July 13, 1954 E. H. GROFF 2,683,446

OVEN DOOR STOP MECHANISM

Filed May 5, 1952

3 Sheets-Sheet 1

Fig. 1

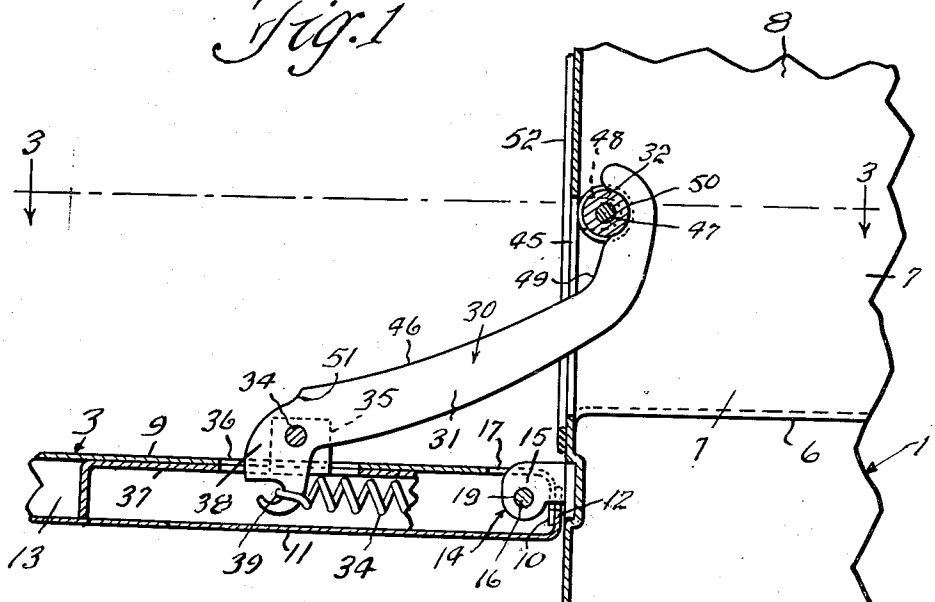
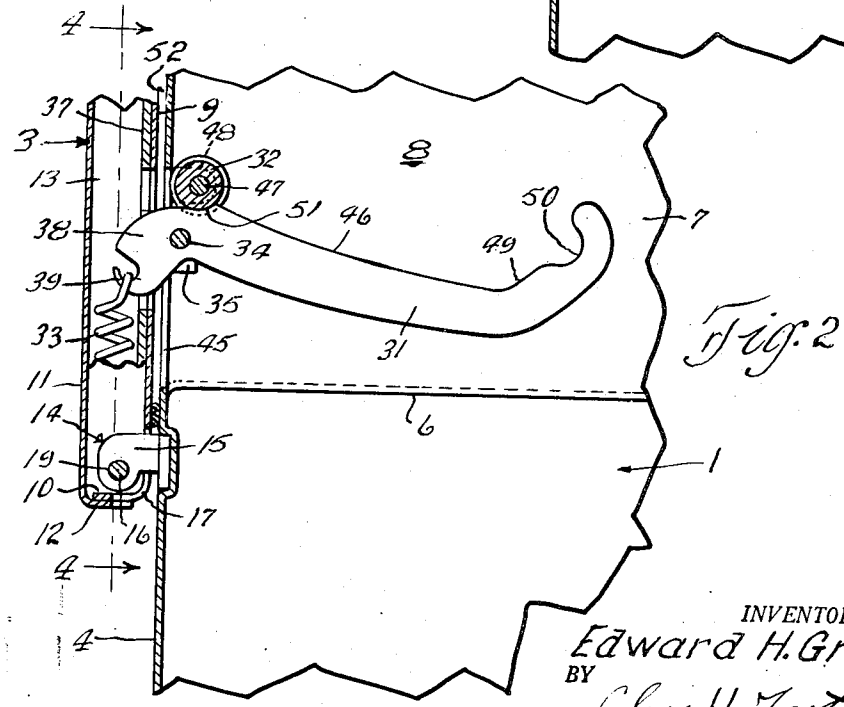


Fig. 2



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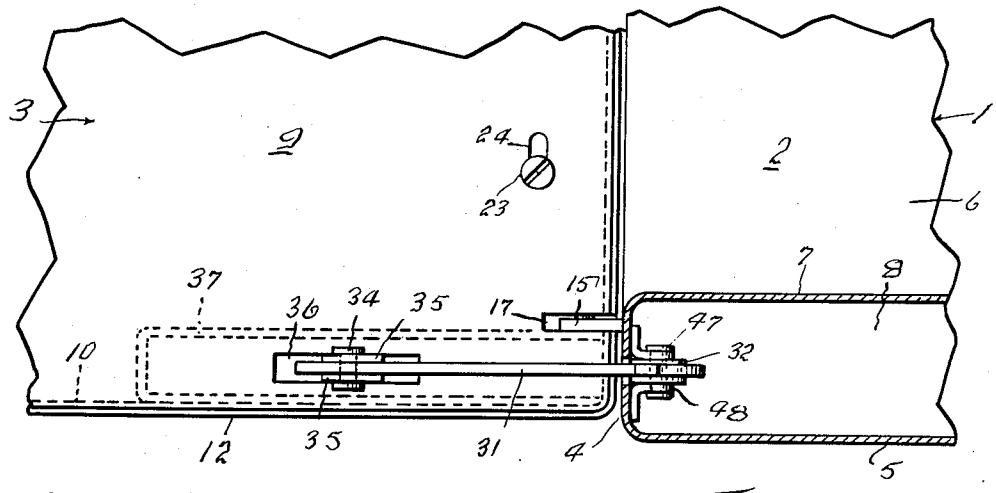


Fig. 3

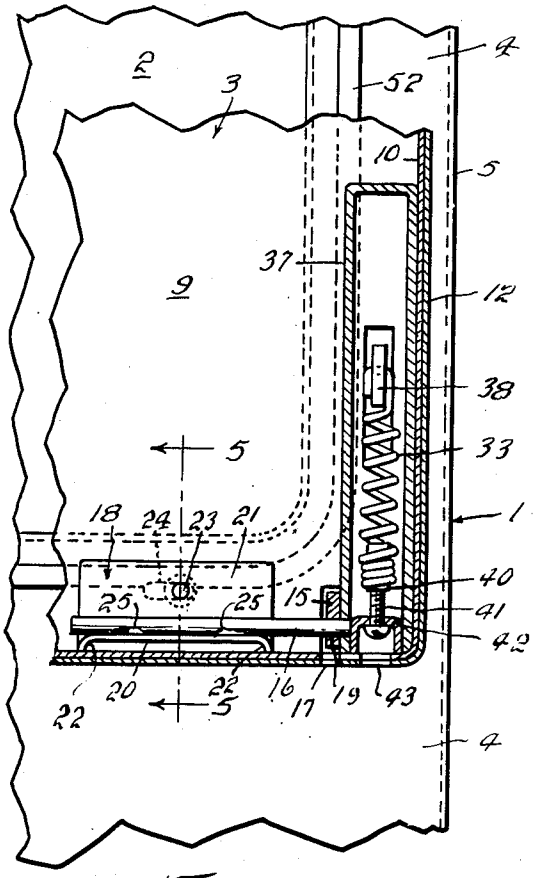


Fig. 4

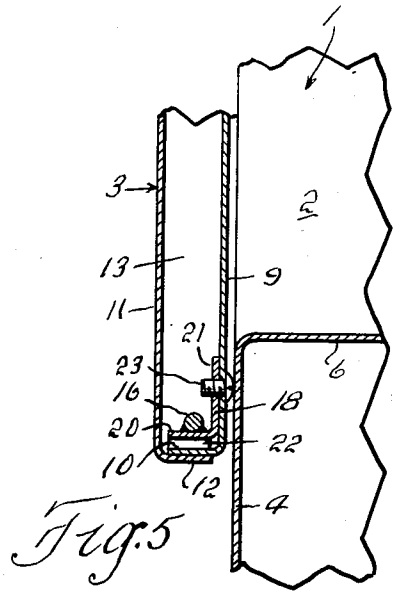


Fig. 5

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Fig. 6

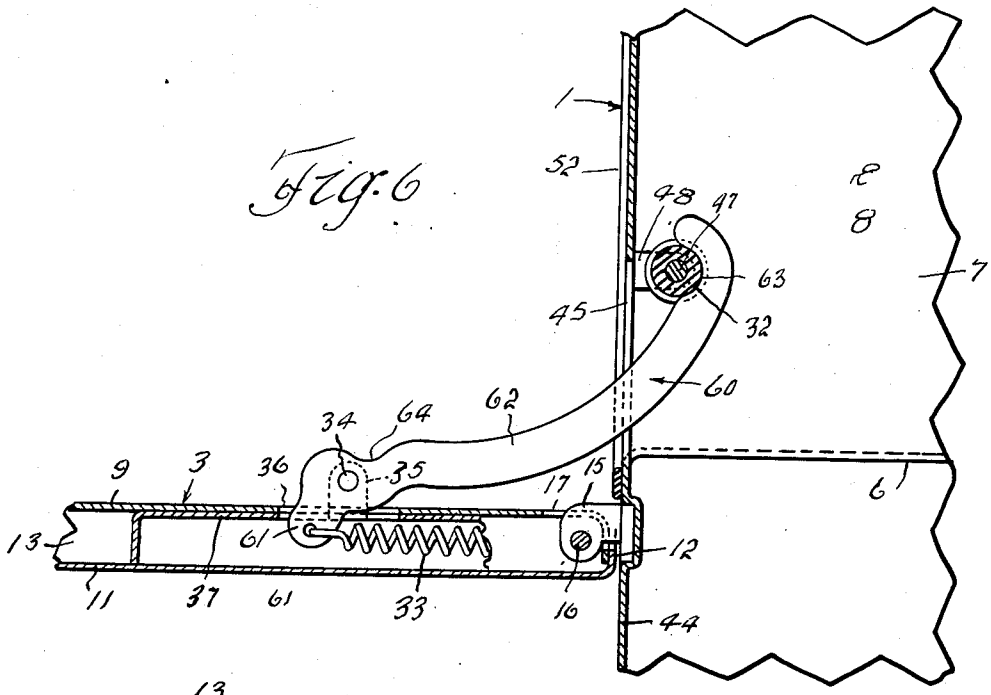
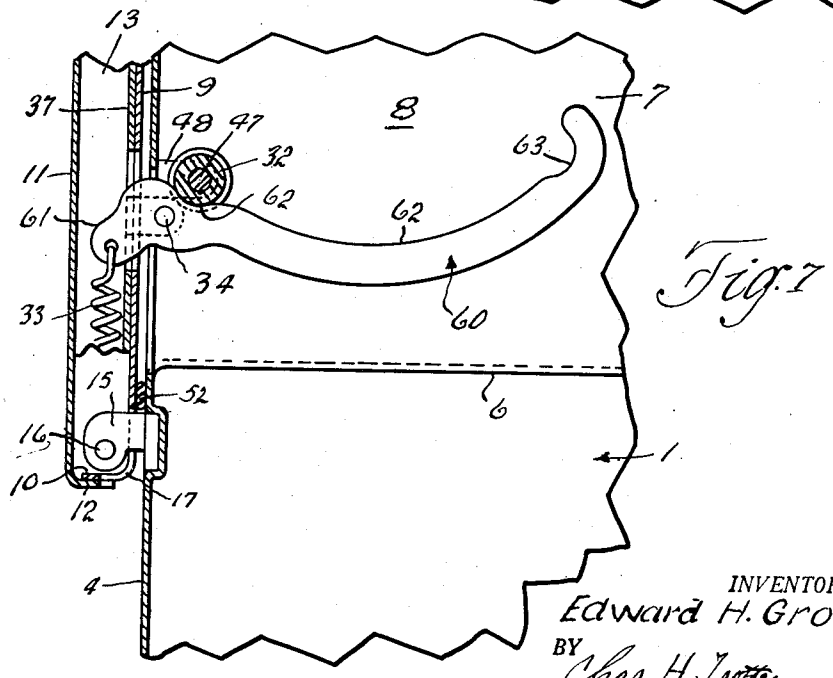


Fig. 7



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OVEN DOOR STOP MECHANISM

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Application May 5, 1952, Serial No. 286,142

6 Claims. (Cl. 126—191)

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This invention relates to a door stop mechanism which is especially adapted for use with outwardly and downwardly opening cooking range oven doors.

In cooking ranges the oven door is usually hingedly secured at the lower end thereof to the front of the range, and in opening swings outwardly and downwardly. In full open position the door extends substantially horizontally outwardly from the front of the range. A door stop mechanism must be provided to limit the opening movement of the door and to hold it in open position and to yieldingly hold the door tightly closed.

Most door stop mechanisms of prior construction frequently cause a violent slamming of the door as it closes. My improved door stop mechanism is so constructed and arranged that it substantially counterbalances the door in all positions between fully open and closed positions, and comprises a lever which is pivotally secured near the outer end thereof to a bracket carried by the inner wall of an oven door which is made up of spaced inner and outer walls and a connecting peripheral wall providing a chamber therebetween. The outer end of the lever extends through a slot in the inner wall of the door into the chamber between the door walls and is attached to one end of a tension spring disposed within the door chamber. The other end of the spring is secured to a tension adjusting screw carried by a fixed bracket within the door chamber. The inner end of the lever extends into the range through a slot in the front wall of the range and terminates in a sharply upwardly inclined section having a semicircular notch therein. During opening and closing of the door the upper edge of the lever is yieldingly held in contact by the tension spring with a flanged roller which is mounted on a fixed shaft behind the front wall of the range. When the oven door is in full open position the semicircular notch adjacent the inner end of the lever hooks onto the roller and limits the opening movement of the door; and when the door is in fully closed position an arcuate notch adjacent the pivoted end of the lever engages the roller and holds the door tightly, but yieldingly closed. The construction and arrangement are such that the lever can be quickly and easily disengaged from the roller and removed from the door when it is desired to remove the door from the range for any reason.

The door is removably secured to the range in front of the oven for movement from a vertical closed position to a substantially horizontal fully open position by a pair of hinge members disposed along the lower edge of the door. Each hinge member comprises a bracket and a pivot pin. The brackets are rigidly secured to the front wall of the range and extend outwardly therefrom into the door chamber through slots in the inner wall of the door. The pivot pins are carried by slides within the door chamber and extend outwardly therefrom into apertures in the brackets. Each of the slides consists of a short length of angle iron having a horizontal leg in contact with the peripheral wall of the door and a vertical leg in contact with the inner wall of the door. The slides are movable back and forth, to shift the pivot pins into and out of engagement with the brackets, by screws which are carried by the vertical legs of the slides and extend out through elongated slots in the inner wall of the door. The screws also serve to hold the slides in adjusted positions.

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The principal object of the invention is to provide an improved oven door stop mechanism of simplified construction that is operative to yieldingly hold an oven door tightly closed, to limit the opening movement of the door and to substantially counterbalance the door in all positions between fully open position and fully closed position.

Another object of the invention is to provide an oven door stop mechanism of this character which includes a tension spring which is disposed in a chamber between the front and rear walls of an oven door.

Another object of the invention is to provide an oven door stop mechanism of this character which can be quickly and easily disengaged whenever it is desired to remove the oven door from the range for any reason.

Another object of the invention is to provide improved hinge means for detachably securing an oven door to a range so that it can be quickly and easily removed and replaced.

Other and more limited objects of the invention will be apparent from the following specification and the accompanying drawings forming a part thereof wherein:

Fig. 1 is a fragmentary vertical section through a cooking range showing my improved door stop mechanism holding the oven door in fully open position, the plane of the section being indicated by the line 1—1 of Fig. 3;

Fig. 2 is a view similar to Fig. 1 showing the the oven door in closed position;

Fig. 3 is a fragmentary horizontal section taken on the line 3—3 of Fig. 1;

Fig. 4 is a fragmentary vertical section taken on the line 4—4 of Fig. 2;

Fig. 5 is a vertical detail section taken on the line 5—5 of Fig. 4;

Fig. 6 is a view similar to Fig. 1 showing a slightly different form of lever; and

Fig. 7 is a view similar to Fig. 2 with the lever of Fig. 6.

Referring now to the drawings by reference characters, the numeral 1 indicates a cooking range having an oven compartment 2 which is closed by an oven door 3. The front wall of the range is designated by the numeral 4 and one of the side walls is shown at 5. The numeral 6 designates the bottom of the oven and the numeral 7 designates one of the side walls of the oven which is spaced from the end wall 5 to provide a chamber 8 therebetween.

The oven door 3 comprises an inner rectangular wall 9 having an outwardly extending annular flange 10, and an outer wall 11 having an inwardly extending annular flange 12 which telescopes the outwardly extending flange 10 and is suitably secured thereto. The walls 9 and 11 are spaced from each other to provide a chamber 13 therebetween. The door 3 is secured to the front wall 4 of the range 1 by a pair of hinge members 14, one of which is disposed at each side of the door adjacent the lower end thereof. In opening, the upper end of the door 3 swings outwardly and downwardly from the front wall 4 of the range.

Each hinge member 14 comprises a bracket 15 and a pivot pin 16. The brackets 15 are rigidly secured to the front wall 4 of the range and extend outwardly therefrom and into the chamber 13 of the door 3 through slots 17 therein. The pivot pins 16 are carried by slides 18 which are secured to the door 3 within the chamber 13. Each of the slides 18 consists of an angle iron having a horizontal leg 20 and a vertical leg 21. The ends of the horizontal legs 20 are turned downwardly as indicated at 22. The downwardly turned ends 22 slidably engage the outwardly extending flange 10 of the inner wall 9 of the door 3 and the vertical legs 21 bear against the inner face of the door wall 9. Screws 23, which are inserted through elongated slots 24 in the wall 9, hold the slides 18 in adjusted position. One of the pivot pins 16 is welded to each of the horizontal legs 20 of the slide 18, as indicated at 25, and extends outwardly therefrom into an aperture 19 in the associated bracket 15. To remove the door 3 from the range the screws 23 are first loosened and then the slides 18 are slid inwardly toward each other by means of the screws 23 thus withdrawing the pivot pins 16 from the apertures 19 in the brackets 15. To replace the door 3 it is held in place with the brackets 15 extending in through the slots 17 and then the slides 18 are slid outwardly until the ends of the pins 16 enter the apertures 19 in the brackets 15. The screws 23 are then tightened which holds the slides 18 firmly in place.

In order to limit the opening movement of the door to yieldingly hold it closed and to counterbalance it between open and closed positions, I provide a door stop mechanism 30 which comprises a lever 31, a flanged roller 32 and a tension spring 33. The lever 31 is pivotally secured near the outer end thereof, by a pivot pin 34, between a pair of ears 35 which extend out through a slot 36 in the inner wall 9 of the door 3 from a cage 37 which is rigidly secured to the door 3 along one side thereof within the door

chamber 13. The end 38 of the lever 31 adjacent the pivot pin 34 extends downwardly into the door chamber 13 through the slot 36, and is connected to one end of the tension spring 33 at 39. The other end of the spring 33 is connected to a nut 40 on an adjusting screw 41 which is rotatably mounted in a cross bar 42 secured to the cage 37 adjacent the lower end of the door 3. Access is had to the screw 41 for adjusting the tension of the spring 33 through an aligned aperture 43 in the annular door flanges 10 and 12. The lever 31 extends rearwardly from the pivot 34 through a slot 45 in the front wall 4 of the range and into the chamber 8 along the side of the oven 2. The spring 33 yieldingly maintains the upper edge 46 of the lever 31 in contact with the flanged roller 32 which is rotatably mounted on a shaft 47 between brackets 48 secured to the rear face of the range wall 4 within the chamber 8. At the free end of the lever 31 within the chamber 8 the upper edge of the lever is turned sharply upwardly as indicated at 49 and terminates in a semicircular notch 50. The opposite end of the upper edge 46 of the lever adjacent the pivot pin 34 terminates in an arcuate depression 51. Between the arcuate depression 51 and the upturned section 49 the upper edge 46 of the lever 31 is slightly concave as shown. In full open position of the door 3 the semicircular notch 50 hooks around the roller 32 and enables the lever 31 to hold the door in this position, as shown in Fig. 1. When the door 3 is closed the arcuate depression 51 engages the roller 32, as shown in Fig. 2, and enables the lever 31 to yieldingly hold the door in this position. The stop mechanism 30 is preferably duplicated at each side of the door 3. When closed the door 3 bears against a gasket 52 which surrounds the open end of the oven 2.

In Figs. 6 and 7 I have shown a slightly modified form of my invention. In this form of the invention I substitute the lever 60 for the lever 31. Otherwise the construction and operation of this form of the invention is the same as that shown in Figs. 1 to 5, and the same reference characters are applied to like parts. The lever 60 is mounted upon the pivot pin 34 between the ears 35 with the end 61 thereof extending through the slot 36 into the door chamber 13 where it is connetced to the spring 33. The upper edge 62 of the lever 60 is generally concave and terminates in a semicircular notch 63, similar to the notch 50, which hooks around the roller 32 when the door is fully open to hold the door against further movement. An arcuate recess 64, similar to the recess 51 in the upper edge 62 of the lever 60 is provided to yieldingly hold the door tightly closed by engaging the roller 32 as shown in Fig. 7. The spring 33 yieldingly holds the concave upper edge 62 of the lever 60 in contact with the roller 32 during the opening and closing of the door which substantially counterbalances the door in all positions between closed and fully open.

From the foregoing it will be apparent to those skilled in this art that I have provided a very simple and efficient mechanism which is operative to yieldingly maintain an oven door in open or closed position and to substantially counterbalance the door in all positions between closed and fully open. It will also be apparent that I have provided a very simple hinge mechanism for detachably securing an oven door to a range so that it can be quickly and easily removed and replaced.

It is to be understood that I am not limited to the specific constructions shown and described herein as various modifications may be made therein within the scope of the appended claims.

What is claimed is:

1. A cooking range comprising a cabinet having a front wall, an oven within said cabinet, an opening into said oven through said front wall, an oven door by which said opening is closed, hinge means by which said door is removably secured to said front wall for movement between a vertical closed position and a substantially horizontal open position, and counterbalance mechanism by which said door is yieldingly held in fully open and closed positions and is substantially counterbalanced in all positions between said fully open and said fully closed position; said oven door comprising spaced inner and outer walls and a connecting peripheral wall defining a door chamber therebetween; and said counterbalance mechanism comprising a fixed shaft within said cabinet, a roller mounted on said fixed shaft, a lever having a generally concave upper edge, said lever being pivotally secured to the said inner wall of said door with one end of said lever being disposed within said door chamber in all positions of said door and the other end of said lever being disposed within said cabinet with said concave edge in engagement with the under portion of said roller, and a tension spring disposed wholly within said door chamber and having one end thereof connected to the said one end of said lever within said door chamber and the other end thereof connected to said door within said door chamber, said spring yieldingly holding the upper concave edge of said lever in engagement with said roller.

2. A cooking range as defined in claim 1 in which adjusting means is provided within said door chamber by which the tension of said spring may be varied.

3. A cooking range as defined in claim 2 in which the said other end of said spring is connected to said door by said adjusting means.

4. A cooking range comprising a cabinet having a front wall, an oven within said cabinet, an opening into said oven through said front wall, an oven door by which said opening is closed, hinge means by which said door is secured to said front wall for movement between a vertically closed position and a substantially horizontal open position, and counterbalance mechanism by which said door is yieldingly held in fully open and closed positions and is substantially counterbalanced in all positions between said fully open and said fully closed position; said oven door comprising spaced inner and outer walls and a connecting peripheral wall defining a door chamber therebetween; and said counterbalance mechanism comprising a fixed shaft within said cabinet, a roller mounted on said fixed shaft, a lever having a generally concave upper edge, said lever being pivotally secured to the said inner wall of said door with one end of said lever being disposed within said door chamber in all positions of said door and the other end of said lever being disposed within said cabinet with said concave edge in engagement with the under portion of said roller, and a tension spring disposed wholly within said door chamber and having one end thereof connected to the said one end of said lever within said door chamber and the other end thereof connected to said door within said door chamber, said spring yieldingly holding the upper concave edge of said lever in engagement with said roller.

5. A cooking range as defined in claim 4 in which adjusting means is provided within said door chamber by which the tension of said spring may be varied.

6. A cooking range as defined in claim 5 in which the said other end of said spring is connected to said door by said adjusting means.

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