Nov. 12, 1929. H. W. O'DOWD 1,735,652

OVEN DOOR CONSTRUCTION

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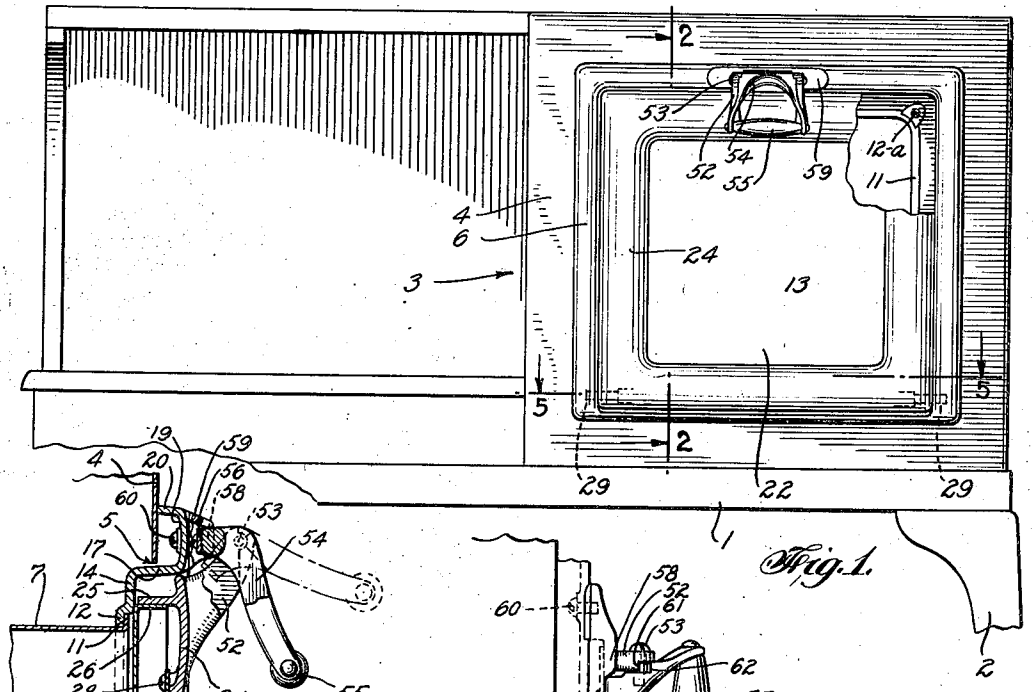

Fig. 1.

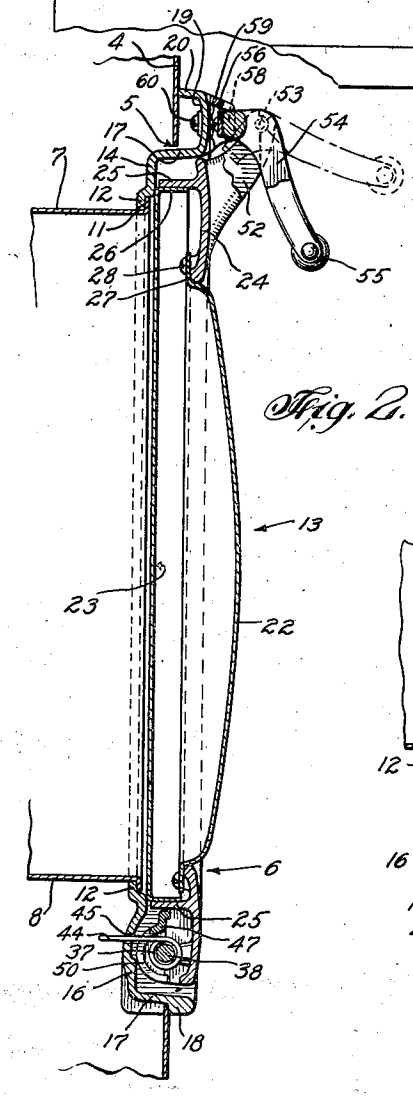

Fig. 2.

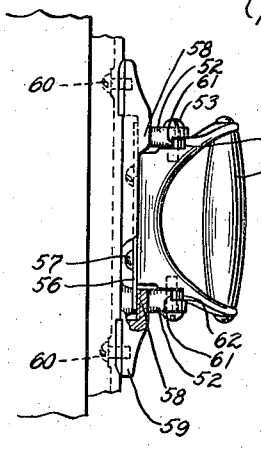

Fig. 3.

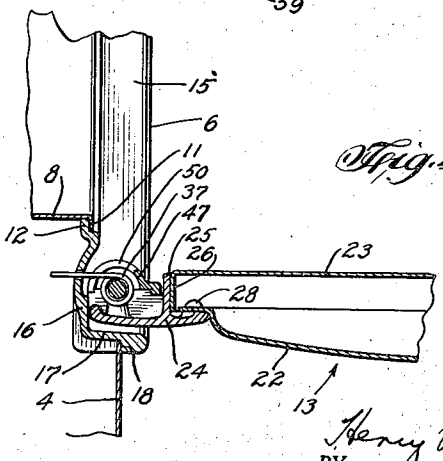

Fig. 4.

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Fig. 5.

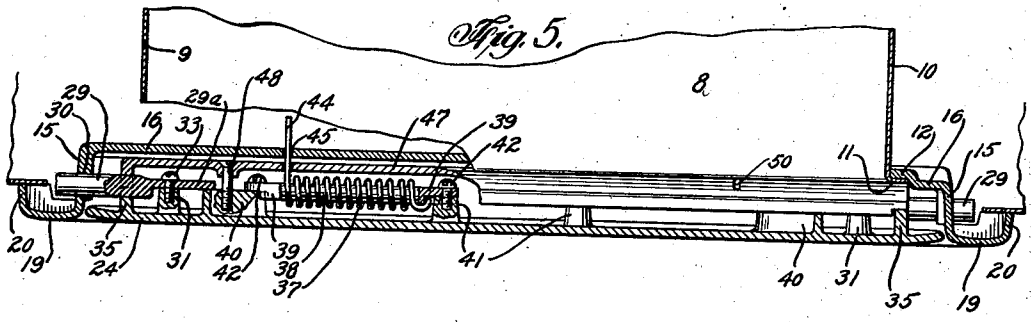


Fig. 6.

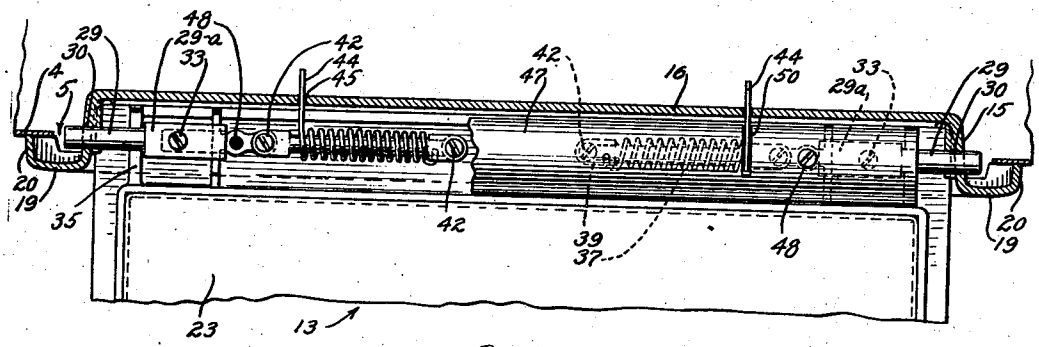
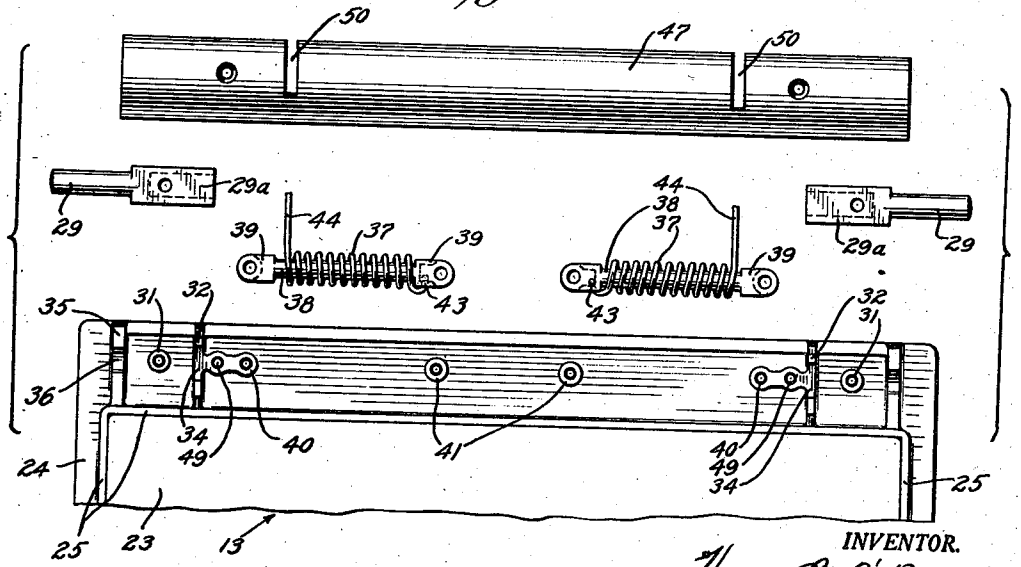


Fig. 7.



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Patented Nov. 12, 1929 1,735,652

UNITED STATES PATENT OFFICE

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OVEN-DOOR CONSTRUCTION

Application filed February 2, 1928. Serial No 251,265.

This invention relates to door mountings and latching means therefor, and has particular reference to novel oven door mountings and latches for gas or electric ranges and the like.

In many instances, it is desirable to use springs for resisting opening movements of doors, and in order to enhance appearances it is desirable that such springs, as well as the hinge connections, be concealed from view. Various arrangements have been proposed and used for this purpose, but they have given rise to objections because of difficulties in manufacturing and assembling. In some cases, the springs have been connected with the hinges in such a manner that these parts had to be mounted as a unit, and because of the tension of the spring, the labor of mounting and dismounting the door has been considerable. It sometimes becomes necessary to replace a spring because of breakage or loss of temper, and to do this with the prior art devices mentioned, it has required the dismounting of the door. In the case of door mountings for ovens of cooking ranges and the like, the question of protection must be taken into consideration, since it is desirable that the parts be maintained in a sanitary condition, as well as protected from extreme temperature changes.

An important object of the present invention in its broader aspects is to provide a hinge mounting for doors wherein the hinge pintles and counterbalance springs are independently and detachably mounted with reference to the door. More specifically, the invention contemplates a door which is swingingly mounted on trunnions which extend laterally from the opposite side edges of the door and adjacent the bottom edge thereof on its inner side. The door is adapted to extend into a recessed door casing which is suitably provided with sockets for the reception of the trunnions, and said trunnions are secured to the door by screws or other detachable fastening elements. Coaxial with the trunnions are a pair of coiled torsion springs which are sustained by supporting rods also secured to the door. Each of said springs has one of its ends acting against the door and the other end acting against the door casing in such manner as to resist opening movement of the door, and a detachable cover plate extends over the trunnions, springs, and spring-sustaining rods whereby to protect the same from injury and to substantially conceal them from view when the door is opened.

Another feature of the invention resides in the provision of an improved latch and handle by means of which the door may be conveniently swung on its hinge mounting and locked in closed position. The arrangement is such that only a single movement of the hand is necessary to unlatch the device and open the door, and the parts are of simple construction and neat appearance.

These and other objects, features and advantages of the invention will be more readily apparent from the following description in connection with the accompanying drawings, wherein the invention has been shown by way of illustration, and wherein.

Figure 1 is a front elevation of a cooking range embodying the invention;

Fig. 2 is a vertical transverse sectional view on line 2—2 of Fig. 1, on a larger scale, and showing the door in closed position.

Fig. 3 is a fragmentary top plan view of the improved latch and handle;

Fig. 4 is a fragmentary view similar to Fig. 2 and showing the door mounting, with the door in open position;

Fig. 5 is a fragmentary horizontal sectional view on line 5—5 of Fig. 1 with the door closed, and with parts broken away;

Fig. 6 is a similar view with the door opened; and

Fig. 7 is an "exploded" view showing the component parts of the door mounting in elevation.

Referring to the drawings in detail, the invention has been shown as applied to a cooking range comprising a rectangular base 1 supported at its corners by legs 2, only one of which is shown. Mounted upon the base 1 adjacent one end thereof is an oven 3 which preferably includes an outer casing and an inner casing articulated together in spaced relation. The front wall 4 of the outer casing

has a substantially rectangular opening 5 of slightly greater area than the cross-section of the inner casing, and at this opening the edges of the wall 4 are reinforced by a door frame 6. The inner casing comprisies upper and lower walls 7 and 8 respectively, side walls 9 and 10, and a back wall (not shown) all formed of relatively thin sheet metal whereby to render the device light in weight, and at their front edges said walls 7, 8, 9, and 10 are provided with annular flanges 11 to which inner edge flanges 12 of the frame 6 are secured by screws 12ª (Fig. 1) or by welding or otherwise, as desired. The frame 6 is preferably a light weight casting which fills the space between the front edges of the bounding walls of the inner casing and the edges of the opening 5 of the outer casing, permanently uniting said casings together. In the illustrated embodiment of the invention, the frame 6 is continuous and of rectangular outline and has offset wall portions which define a recess for the reception of a door 13 constituting a closure for the oven. The bottom of said recess is formed by continuous wall portions 14 (at the top), 15 (at the vertical sides), and 16 (at the bottom) said wall portions being substantially parallel with the front 4 of the outer casing, but in a different plane, as best shown in Figs. 2 and 5. Integral with said wall portions 14, 15, and 16 and extending forwardly therefrom through the opening 5, are continuous wall portions 17, the lower one of which has a shoulder 18 (Fig. 2) which seats against the front of the outer casing wall 4, while said portions 17 on the top and side edges terminate in lateral portions 19 and edge flanges 20, also seating against said front casing wall 4. The lower wall portion 16 of the frame 6 is wider than the portions 14 and 15, and is slightly curved transversely whereby to more readily accommodate the door hinge members, as will hereinafter be described.

The door is of rectangular outline corresponding with that of the door frame 6 and adapted to fit in the recess defined by the frame walls 14, 15, 16 and 17, and comprises front and rear plates 22 and 23 of thin sheet metal secured to a cast peripheral frame member 24. The outer surface of the body of the frame member 24 is substantially flush with the portions 19 of the frame 6 and carries inwardly extending continuous flanges 25, to which peripheral flanges 26 of the rear plate 23 are secured. The front plate 22 may preferably be bulged outwardly by way of enhancing the appearance of the range, and has edge flanges 27 secured to the inner side of the frame member 24 by means of screw 28 or other suitable fastening means. The arrangement is such that the door plates 22 and 23 are spaced apart providing a heat insulation chamber within the door, and the edge portions of said rear plate 23 are adapted to abut against the stationary wall portions 14, 15 and 16 when the door is closed, whereby to retain heat in the oven.

Extending laterally from the side edges of the door, adjacent the lower edge thereof, there is a pair of hinge pintles or trunnions 29 pivotally received in apertures 30 in the side wall portions 17 of the fixed frame 6. As best shown in Figs. 5, 6, and 7, the trunnions 29 have flattened body portions 29ª which bear against lugs 31 and 32 on the frame member 24, and they are firmly held in place on the door, and independently detachable, by means of screws 33. The lugs 32 are grooved at 34 and additional lugs or ribs 35 are grooved at 36 to form sockets for the trunnions and their body portions, whereby to maintain the same in proper axial alinement. In order to resist opening movement of the door 13, one or more coil springs are associated with the door, there being two such springs shown in the illustrated embodiment. Each spring 37 encircles a sustaining rod 38 having enlarged apertured ends 39 secured to lugs 40 and 41 by screws 42, and when so mounted the rods 38 and the springs 37 are in axial alinement with the trunnions 29. One end of each spring is secured as at 43 to the adjacent end 39 of its sustaining rod 38, while the other end 44 of the spring extends inwardly through a suitable hole 45 in the frame wall portion 16. Said hinge members and springs are entirely concealed from view when the door is closed, yet readily accessible when the device is open, and in view of the fact that the hinge pintles and the springs are independently detachable, the door can be very easily mounted and dismounted, and the springs can be adjusted or replaced without disturbing the door mounting. In order to protect the springs 37 from high temperatures when the oven is in use, and to maintain the same in sanitary condition, a transversely curved cover plate 47 extends longitudially between the ribs 35, overlying the trunnion bodies 29ª, springs 37 and associated parts, said plate being held in position by countersunk-head screws 48 engaging in tapped holes 49. The plate 47 is provided with a pair of transverse slots 50 in line with the ends 44 of the springs 37, whereby the plate will be capable of movement relative to said spring ends as the door is swung about its hinge members.

When it is desired to remove the door from the range, it is first swung to its open position, whereupon the cover plate 47 may be removed and then by taking out the two screws 33, the entire door can be dropped down and then drawn out forwardly, leaving the trunnions 29 mounted in the frame wall portions 15 if desired. Instead of detaching both trunnions, one alone may be detached and the door removed by shifting it endwise for the short distance necessary to disengage the other trunnion from its bearing. This operation

does not affect the relationship between the door and springs 37, and in remounting the door it is only necessary to guide the ends 44 of the springs into the holes 45 provided for them in the frame wall 16. Similarly, the removal and replacement of either or both of the torsion springs 37 may be carried out without disturbing the pivotal mounting of the door, it being necessary only to remove the cover plate 47 and then detach one or both of the supporting rods 38 by taking out the screws 42. Since the springs are under tension when the door is open, it may be preferred to remove the door entirely in effecting a change or adjustment of the springs, and especially in view of the ease and facility with which the door may be removed.

A preferred type of latch and handle is shown in Figs. 1, 2, and 3 of the drawings, from which it will be seen that that frame member 24, adjacent its upper edge, is provided with a pair of upwardly and forwardly extending fixed arms 52 arranged in spaced relation and preferably integral with said frame member 24. The upper ends of said arms 52 are provided with alined apertures for the reception of screws 53 which pivotally support a handle member 54 between said arms 52. The outer end of said handle member 54 carries a gripping portion 55 which normally is disposed below the screws 53, while the inner end of said handle member carries a latch bar 56, secured by means of screws 57. The bar 56 is longer than the width of the handle member 54, and has its ends extending beyond the sides thereof in such manner as to engage behind depending lip portions 58 of a bracket 59 mounted on the fixed frame 6. Said bracket 59 is secured to frame 6 by screws 60 which are invisble from the front of the door, and the arrangement is such that when the door is closed, as shown in Fig. 2, it will be tightly held so as to prevent leakage of air past the door, into or out of the oven. The arms 52 and handle member 54 are respectively provided with shoulders 61 and 62, which limit rocking movement of the handle with reference to said arms.

In opening the door, the gripping portion 55 is grasped and pulled outwardly away from the oven. At the beginning of this movement, the handle member swings about the screws 53 until the ends of the latch bar 56 become disengaged from the lips 58 of the bracket 59. The shoulders 62 of the handle member then come into abutting relation with the shoulders 61 of the arms 52 preventing further pivotal movement of the handle, and thereafter continued pulling force on the handle results in opening of the door.

From the foregoing it will be evident that an improved oven door mounting and latching means has been provided, which is of extremely simple construction, strong and durable in service, neat in appearance, and a substantial advance in the art. Obviously the invention is not necessarily restricted to use on oven doors, since it may be employed in other environments with equal advantage, and as it is susceptible of numerous modifications in the details of construction and arrangement of parts. The right is herein reserved to make such changes as fall within the scope of the appended claims without departing from the spirit of the invention

Having thus described my invention, what I claim is:—

1. In or for a gas range, an oven having a door frame, a door mounted in said frame, and a pair of hinge pins or trunnions pivotally connecting the door at its opposite side edges to the door frame, said hinge pins being inaccessible when the door is closed but rendered accessible when the door is opened, and at least one of said pins in the open position of the door being removable as an individual unit to permit the instant removal of the door from the door frame.

2. In or for a gas range, an oven having a door frame, a door mounted in said frame, and a pair of hinge pins or trunnions pivotally connecting the door at its opposite side edges to the door frame, said hinge pins being inaccessible when the door is closed but rendered accessible when the door is opened, and said pins being detachably connected to the door so as to be removable therefrom as individual units in the open position of the door to permit the instant removal of the door from the door frame.

3. In or for a gas range, an oven having an inset door frame, a door mounted in said frame with its front face substantially flush with that of the frame, a pair of rotatable hinge pins or trunnions mounted on the inside of the door at its opposite side edges and engaged in aligned bearing openings formed in the door frame, and means for detachably connecting at least one of the hinge pins to the door so as to permit the instant removal of the latter when desired.

4. In or for a gas range, an oven having an inset door frame, a door mounted in said frame with its front face substantially flush with that of the frame, a pair of rotatable hinge pins or trunnions mounted on the inside of the door at its opposite side edges and engaged in aligned bearing openings formed in the door frame, means for detachably connecting at least one of the hinge pins to the door so as to permit the instant removal of the latter when desired, and a guard plate also mounted on the inside of the hinged door and movable therewith, said plate covering the hinge pins and removable independently thereof.

5. In or for a gas range, an oven having an inset door frame, a door mounted in said frame with its front face substantially flush with that of the frame, said door being

formed on the inside and at its lower edge with an inwardly facing longitudinally extending groove or channel, a pair of rotatable hinge pins or trunnions mounted within said groove at the opposite side edges of the door and engaged in aligned bearing openings formed in the door frame, said pins in the open position of the door being freely detachable to permit the instant removal of the door, and a guard plate detachably connected to the door and forming a closure or covering for the open side of the door groove or channel so as thus to house the hinge pins.

6. In or for a gas range, an oven door having a door frame, a door mounted in said frame, a pair of hinge pins or trunnions pivotally connecting the door at its opposite side edges to the door frame, a torsion spring coaxial with the hinge pins and having one end engaged with the door and the other end engaged with the door frame to resist opening movement of the door, and an independent detachable mounting for the torsion spring whereby it may be removed without disturbing the hinge pins.

7. In or for a gas range, an oven door having a door frame, a door mounted in said frame, a pair of hinge pins or trunnions pivotally connecting the door at its opposite side edges to the door frame, a torsion spring coaxial with the hinge pins and having one end engaged with the door and the other end engaged with the door frame to resist opening movement of the door, and a detachable supporting rod encircled by the torsion spring and independent of the hinge pins, whereby the supporting rod and its encircling spring may be removed as an independent unit and without disturbing the hinge pins.

8. In or for a gas range, an oven door having a door frame, a door mounted in said frame, a pair of rotatable hinge pins or trunnions mounted on the inside of the door at its opposite side edges and engaged in aligned bearing openings formed in the door frame, means for detachably connecting at least one of the hinge pins to the door so as to permit the instant removal of the latter from the door frame, a torsion spring coaxial with the hinge pins and having one end engaged with the door and the other end with the door frame to resist opening movement of the door, a supporting rod encircled by the torsion spring and independent of the hinge pins, and means for detachably connecting said supporting rod to the inside of the door; whereby the door may be removed without detaching the spring therefrom, or the spring detached without or after removing the door as desired.

9. The combination as in claim 6, characterized by the fact that there are two torsion springs, one arranged adjacent each hinge pin, each spring being mounted as recited in said claim.

10. A combination as in claim 6, including as a further element a detachable guard plate also mounted on the inside of the hinged door and movable therewith, said plate covering the hinge pins and the torsion spring and removable independently thereof.

11. In or for a gas range, an oven having a door frame, a door mounted in said frame, a pair of hinge pins pivotally connecting the door at its opposite side edges to the door frame, a torsion spring arranged intermediate of the hinge pins and coaxial therewith and having one end engaged with the door and the other end with the door frame, said hinge pins and torsion spring being inaccessible when the door is closed but rendered accessible when the door is opened, means for detachably connecting the hinge pins to the inside of the door, and independent means for detachably mounting the torsion spring on the inside of the door.

In testimony whereof, I have affixed my signature hereto.

HENRY W. O'DOWD.