April 8, 1969 G. E. PRICE 3,437,087

HINGE ASSEMBLY

Filed April 18, 1967 Sheet 1 of 2

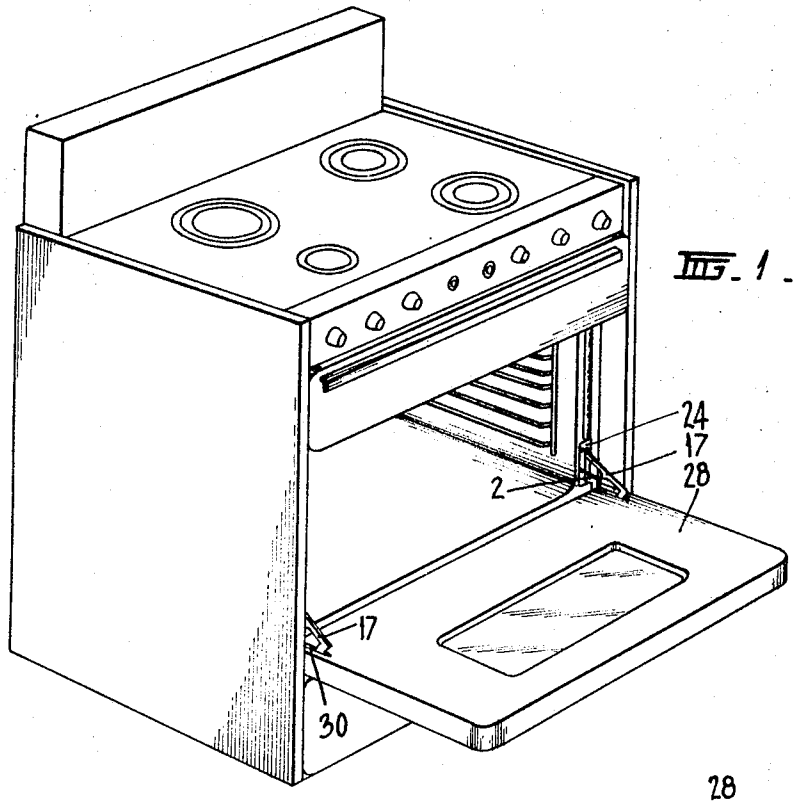


FIG. 1.

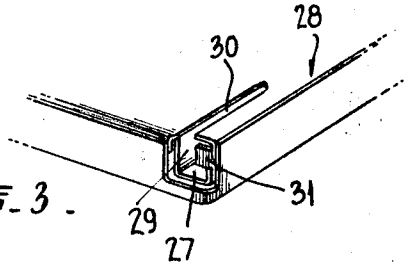


FIG. 3.

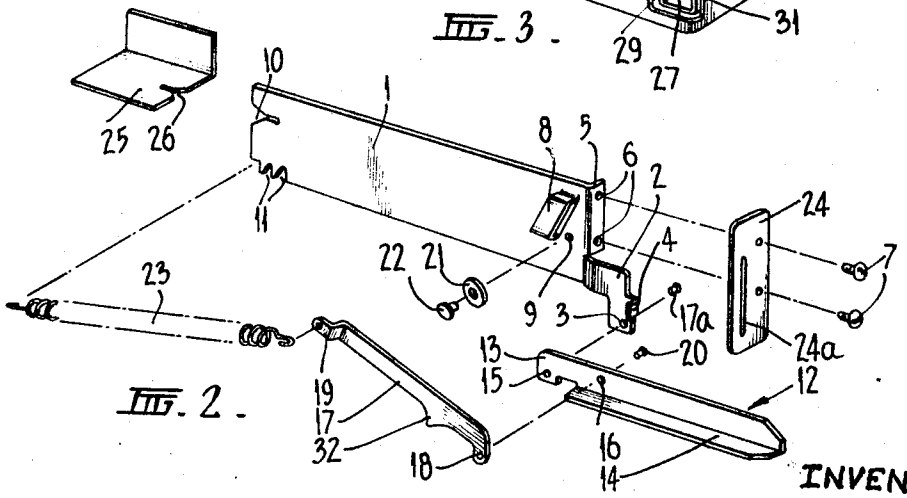


FIG. 2.

INVENTOR

GEORGE E. PRICE

Smiley & Smiley

ATTYS.

April 8, 1969 G. E. PRICE 3,437,087

HINGE ASSEMBLY

Filed April 18, 1967 Sheet 2 of 2

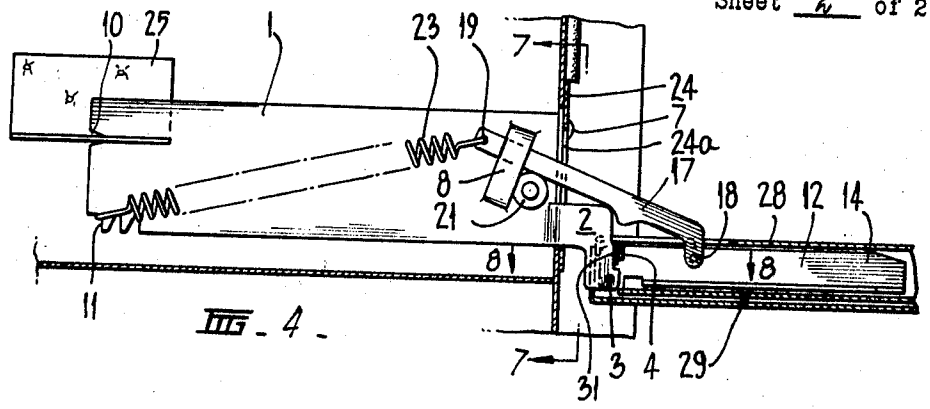


FIG. 4.

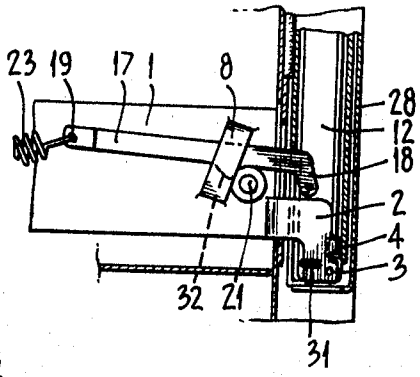


FIG. 5.

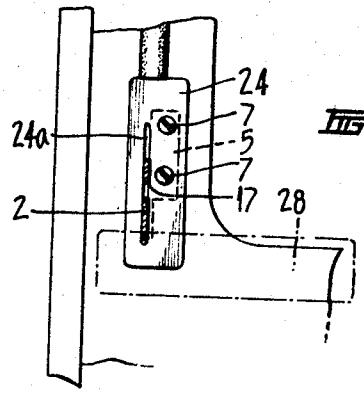
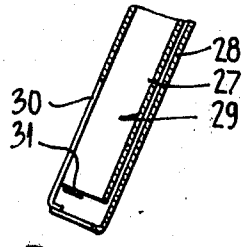


FIG. 7.



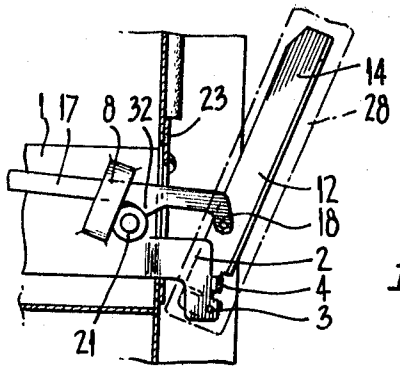


FIG. 6.

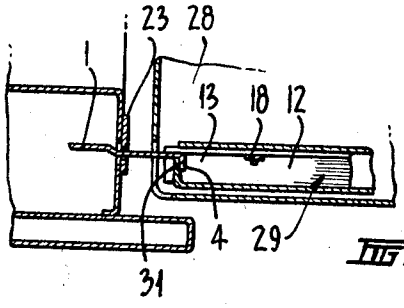


FIG. 8.

INVENTOR

GEORGE E. PRICE

Smiciie & Smiley

Attys.

United States Patent Office 3,437,087
Patented Apr. 8, 1969

3,437,087

HINGE ASSEMBLY

George Edmond Price, Essendon, Victoria, Australia, assignor to Craig & Seeley Limited, Brunswick, Victoria, Australia, a corporation of Victoria, Australia

Filed Apr. 18, 1967, Ser. No. 631,692
Claims priority, application Australia, Apr. 27, 1966, 4,692/66
Int. Cl. F24c *15/02*; F23m *7/00*
U.S. Cl. 126—191 15 Claims

ABSTRACT OF THE DISCLOSURE

A unitized hinge assembly comprising an elongate substantially flat support plate formed with an integral hinge bracket at one end, a door-engaging arm pivotally connected to said bracket and a tension rod pivotally secured to the arm at one end and secured, through a tension spring, at the other end to the support plate, the door-engaging arm, tension rod and plate being arranged in substantially parallel contiguous planes to enable housing of the unit in narrow spaces. The unit is easily fitted to and removed from its housing body.

This invention relates to an improved hinge assembly for a door and more particularly to a hinge assembly for the oven door of a domestic or industrial cooking stove.

In most modern stoves, the oven door opens downwardly about a horizontal axis and some form of biasing mechanism is usually provided to assist in closing the door and maintaining it firmly closed. Such biasing mechanisms take many forms the most common being a pair of tension springs each connected at one end by an arm or the like to one side of the oven door and at the other end to the stove or some other fixed point. The arms and tension springs are usually housed in a space between the side walls of the oven and the body of the stove and thus are accessible only by removing some part of the stove body. Thus it is extremely difficult to service these parts if this is required.

It is accordingly an object of the present invention to provide a hinge assembly, including a biasing mechanism which is fitted as a unit and which may be removed quickly and conveniently if service is required.

According to the invention there is provided a unitized hinge assembly comprising a rigid support having a pivot connection for a pivotable member, means connected to said support and said pivotable member for biasing said member in one direction, said pivot connection and connections between said rigid support and biasing means being such that said biasing means and pivotable member are disposed in substantially parallel and contiguous planes.

In order that the invention may be more readily understood, a preferred embodiment will now be described with reference to the accompanying drawings wherein:

FIGURE 1 is a perspective view of a domestic stove to which the hinge assembly according to the invention is fitted;

FIGURE 2 is an exploded view of the hinge assembly showing the various components thereof;

FIGURE 3 is a partial perspective view of the oven door;

FIGURE 4 is a partial sectional elevation of the stove with the oven door open showing the fitting of the hinge assembly thereto;

FIGURE 5 is a partial sectional elevation of the stove with the oven door closed showing the position of some of the hinge assembly components;

FIGURE 6 is a partial sectional elevation of the stove with the oven door partly open to enable removal of the door from the hinge assembly; and

FIGURES 7 and 8 are partial sectional views taken along lines 7—7 and 8—8 respectively of FIGURE 4.

The hinge assembly includes an elongate, substantially flat sheet metal support plate **1** having an integrally formed hinge bracket **2** at one end which is displaced laterally slightly from the rest of the plate **1**. The bracket **2** has a pivot pin aperture **3** adjacent its free end and a lateral abutment **4** extending from its forward edge.

At the connection between the plate **1** and bracket **2**, the remaining edge of the plate **1** is formed into a securing flange **5** provided with two vertically spaced apertures **6** through which securing screws **7** may pass to engage the stove body.

The plate **1** is also formed with an integral, laterally-pressed U-bracket **8** which is disposed angularly with respect to the longitudinal centreline of the plate **1**. A small aperture **9** is provided in the plate **1** just forwardly of and slightly above the lower leg of the U-bracket **8**, as will be clear from the drawings.

At its inner end, the plate **1** is formed with a V-shaped slot **10** extending inwardly from the free edge. The plate is also formed with three notches **11** in its lower edge adjacent the inner end. The purposes of the slot and notches will become apparent below.

The hinge assembly also includes a door-engaging arm **12** having a short flat portion **13** at one end to which is integrally connected an angular portion **14** formed with a taper at its free end. The arm **12** is provided with two spaced parallel pivot pin apertures **15** and **16**, aperture **15** being adjacent the end of flat portion **13** and aperture **16** being positioned in the angular portion **14** adjacent the flat portion **13**.

The arm **12** is pivotally connected to hinge bracket **2** by means of a pivot pin **17** engaging apertures **15** and **3** respectively with the flat portion **13** disposed on the opposite side of bracket **2** to lateral abutment **4**. The length of flat portion **13** is such that the arm **12** may be pivoted in a vertical plane without the angular portion **14** engaging the abutment **4**. However, the angular portion **14** will engage the forward edge of the bracket **2** when the arm **12** is disposed vertically as will be clear from FIGURE 5.

The assembly further includes a tension rod **17** having an apertured nose **18** at one end and a laterally offset apertured portion **19** at the other. The rod **17** is pivotally connected to the arm **12** by a pivot pin **20** engaging apertured nose **18** and aperture **16** respectively. The rod **17** extends rearwardly from the arm **12** and passes through the U-bracket **8** where it is supported in a vertical direction by a nylon roller **21** on axle member **22** engaged in the aperture **9** in the support plate **1**. The offset end **19** of the rod **17** is engaged by an end tension spring **23**, the other end of which engages one of notches **11** in the plate **1**. Thus, the tension arm **17** tends to pull the door-engaging arm **12** rearwardly. The length of the rod **17** is such that the offset end **19** engages the rear edge of the U-bracket **8** when the arm **12** is horizontally disposed. This is clearly illustrated in FIGURE 4 of the drawings.

It will be evident that the rod **17** and arm **12** are disposed to operate in contiguous vertical planes which are in turn contiguous to the plane in which the support plate **1** is disposed. Thus the overall width of the unit is small and this allows the fitting of the unit in narrow spaces.

In use, the hinge assembly is adapted to be secured to the stove between the side wall of the oven and the body of the stove adjacent the bottom of the oven. The front of the assembly is secured to the stove by means of screws **7** and for neat appearance a cover plate **23** having a vertical slit **24** through which the bracket **2** and arm **17** pass

is positioned between the screws 7 and the securing flange 5. To secure the other end of the assembly, a right angled bracket 25 having a V-shaped slot 26 similar to slot 10 in plate 1 is secured to the side wall of the oven in such a manner that the plate 1 and slotted part of the bracket 25 are mutually perpendicular. When the plate 1 is inserted into the stove body, the slots 10 and 26 engage so that the assembly is firmly supported as shown in FIGURE 4.

The door-engaging arm 12 is adapted to be received in a square U-shaped channel member 27 secured within the oven door 28 at each side to define an open-ended pocket 29. A slit 30 opening into the pocket 29 is provided in the door 28 for the hinge bracket 2 and rod 17. It will be clear from the drawings (FIGURES 3 and 6) that the channel member 27 has one end located inwardly of the lower edge of the door so that the free end of the hinge bracket 2 will be located substantially within the door 28 to present a pleasing appearance.

To prevent accidental removal of the door 28 during opening, a lug 31 is provided extending across the open end of the channel member 27. Thus when the door 28 is positioned on the arms 14, the lug 31 will be positioned inwardly of the abutment 4 on the hinge bracket 2. At all angular positions of the door past about 20° or 30° from the vertical, the removal of the door 28 from the arms 14 is prevented by engagement between the lug 31 and abutment 4. When the door is in the horizontal position, the lug 31 and abutment 4 are in full engagement as shown in FIGURES 4 and 8. When the door is at approximately 20° to 30° to the vertical, the door may be removed as shown in FIGURE 6 since the lug 31 will clear the abutment 4.

To locate the door 28 in the above position for easy removal of the door from the arms 12, the tension rod 17 is provided with a lobe 32 on the edge thereof which engages the roller 21. The lobe 32 is of such dimensions and is so positioned on the rod 17 that when the door 28 is in the angular position required for removal, the lobe 32 will be positioned forwardly of the roller 21 to prevent self-closure of the door 28 (FIGURE 6). The door 28 may also be maintained in this position for airing of the oven. The door 28 may be closed by applying sufficient force thereto to displace the arm 17 upwardly and rearwardly over the roller 21. The lobe 32 then engages behind the roller 21 to assist in maintaining the door 28 in the closed position.

When the hinge assembly requires service, the oven door 28 is opened till the lobe 32 is engaged forwardly of the roller 21, the door 28 removed from the arms 12, the two screws 7 removed from each cover plate 28 and the assembly withdrawn from the stove body. Then any service function may be performed quickly and effectively since full access is gained to all components of the assembly. In a similar manner, the assembly may be quickly and easily fitted to the stove which is of advantage during the initial assembly of the stove. Thus the hinge assembly is of a unitized or cartridge form which assists in servicing and initial assembly of the stove.

The door need not necessarily be of the removable type and in such a case the hinge bracket and tensioin rod would be pivotally secured to the sides of the door or in some other suitable manner. To service the hinge assembly in this case, the door is opened fully and the assemblies removed as above.

In an alternative embodiment which is not shown in the drawings, the suppport plate 1 is replaced by a substantially shallow channel member of approximately the same width as the plate. The integral hinge bracket 2 and U-bracket 8 are replaced by a separate substantially L-shaped bracket secured to the base of the channel member adjacent one end thereof with the long leg of the L extending between the sides of the channel. Thus the short leg extends from the end of the channel adjacent one side and it is provided with a downwardly and forwardly extending nose formed with a pivot pin aperture. The long leg of the bracket is formed with an offset so that a major portion of the leg is spaced from and parallel to the base of the channel but within the confines of the channel. The offset portion acts as a stop for the tension rod.

Adjacent the other side of the channel, a roller is positioned between the base and the offset part of the bracket for rotation about an axis perpendicular to the base. The axle for the roller is constituted by one of the rivets which secures the bracket in position in the channel.

The door-engaging arm is identical to that shown in the drawing and it is pivotally connected to the bracket. The tension rod, which extends between the offset and the base of the channel and is pivotally connected to the door-engaging arm, is substantially identical to the rod 17 except that the lobe is on the upper edge of the rod since this is the edge which engages the roller. The rod is formed with a further lobe adjacent its apertured nose which prevents the rod from being pulled fully into the channel. This prevents the door-engaging arm from hitting and chipping the enamel from the stove surrounding the hinge assembly when the assembly is being fitted on the assembly line. It will be evident that the embodiment described with reference to the drawings could also be modified in this manner.

The remaining construction of the assembly is substantially the same as the above described embodiment and its operation is identical.

I claim:

1. In a structure having an opening, a door for said opening, and a unitized hinge assembly for mounting said door on said structure, said hinge assembly comprising a rigid support member having a hinge bracket extending from one end thereof, a rigid arm pivotally connected between said hinge bracket and said door to facilitate pivotal movement of said door about said hinge bracket, means connected to said support member and to said rigid arm for biasing said arm to pivot to close said door when engaged with said rigid arm, said rigid support member having a flange at said one end overlying and removably secured to said structure and said support member being constructed to allow the assembly to be secured to and removed from a narrow space in the structure wholly from a position outside the structure, said door being provided with a channel member to form an elongate open-ended pocket, said rigid arm being received within said pocket, said channel member having a stop means formed at the open end of said pocket there being a lateral abutment on said hinge bracket which is arranged to engage said stop means at all but a small range of angular dispositions of the door with respect to the support member.

2. The assembly according to claim 1, wherein said rigid support comprises an elongate substantially flat plate having said hinge bracket formed integrally therewith and having an aperture, a pivot pin in said aperture engaging said rigid arm.

3. A unitized hinge assembly for a door closing an opening in a structure, comprising a rigid support member having a hinge bracket extending from one end thereof, a rigid arm pivotally connected to said hinge bracket and formed to engage said door to facilitate pivotal movement of the door about said hinge bracket, means connected to said support member and to said rigid arm for biasing said arm to pivot to close said door when engaged with said rigid arm, said rigid support member having a flange at said one end for securing the assembly to the structure and being constructed to allow the assembly to be secured to and removed from a narrow space in the structure wholly from a position outside the structure, said biasing means comprising a substantially flat rod pivotally connected at one end to said rigid arm at a point spaced towards the free end of the arm from its pivot connection to said hinge bracket, said rod being formed

with an offset at the other end which is adapted to engage a stop member on said rigid support when the rigid arm is in the pivoted position it assumes when the door is fully open, and a tension spring connected to said offset end of said rod and to said support.

4. A unitized hinge assembly according to claim 3, wherein said rod is supported on a roller mounted on said support and rotatable about an axis substantially perpendicular to said support, said rod having a lobe formed on the edge which contacts said roller, said lobe being positioned so as to maintain said rigid arm at two angular dispositions relative to the hinge bracket.

5. A unitized hinge assembly according to claim 3, wherein said stop is constituted by a U-shaped bracket formed integrally with the support, said rod being disposed between the bracket and support so as to confine lateral displacement of the rod.

6. The assembly according to claim 1, wherein said rigid support is formed with a V-shaped slot at the other end thereof and a support bracket secured to the structure and removably engaged with said V-shaped slot.

7. A unitized hinge assembly for a door closing an opening in a structure, comprising a rigid support member having a hinge bracket extending from one end thereof, a rigid arm pivotally connected to said hinge bracket and formed to engage said door to facilitate pivotal movement of the door about said hinge bracket, means connected to said support member and to said rigid arm for biasing said arm to pivot to close said door when engaged with said rigid arm, said rigid support member having a flange at said one end for securing the assembly to the structure and being constructed to allow the assembly to be secured to and removed from a narrow space in the structure wholly from a position outside the structure, said rigid support having a V-shaped slot at the other end thereof and a support bracket secured to the structure and removably engaged with said V-shaped slot, said support bracket being formed with a similar V-shaped slot, the slotted portions of said support and said bracket being mutually perpendicular when engaged.

8. A unitized hinge assembly for a door closing an opening in a structure, comprising a rigid support member having a hinge bracket extending from one end thereof, a rigid arm pivotally connected to said hinge bracket and formed to engage said door to facilitate pivotal movement of the door about said hinge bracket, means connected to said support member and to said rigid arm for biasing said arm to pivot to close said door when engaged with said rigid arm, said rigid support member having a flange at said one end for securing the assembly to the structure and being constructed to allow the assembly to be secured to and removed from a narrow space in the structure wholly from a position outside the structure, and a rectangular cover plate having a slot through which said hinge bracket and biasing means may project to be connected to said rigid arm.

9. The assembly according to claim 1, wherein said rigid support comprises an elongate substantially shallow channel member, said hinge bracket being disposed in a plane slightly laterally displaced from the plane of the base of said channel member so that said rigid arm pivots in a plane substantially coincident with that of said base.

10. A unitized hinge assembly for a door closing an opening in a structure, comprising a rigid support member having a hinge bracket extending from one end thereof, a rigid arm pivotally connected to said hinge bracket and formed to engage said door to facilitate pivotal movement of the door about said hinge bracket, means connected to said support member and to said rigid arm for biasing said arm to pivot to close said door when engaged with said rigid arm, said rigid support member having a flange at said one end for securing the assembly to the structure and being constructed to allow the assembly to be secured to and removed from a narrow space in the structure wholly from a position outside the structure, said rigid support comprising an elongate substantially shallow channel member, said hinge bracket being disposed in a plane slightly laterally displaced from the plane of the base of said channel member so that said rigid arm pivots in a plane substantially coincident with that of said base, said hinge bracket comprising a substantially L-shaped member secured to the base of said channel member adjacent said one end with the short leg of said L-shaped member extending from said one end adjacent one side of the channel, said short leg having an aperture receiving a pivot pin which also engages said rigid arm.

11. A unitized hinge assembly according to claim 10, wherein the long leg of said L-shaped bracket is offset to be disposed in a plane spaced from and substantially parallel to the base of said channel, said biasing means extending between said offset portion and said base.

12. A unitized hinge assembly according to claim 11, wherein said biasing means comprises a substantially flat rod pivotally connected at one end to said rigid arm at a point spaced from its pivot connection to said hinge bracket, said arm being formed with an offset at the other end which is adapted to engage said offset portion of said L-shaped bracket when the door is fully open and a tension spring connected to said offset end of said rod and to said support and wherein a roller is mounted between the base and said offset portion, one longitudinal edge of said rod bearing on said roller.

13. A unitized hinge assembly according to claim 12, wherein said rod has a lobe formed on the edge which contacts said roller, said lobe being positioned so as to maintain said rigid arm at two angular dispositions relative to the support.

14. A unitized hinge assembly according to claim 13, wherein a further lobe is provided forwardly of said lobe, said further lobe being positioned to prevent said rigid arm from engaging the front of the support.

15. In an oven structure having an opening bounded in part by opposite side faces, a door for closing said opening, and a unitary hinge assembly for pivotally mounting said door for opening and closing movement,

said hinge assembly comprising a pair of arms carried by said door, a support member pivotally attached to each arm, and means connected to said arms and said support members for biasing said arms to close the door,

each support member having an inner end projecting into the oven structure and an outer end lying outside the oven structure, each outer end having a flange lying against a corresponding side face,

means in said oven structure engaging said inner ends of the support member to hold them in place when said flanges are against said side faces, and

removable fasteners connecting said flanges to said side faces whereby the hinge assembly may be secured to and removed from the oven structure wholly from a position outside the structure.

References Cited

UNITED STATES PATENTS

2,264,059	11/1941	Weimer et al.	126—191
2,313,582	3/1943	Rees	126—191
2,492,084	12/1949	Almquist	126—191
2,541,942	2/1951	Sherman	126—194
3,040,731	6/1962	Mudd	126—191
3,170,455	2/1965	Gass	126—194
2,780,219	2/1957	Pollock	126—194
3,286,706	11/1966	Hoppe	126—194
3,072,117	1/1963	Stoligrosz et al.	126—191

KENNETH W. SPRAGUE, *Primary Examiner.*

U.S. Cl. X.R.

126—194