Dec. 30, 1930. B. B. KAHN 1,786,429

DOOR

Filed Sept. 10, 1928 3 Sheets-Sheet 1

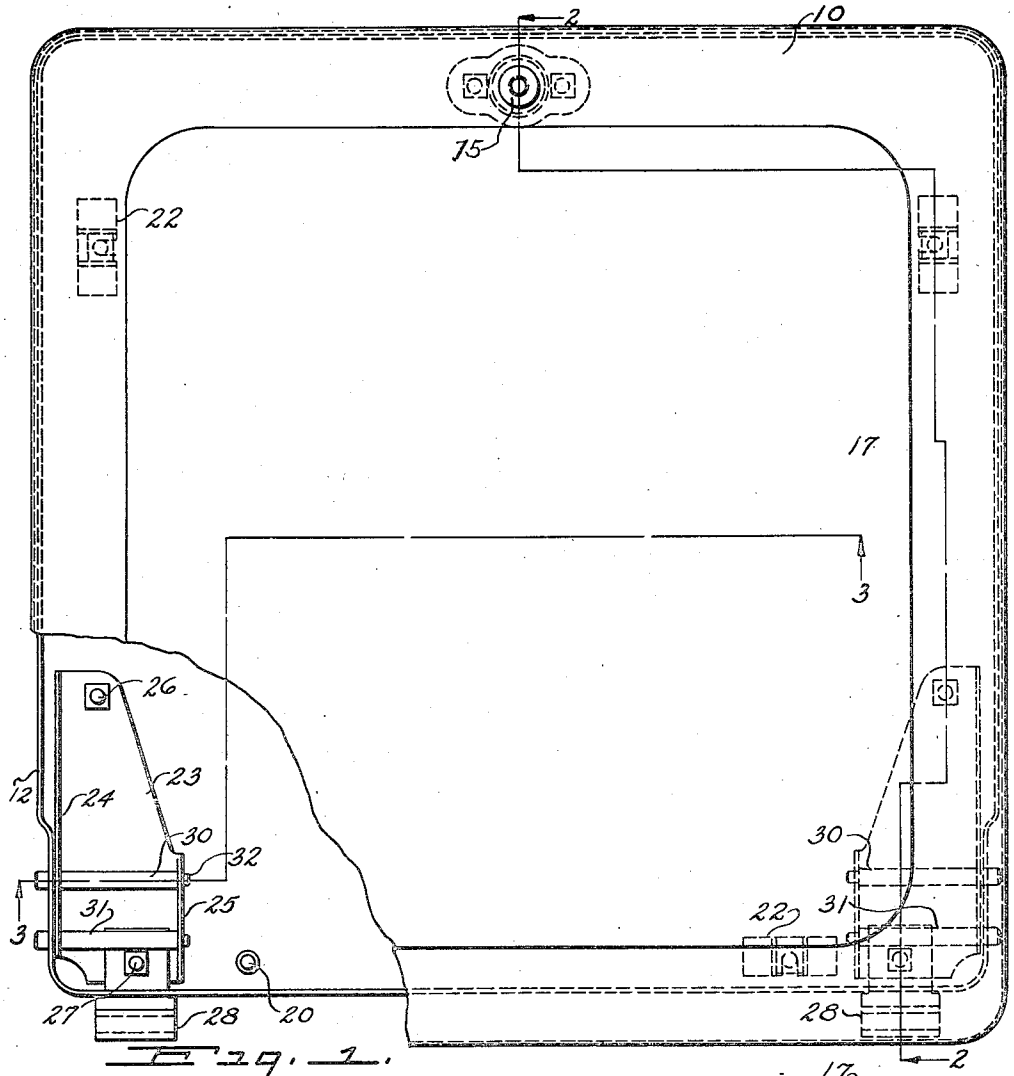


Fig. 1.

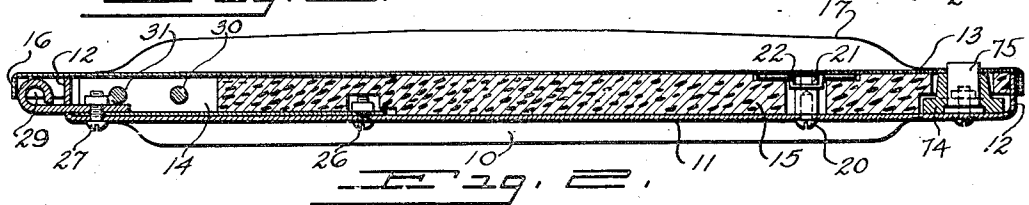


Fig. 2.

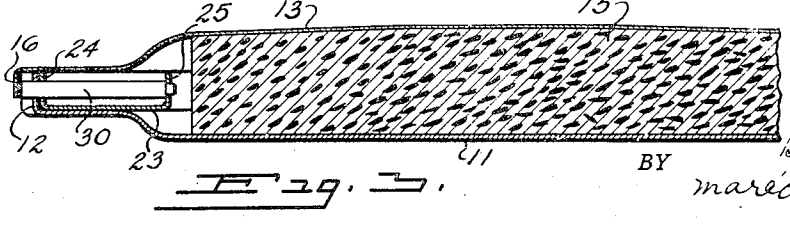


Fig. 3.

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DOOR

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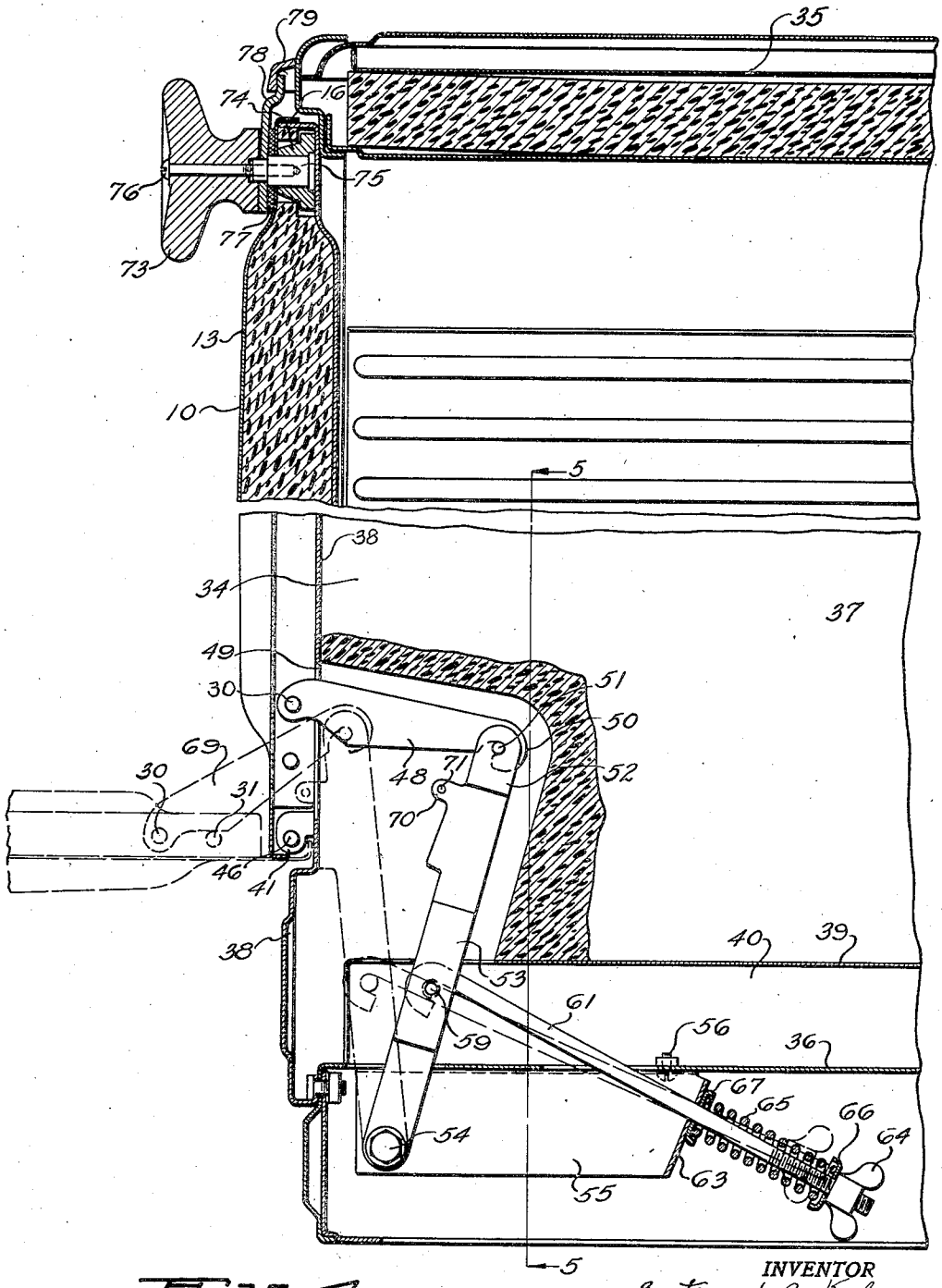


Fig. 4.

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DOOR

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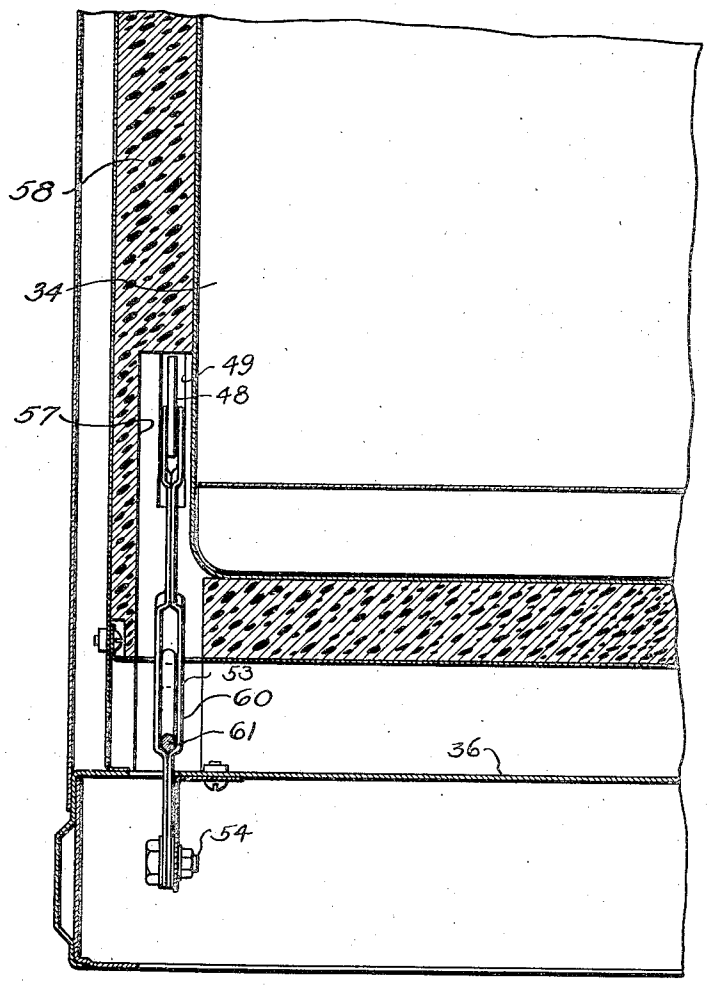


Fig. 5.

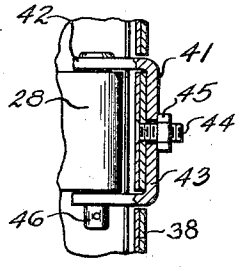


Fig. 6.

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UNITED STATES PATENT OFFICE

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DOOR

Application filed September 10, 1928. Serial No. 304,996.

This invention relates to metal doors such as are used in oven constructions and the like.

One object of the invention is the provision of a door of this character having a rigid back or inner plate portion and a front finish plate, the back plate supporting the door hinge part so that the front finish plate is substantially free from stresses in normal door movements.

Another object of the invention is the provision of a door having a front enameled finish plate attached to a rigid metal back plate, the plates having marginal flanges which space the plates apart and finish the marginal portions of the door.

Other objects and advantages of the invention will be apparent from the following description and from the accompanying drawings in which—

Fig. 1 is a front elevation of a door embodying the present invention, part of the finish or front plate of the door being broken away;

Fig. 2 is a section of the door taken on the line 2—2 of Fig. 1;

Fig. 3 is a horizontal section through the door on the line 3—3 of Fig. 1;

Fig. 4 is a sectional view of part of a range, showing the door as an oven closure;

Fig. 5 is a vertical section through a part of the range, taken on the line 5—5 of Fig. 4; and

Fig. 6 is a detail of a part of the door hinge connection.

Referring more particularly to the drawings by reference numerals, in which corresponding numerals designate like parts in the various views, 10 indicates generally a door adapted to be used as an oven closure, the invention being herein disclosed as applied to a cooking range. Ordinarily in prior constructions of electric or gas ranges, oven doors are provided with a comparatively heavy outer member to which the hinge mechanism is attached, this outer member being enameled or otherwise finished. An inner lining is usually provided attached to the outer member of the door. One serious objection to this type of construction is that the outer door member, on which the enamel or other finish is applied, is subjected to strains and stresses in normal usage which result in the cracking or marring of the enamel or finish. In accordance with this invention however the outer enamel or finish member of the door is not subjected to door strains, and is applied to a rigid inner or back door portion in a detachable manner.

The portion of the door which assumes the strains and stresses of normal usage comprises a rigid back portion, in the form of a heavy gauge sheet metal plate 11 which is shown marginally flanged at 12, these flanges projecting toward the front of the door and forming spacing means for a finish front plate 13, which is thus spaced from the back plate 11 to provide an insulation space 14 between these two door portions. Within this space 14 there is preferably a block 15 of suitable heat insulating material. The finish plate 13, which is preferably a sheet metal plate of lighter gauge than the back plate, is also marginally flanged at 16, these flanges extending toward the rear of the door and finishing the edges of the door in a pleasing manner. At the top and sides of the door the flanges 12 are covered, at least in part, by the top marginal flange 16 of the finish plate, while at the bottom of the door, as shown in Fig. 2, the marginal flange 16 is spaced below the flange 12. The front finish plate 13, which may, if desired, be stamped in any suitable form so as to provide an outward bulge 17, is provided with a suitable finish surface, ordinarily of enamel. This enameled finish plate is attached to the back plate 11 in a readily detachable manner so that the finish plate may be easily replaced or assembled to the back portion of the door, the connection between the front and back plates being such that the front finish plate is not subjected to the door strains and stresses which are incurred in normal usage.

The attachment means between the two door plates is preferably accessible and visible only from the rear of the door, and as shown this attachment means comprises screws 20 which thread into nuts 21 held tightly in straps or clips 22 which are preferably spot welded or similarly attached to

the inner face of the front plate in suitable positions around this plate.

At each of the lower corners of the door is a reinforcement member 23 in the form of a metal plate having spaced outwardly extending flanges 24 and 25, the reinforcement member 23 being held firmly to the back plate 11 by bolts 26 and 27. The bolt 27 also extends through a hinge part 28, or fulcrum piece which projects through a slot in the marginal flange 12 of the back plate, this hinge part being shown lying against the front face of the reinforcement member 23,—the hinge part 28, reinforcement 23, and back plate 11 being thus firmly interconnected so that strains resulting from the hinged mounting of a door are applied directly to the back plate without affecting the front finish plate of the door. The hinge part 28 is bent circularly at its lower end to provide a hinge pin holder 29 within the lower edge of the front finish plate. Extending between the flanges 24 and 25 of the reinforcement member are a pair of pins 30 and 31, which are shouldered near their inner ends, the shoulders abutting against flange 25, inner tip portions 32 of these pins supporting their inner ends. The outer ends of the pins lie freely in bearing holes in the flange 24 and in the side marginal flange of the back plate. The pins are retained in bearing engagement with the flanges 24 and 25 in their proper positions by the side marginal flange of the front finish plate as shown in Fig. 3, this plate being fastened to the back plate 11 after the pins have been assembled in their proper positions, this arrangement resulting in a very simple assembly operation. These pins provide engaging and stopping parts operating in conjunction with suitable door closing and holding means which will be presently described.

As shown in Fig. 4 the door 10 forms a closure for a range oven designated generally 34, of any suitable construction, shown as comprising a suitable oven top 35, a lower main frame 36, side walls 37 and front 38. The oven bottom 39 is shown spaced above the main frame 36 to provide a heat insulating chamber 40 therebetween.

In the oven front 38 are provided suitable hinge parts 41 these hinge parts, as shown in Fig. 6, being preferably of substantially U-shape so as to provide spaced ears 42 as holders through which the hinge pins extend. The ears 42 of these hinge parts extend through vertical slots in the oven front 38 so that the ties 43 of the hinge parts lie inside the oven front 38, being attached to it by screws 44 which engage nuts 45 on the inside of the oven front. When the hinge pins 46 are inserted through the hinge parts 28 and 41 it will be apparent that the door is pivotally supported at its lower end so as to swing downwardly to open position as shown in dotted lines in Fig. 4.

To hold the door closed, and to assist in closing movements of the door and at least partially counterbalance the weight of the door when in various part open positions, at each side of the door is a link or strap 48 which projects through a slot 49 in the door seat which is part of the front 38 and pivotally engages the upper pin 30 where this pin projects past the flanges 24 and 12, inside of the marginal flange 16 of the front finish plate. The rear end of this strap is provided with a hook 50 which engages a rivet 51 provided in the bifurcated end 52 of a lever 53, pivotally mounted at its lower end at 54 on a bracket 55, which is attached by screws 56 to the bottom frame 36 of the range. The lever 53 extends through a slotted opening in the frame 36 and through an opening in the oven bottom 39, this lever being located in the side wall 34 in recess 57 provided in insulation block 58 as shown. Engaging a rivet 59 which is held between the spaced sides 60 of the lever 53 is the hooked end of a bar 61 which extends downwardly and rearwardly below the oven bottom as shown in Fig. 4 and through an opening in the flange 63 of the metal bracket 55. The lower end of this bar 61 is provided with a wing nut 64 and a spring 65 surrounds this end of the bar 61 and engages pressure plates 66 and 67 at its ends so as to pull rearwardly upon the bar 61 and hold the door in closed position or counterbalance the weight of the door in its opening and closing movements. The spring 65 is located in a comparatively cool part of the range, being below and at one side of the oven, and is also readily accessible for adjustment of tension, which is accomplished by screwing the wing nut 64 along the threaded end of the rod 61. When the door is open, and extends substantially horizontally as shown in dotted lines in Fig. 4, the pin 31 is engaged by a surface 69 on the strap 48, the lever 53 at this time extending along the inner side of the oven front 38 so that the door is firmly braced in its full open position and strains on the hinge parts of the door are to some extent relieved. Preferably the lever 53 is provided with an outwardly extending projection 70 having a hole 71, this projection extending beyond the oven front 38 when the door is open so that a nail or suitable retaining pin may be inserted through the hole 71 to take the strain of the spring 65 when it is desired to remove the hinge pins of the door, the hook end 50 of the strap 48 facilitating the detachment of the door under such conditions. The various parts just described are duplicated on opposite sides of the range each side of the door being thus provided with a door holding and counterbalancing system as just described.

A door opening and closing knob 73 is provided at the top of the door, this knob being held on the back plate 11 in a manner which

imposes no strain on the front finish plate of the door. As shown, a hollow retainer block 74 is firmly attached to the upper portion of the back plate 11 in any suitable manner, and holds an internally threaded swivel block 75, which projects freely through the front finish plate. Threaded into the block 75 is a screw 76 which passes through the knob 73 and retains and supports the knob directly on the back plate of the door, a washer 77 of suitable soft material being provided between the door knob and the front finish plate. 13. Between the washer and the knob is a door retainer or finger 78 which moves with the door knob in the rotational movement of the latter so that it may be brought into engagement with a holder 79 provided in the top of the range front. When the knob 73 is rotated it moves the retainer 78 out of engagement with the holder 79 and permits the door to be opened. It will be apparent that by reason of such construction as just described a pull or push on the knob in the opening and closing movements of the door does not impose strains on the front finish plate which might crack or injure the enamel or finish surface of the latter, and furthermore the construction is such that the finish plate may be easily removed for replacement or refinishing if that should be necessary. The parts are all of simple construction and are very easily assembled. The removal and replacement of the front finish plate may be effected without disturbing the hinge connection between the door and the range, and without the removal of the door.

While the form of apparatus herein described constitutes a preferred embodiment of the invention, it is to be understood that the invention is not limited to this precise form of apparatus, and that changes may be made therein without departing from the scope of the invention which is defined in the appended claims.

What is claimed is:

1. An oven door comprising a rigid back plate assuming substantially all the door strains, hinge means fixed to said back plate and providing a pair of spaced pivot members, a front finish plate, and means for fastening said front finish plate to said back plate without direct connection to said hinge means so that the front plate is substantially free from stress in normal door movements, the points of fastening all being inwardly spaced from the peripheral edges of said finish plate.

2. A door of the class described comprising a back portion of rigid construction assuming substantially all the door strains, a door supporting and strengthening means attached to said back portion and of lighter gage material than said back portion, and a front finish plate detachably fastened only to said back portion.

3. A door of the class described comprising a rigid back plate of heavy gauge sheet metal assuming substantially all the door strains, a hinge means fixed to said back plate and providing a pair of spaced pivot members, and a front finish plate of lighter gauge sheet metal supported on said back plate, said front finish plate being spaced from said back plate and peripherially flanged toward the back plate.

4. A door of the class described comprising a rigid back plate, a hinge means fixed to said back plate, and a front finish plate supported on said back plate, clips on the inner side of said front plate and means extending through said back plate for detachable connection with said clips, said back plate being peripherially flanged toward the front finish plate, the flanges spacing the plates apart.

5. A door of the class described comprising a rigid back plate, a hinge means fixed to said back plate and having a portion projecting therefrom, and a front finish plate supported on said back plate, said plates being spaced apart and peripherially flanged toward each other, the flanges of the back plate spacing said plates apart to provide an insulation chamber therebetween, the flange of the front finish plate extending over and covering the projecting portion of said hinge means from view.

6. An oven door comprising a rigid back plate, hinge means fixed to said back plate, a front enameled plate spaced from said back plate and having peripheral flanges extending toward the back of the door, and attaching means accessible only from the back of the door for fastening said plates together so that the front plate is substantially free from stress in normal door movements, said attaching means being entirely independent of said hinge means.

7. A door of the class described comprising a back portion, a front finish plate detachably fastened to said back portion, hinge means attached to said back portion without connection to the front finish plate and a door handle firmly attached to said back portion without rigid connection to the front finish plate, whereby strains from the door handle and the hinge means are taken by the back portion and relieved from the front finish plate.

8. An oven door comprising a rigid back plate assuming substantially all the door strains, a front finish plate spaced from said back plate, means for detachably fastening said front and back plates together, a door counterbalance, a metal reinforcement attached to said back plate to provide an anchorage for the door counterbalance, and hinge means fixed to said reinforcement and said back plate.

9. An oven door comprising a rigid back

plate assuming substantially all the door strains, a front finish sheet metal plate spaced from said back plate, means for detachably fastening said front and back plates together, a metal reinforcement attached to said back plate to provide an anchorage for a door counterbalance, hinge means fixed to said reinforcement and said back plate, and a door handle firmly attached directly to said back plate and without rigid connection to said front plate.

10. An oven door comprising a rigid back plate, a front enameled finish plate spaced from said back plate and having inturned marginal flanges, a pair of reinforcement members rigidly attached to said back plate at the lower corners of the door, said reinforcement members having outturned flanges, pins held in said outturned flanges by the marginal flanges of the front finish plate, said pins providing anchorages for a door counterbalance, and hinge means fixed to said reinforcement members and to said back plate and projecting downwardly from said back plate.

11. In combination, an oven door comprising a rigid back plate, hinge means therefor, a front finish plate attached to said back plate, reinforcement members at the lower corners of the door fixed to said back plate, pins supported in said reinforcement members, the flanges on said front plate holding said pins in place, straps attached to some of said pins and adapted to engage others of said pins when the door is open, and spring means operably connected to said straps for holding the door in closed position.

12. In combination, in an oven door, a pair of reinforcement members for said door, pins mounted on each reinforcement member, a strap engaging a pin on each side of the door and adapted to engage another pin to firmly support the door in open position, a pivoted lever for actuating each of said straps, and spring means associated with said levers for yieldingly holding the door in closed position.

13. An oven door comprising a rigid back plate, a fulcrum piece on said back plate, a front finish plate, means for fastening said front finish plate to said back plate, and a door handle supporting means rigidly fixed to said back plate, said supporting means extending through said front finish plate without rigid connection therewith.

14. A door of the class described comprising a rigid back plate of heavy gauge sheet metal assuming substantially all the door strains, hinge means rigidly fixed to said back plate, and a front finish plate of lighter gauge sheet metal spaced from said back plate and means accessible from the rear of the door for detachably connecting said back plate to said front plate at points spaced inwardly of the peripheral edges of said front plate.

15. An oven door comprising a rigid flanged back plate, spaced fulcrum pieces fixed to said back plate and projecting through one of its flanges, a front finish plate supported on said back plate and spaced therefrom and peripherally flanged, the finish plate being substantially co-extensive in size with the back plate on three edges and projecting a substantial distance beyond the back plate adjacent the projecting portions of said fulcrum pieces to cover them from view.

16. An oven door comprising a rigid back plate assuming substantially all the door strains, hinge means fixed to said back plate, a front enameled plate spaced from said back plate and having peripheral flanges extending toward the back of the door, and attaching means for securing said plates together inwardly of their peripheral flanges so that the front plate is substantially free from stress in normal door movements.

17. An oven door comprising a rigid back plate assuming substantially all the door strains, fulcrum pieces fixed to said back plate, a front enameled plate spaced from said back plate and having peripheral flanges extending toward the back of the door, and attaching means accessible only from the back of the door and adjacent the four corners of the door for fastening said plates together inwardly of their flanges so that the front plate is substantially free from stress in normal door movements.

18. An oven door comprising a back plate of substantially rigid construction assuming substantially all the door strains, a front finish plate of lesser rigidity spaced from said back plate, means for detachably fastening said front and back plates together, a door counterbalance, a metal reinforcing plate attached rigidly to said back plate and free from direct attachment to said front finish plate to provide an anchorage for the door counterbalance, and hinge means fixed to said reinforcing plate and said back plate and free of direct connection to said front finish plate.

In testimony whereof I hereto affix my signature.

BERTRAND B. KAHN.