinets and more particularly to support structures for such doors permitting detachment of the latter.

Ovens, comprising a part of a range, are an example of an installation using a removable door. They are used in that instance because the door, when open, projects outwardly and a person must maneuver thereabout to reach portions of the oven interior for cleaning, repairing and other maintenance jobs. Thus, it is desirable to have the oven door removable to permit access to the oven interior with a minimum of difficulty. Furthermore, a door support structure permitting detachment of the oven door but leaving parts projecting from the oven, does not solve the problem as the projections are a nuisance in working about the front of the oven.

Accordingly, it is an object of the present invention to provide a support structure for an oven door which permits easy removal or detachment of the door, yet assures positive holding of the door support structure under ordinary operating circumstances. Along this line, it is an object to provide a door support structure which permits of complete removal so that no extending or projecting structure is left about the front of the oven after the door is removed.

It is a more detailed object of the present invention along the lines of the above to provide an oven door supporting structure easily operated to remove the door from the oven and which, both provides a counterbalancing force on the door to ordinarily maintain it closed and a limit stop to hold the door in a substantially horizontal or other desirable plane when fully opened.

It is an additional object of the present invention to provide a safety means for releasably holding the door closed once it is swung to the latter position.

It is an overall object of the present invention to provide an oven door support structure permitting quick removal of the door from the oven and which structure is economical to manufacture and easy to maintain yet facilitates the cleaning of ovens and other activities which require easy access to the oven interior.

Other objects and advantages of the invention will become apparent upon reading the following detailed description and upon reference to the drawings in which:

FIG. 1 is a fragmentary section of a range embodying an oven door constructed in accordance with the present invention;

FIG. 2 is an enlarged elevational section taken along 2—2 in FIG. 1 showing details of the door structure;

FIG. 3 is an enlarged elevational section taken substantially along the same reference as FIG. 2 except that the door is in a closed position;

FIG. 4 is a section taken along 4—4 in FIG. 3;

FIG. 5 is a section taken along 5—5 in FIG. 3;

FIG. 6 is a section taken along 6—6 in FIG. 3; and

FIG. 7 is an enlarged elevation of the oven door support structure shown partially installed in the oven frame.

While the invention will be described in connection with the preferred embodiment, it will be understood that I do not intend to limit that invention to that embodiment. On the contrary, I intend to cover all alternatives, modifications, and equivalents as may be included in the spirit and scope of the invention as defined by the appended claims.

Turning to the drawings, shown in FIG. 1 is a range

10 having a front frame 11 defining an opening 12 for an oven 14. A door 15 having a handle 13 is constructed of an inner panel 16 and an outer panel 18 hingedly supported along an axis substantially parallel to a door lower edge 19 by respective door-and-frame assemblies 20, 21.

In accordance with the present invention the assemblies 20, 21 are of a new and novel construction to permit selective installation and removal of the oven door 15 in respect of the oven frame 11. The assemblies are identical in construction and operation, two being provided to support opposite sides of the door, thus, only one door-and-frame assembly 20 is explained in detail. The assembly 20 includes, in the door carried portion of the structure, a door support arm 30 including an extending portion 31 and an integral transverse portion 32 (see FIG. 2). For permitting pivotal connection between the door 15 and the arm transverse portion 32, carried in the door between panels 16, 18 and substantially parallel to door side edge 33, is a hinge brace 35. The arm portion 32 extends through a slot 36 in the door inner panel 16 and is connected to a longitudinal wall portion 38 of the hinge brace by a pivot pin 39. The arm transverse portion 32 and pin 39 are positioned outward of the oven frame 11 so that the door lower edge 19 can swing by the frame when the door is opened. To provide a tight fit between peripheral portions of the door inside panel 16 and the oven frame 11 when the door is swung upward to its closed position, the arm transverse portion 32 and pin 39 support the door a predetermined distance from the frame. Accordingly, a seal of the oven enclosure is effected to eliminate substantially all escape of heat from the oven.

Complementary structure is carried by the oven frame to selectively receive and hold the door support arm 30, in the present instance it takes the form of respective sheaths 41, 42 provided at the opposite sides of the oven opening suitably fastened to the frame 11, illustratively, by screws 44. Taking sheath structure 41 as exemplary, it includes, as best shown in FIG. 3, an arm receiving and holding portion 45 and a sheath anchoring bracket 46. The arm receiving and holding portion 45 is comprised of a pair of planar members 48, 49, constructed for example of sheet metal, outboard of a spacer 50. As best shown in FIG. 7, a plurality of screws 51 hold the planar members 48, 49 and the spacer 50 sandwiched together.

Additional screws 52, 54, as best shown in FIG. 5, are inserted through openings at the front end of the planar members and join the latter with the sheath anchoring bracket 46. An opening 55 is provided in the front panel 11 which communicates with a slot 56 in the sheath anchoring bracket 46. Thus, in the present instance, an access passage or opening is defined by the frame opening 55 and the mounting bracket slot 56 through which the arm extending portion 31 is insertable for installation in a pocket 58 defined by the two planar members 48, 49 and a recess 47 in the spacer 50. The sheath anchoring bracket 46 is constructed of suitable material so that it can carry the weight of the door.

Engaging means are provided to hold the support arm 31 in position once it is received by the sheath 41, in the present instance the engageable means include a notch 59 cut in a lower edge 57 of support arm 31, and a transverse ledge 60 defining the lower end of the slot 56 in the sheath anchoring bracket 46. An end 31*a* of the arm is complementarily shaped to fit into the pocket defined by the spacer 50 so that when the arm 31 is inserted as far as it will go, the notch 59 provides a catch into which the ledge 60 fits. Accordingly, the door support arm 31 is tightly held by the sheath 41. The arm 31 is held so that it supports the door to provide clearance between

the lower edge 19 and frame 11 permitting opening of the door, while bringing the peripheral portion of door inner panel 16 flush against the frame when the door is raised to a vertical position closing the oven.

As another feature of the present invention, easy removal of the door support arm from the sheath structure is permitted simply by lifting the door. To this end, the spacer recess 47 and a support arm end 31*a* are complementarily shaped in a rounded form, and space is provided in the recess above and below the support arm edges so that the support arm can be pivoted upon lifting of the door. Initial lifting causes the arm 31 to slide relative to the spacer so as to disengage the notch 59 and ledge 60. Thereafter, continued lifting causes outward movement of the support arm, in a path determined by the recess shape, so that a portion 31*b* of the support arm lower edge rides up onto the ledge 60. The support arm extending portion includes the rounded end 31*a*, the lower edge 31*b* and an upper edge 31*c*. The shape of the latter as well as the sheath recess 47, are such that the lower and upper edges are received in the pocket in spaced relationship except for the rounded end 31*a* which engages a sheath pocket rounded portion 47*a*. Though a curvilinear form is shown for the support arm extending portion end 31*a* and the complementarily-shaped recess portion 47*a*, these interfitting structures can take other shapes permitting the explained camming action in response to lifting of the door 15. Subsequently, simply pulling out on the door removes it from the range frame.

To support the door in a substantially horizontal plane when opened, as shown in FIG. 2, a door limit stop member 61 is provided. As herein shown, one end of the door limit stop member 61 is pivotally attached to the support arm transverse portion by a pivot pin 62. The other end of the limit stop member 61 is connected to the hinge brace side wall 38. As here shown, the connection includes a pin 64 received in a slot 65 formed in brace side wall 38. The pin 64 is formed so that it cannot disengage from the hinge brace while the slot coupling permits both pivotal and sliding movement between the hinge brace wall 38 and the stop member 61. It is necessary for the pin to slide longitudinally relative to the edge 33 of the door 15, so that when the door is raised to a vertical position, the stop member articulates and the door can close tight against the range front frame. The stop member 61 is connected to the transverse support arm portion 32 at a point above the pivot pin connection hinging the door to the support arm, so that it can counteract the weight of the door acting about the pivot pin.

To provide a counterbalancing force for the door so that it does not open too quickly, and also to bias the door in its closed position, a spring 66 is provided. An end 66*a* of the spring is connected to the door support arm 30 by pin 67, and an opposite end 66*b* is connected to a transverse portion 68 of the hinge brace 36. The spring 66 is also connected to the support arm transverse portion 32 above the pivot pin 39. Accordingly, the spring counteracts the weight of the door and also applies a biasing force to the door urging it in a direction to effect closing of the oven.

To provide a safety hold for the oven door in the closed position, a catch 69 is provided on the hinge brace wall 38 (see FIGS. 3, 4). In the present instance the catch 69 includes a spring member 70 of the leaf type which engages with a projection 71 on the end of door limit member 61. Thus when the door is raised and the door limit member moves along slot 65 to its upper extreme position, the projection 71 will snap under the leaf spring 70 and hold the door in a closed position. Upon pulling open of the door the spring 70 and projection 71 disengage and permit the door to be swung open.

In operation, to remove the door the handle 13 is manually grasped and the door is raised. Because of the complementary rounded shape of support arm end 31*a* and sheath recess portion 47*a* the door support arm 31 is cammed or pivoted upwardly disengaging the notch 59 and the ledge 60. This camming action permits easy removal of the door, yet the engaging parts support the door rigidly so that the oven opening is not accidentally uncovered permitting the heat to escape and cause injury or fire danger while being used. Additional upward pull on the door will cause the door support arm edge 31*b* to ride up onto the ledge 60. Thereafter, the door can be simply pulled outwardly and carried away from the range. There are no projecting parts left as the range part of the coupling structure is fully enclosed behind the front frame 11.

To install the door, the support arm 30 is simply inserted through slot 55 and opening 56 into the receiving pocket 57 defined by the spacer 50 and the sheath planar sides 48, 49. When the notch 59 and ledge 60 engage the weight of the door assures a positive lock. Since the door weight is never lifted off of the pivot pin 39 during normal use, the support arm 40 carries the door weight and maintains the notch and ledge positively engaged.

It is, of course, understood that the structure and operation of the door-and-frame assembly 21 on the other side of the oven, supporting the other side of the door, is the same except for possible mirror image construction of certain structures to permit their use on that side of the oven. Though particular engaging means have been described for holding the door support arm attached to the frame, other forms of structure utilizing the weight of the door to effect positive locking and complementary shape of parts to permit camming disengagement are within the scope of the present invention.

What is claimed is:

1. In a range, the combination comprising a frame defining an opening in an oven or the like, a door for normally closing said opening, a sheath associated with said frame having an access opening and defining a pocket, said sheath pocket terminating in a rounded portion, a longitudinally extending door support arm having lower and upper edges, respectively, and opposite ends, said lower and upper edges being received in said pocket in spaced relationship with one of said arm ends being rounded to engage said sheath rounded portion, means at the opposite end of said arm for pivotally carrying said door, a notch provided in said arm lower edge and positioned a predetermined distance from said means for pivotally carrying said door, a slot in said frame exposing said sheath access opening, a ledge associated with said slot, said arm insertable into said sheath through said slot and said notch engageable with said ledge to hold said arm in position permitting pivoting of said door to close said oven opening, said sheath rounded portion and said arm rounded end complementarily shaped to cam said notch and ledge out of engagement upon lifting of said door thereby permitting selective removal of said door from said oven, said door weight normally acting on said arm to maintain said notch and ledge engaged.

2. The combination of claim 1 including safety means carried by said door operated upon closing of said door to prevent accidental opening of said door.

3. In a range, the combination comprising a frame defining an opening for an oven or the like, a door for normally closing said opening having a bottom edge extending between opposite sides, a longitudinally extending door support arm having lower and upper edges, respectively, and opposite ends, means carried by said door and positioned in predetermined relationship to said door lower edge for pivotal connection with one of said support arm ends, a sheath carried by said frame having an access opening and forming a pocket terminating in a rounded surface, said arm insertable into said sheath through said access opening, said other support arm end and sheath complementarily-shaped to effect camming action in response to lifting of said door, said pivotal connection permitting swinging of said door between oven open and oven closed positions, a counterbalance spring acting on said door about said pivotal connection to normally exert a

spring force on said door tending to move the latter toward said oven closed position, a ledge carried by said frame positioned below said sheath access opening, and a notch in the lower edge of said extensible arm engageable with said ledge when said arm is inserted in said sheath, said ledge and said sheath holding said arm tightly to provide a solid support therefor, said ledge and notch disengageable by lifting upwardly and pulling away on said door to remove the latter from said range.

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