Jan. 18, 1944. J. F. HENNESSY ET AL 2,339,398

OVEN DOOR SEAL

Filed Nov. 12, 1940 2 Sheets-Sheet 1

Fig. 1

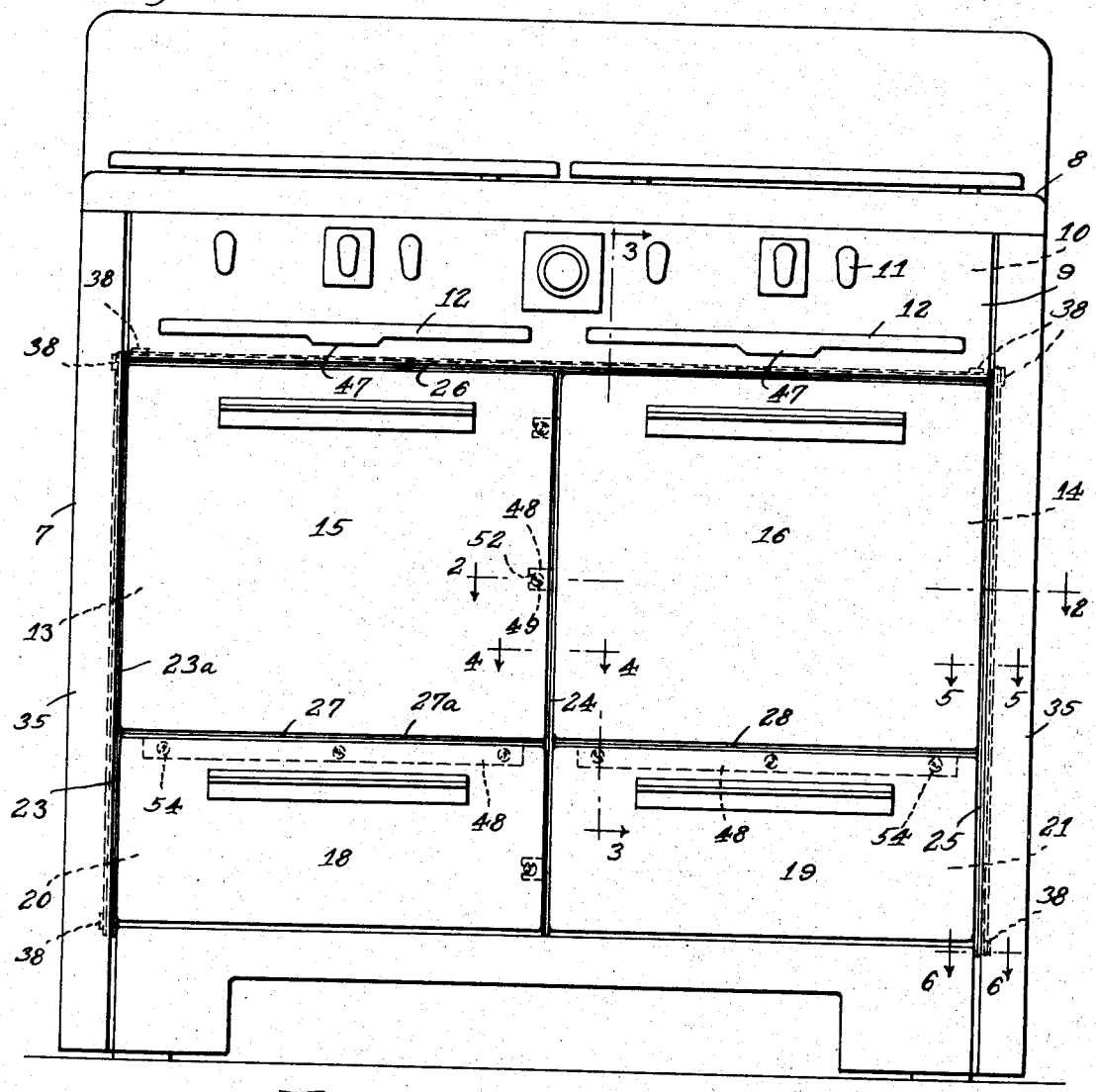

Fig. 2

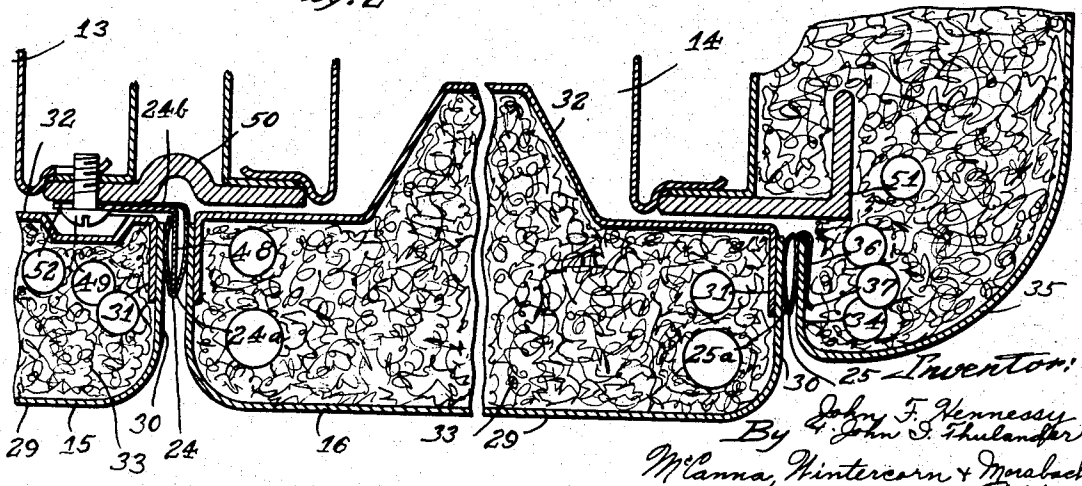

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Fig. 3

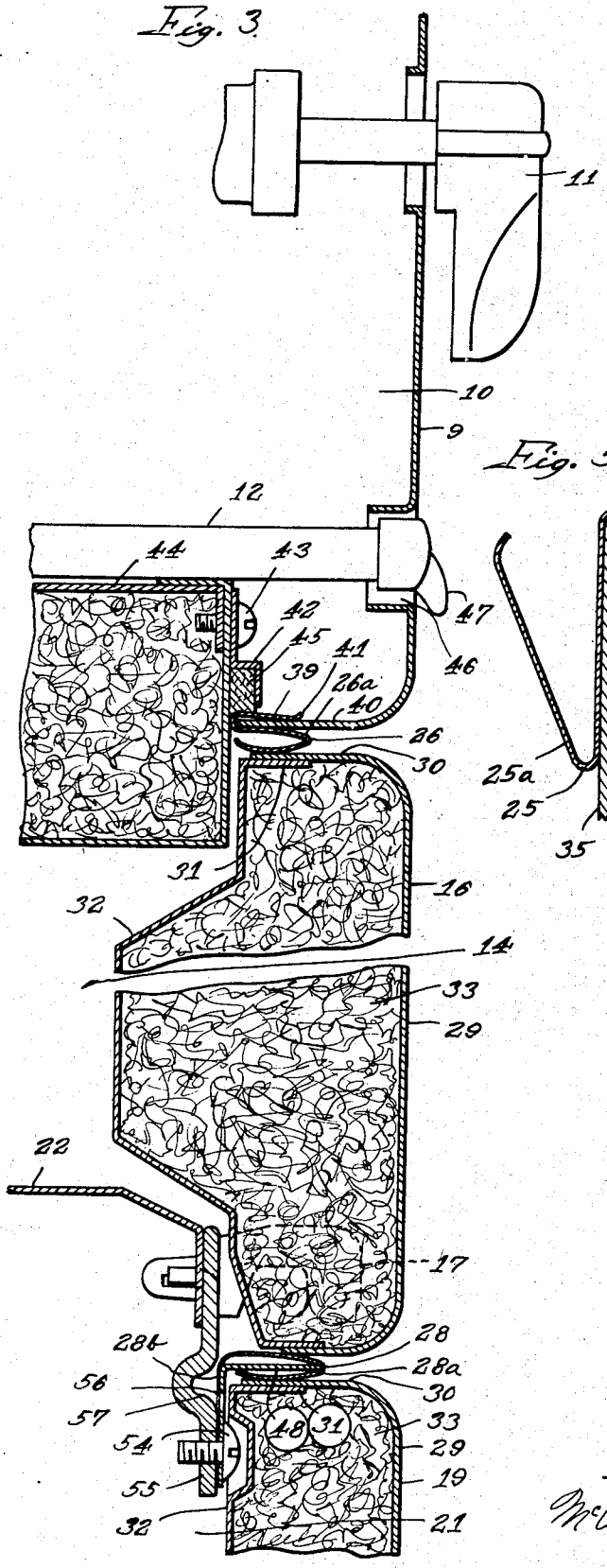


Fig. 4

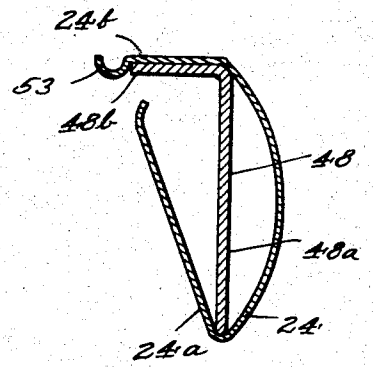


Fig. 5

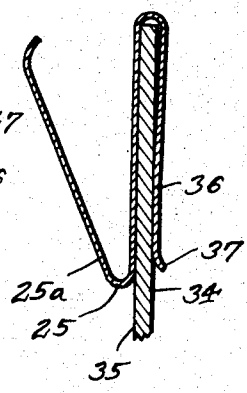
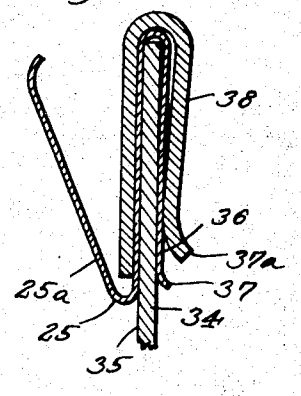


Fig. 6



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UNITED STATES PATENT OFFICE

2,339,398

OVEN DOOR SEAL

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Application November 12, 1940, Serial No. 365,262

7 Claims. (Cl. 20—69)

This invention relates to the doors of ovens for domestic cooking ranges and is particularly concerned with improved sealing means therefor.

The principal object of our invention is to provide oven door seals designed to have wiping contact with the outer peripheries of the doors in the closing thereof, whereby to give assurance of more complete sealing than is possible where the sealing action relies for its effectiveness upon the compression of sealing means between the inner faces of the doors and the stove front, such seals obviously necessitating fairly accurate alignment of all of the parts involved, such as is not usually obtainable in the quantity production of ranges.

Still another important object consists in the provision of door seals for domestic cooking ranges, the application of which to the range involves a minimum of special construction of the range, the strips being applicable to certain existing ranges with little or no change in the construction of the doors or front structure.

The invention is illustrated in the accompanying drawings, in which—

Fig. 1 is a front view of a gas range equipped with door seals provided in accordance with our invention;

Fig. 2 is a horizontal section on the line 2—2 of Fig. 1, with an intermediate portion of the section broken away to permit showing the parts on a larger scale;

Fig. 3 is a vertical section on the line 3—3 of Fig. 1, with an intermediate portion of the section broken away for the same reason as in Fig. 2;

Fig. 4 is a horizontal sectional detail of the middle vertical sealing strip taken on the line 4—4 of Fig. 1;

Fig. 5 is a horizontal sectional detail of one of the other vertical sealing strips taken on the line 5—5 of Fig. 1; and

Fig. 6 is a similar sectional detail on the line 6—6 of Fig. 1, showing the auxiliary attaching spring clips used in connection with these other sealing strips.

The same reference numerals are applied to corresponding parts throughout the views.

Referring first mainly to Fig. 1, the reference numeral 7 designates a domestic gas range, although, of course, the door seals of our invention are applicable to the oven doors of domestic cooking ranges generally. 8 is the cooking top of the range, and 9 is the panel closing the front of the burner box compartment 10 under the cooking top. The gas burners for the cooking top are not shown, but have the cocks thereof controlled by knobs 11, and at 12 are indicated the drip pans provided in the bottom of the burner box compartment. At 13 and 14 are indicated the baking ovens, for which the doors 15 and 16 form closures, these doors being mounted on hinges 17 to swing downwardly to substantially horizontal open positions. At 18 and 19 are indicated closures for the compartments 20 and 21 beneath the ovens 13 and 14, respectively. Usually one of these compartments has a broiler drawer therein, in which event the closure 18 or 19, as the case may be, forms the hinged front on said drawer. The burners for the ovens 13 and 14 are provided under the oven bottoms 22 in the upper portions of the compartments 20 and 21. Where there were no seals for the oven doors 15 and 16, the operating efficiency of the ovens was not as high as desired, due to the heat losses around the doors, and, of course, this heat loss became a more noteworthy objection when the ovens were insulated, as herein illustrated. The seepage around the doors also had a tendency to discolor the range front, or at any rate necessitate more frequent cleaning than would otherwise be necessary. In the application of seals to the oven doors 15 and 16, it also is desirable to provide seals at least around the sides and tops of the closures 18 and 19 to cut down heat losses and accordingly further increase the over-all efficiency, no seals being necessary along the bottoms of these closures, inasmuch as the bottoms of the compartments 20 and 21 are provided with openings to admit air to support combustion at the burners as well as to mix with the gas delivered to the burners to form combustible mixtures. We have, therefore, provided three vertically extending sealing strips, 23, 24, and 25, and three horizontally extending sealing strips, 26, 27, and 28, to seal all four edges of each of the oven doors 15 and 16 and only the upper edges and lateral edges of the doors or closures 18 and 19, whereby effectively to prevent seepage from the ovens 13 and 14 and at the same time greatly reduce heat losses from the compartments 20 and 21 without interfering with the adequate supply of air to the oven burners. Strips 23 and 24 reach from the bottom of the compartment 20 to the top of the oven 13, and the strips 24 and 25 bear the same relation to the compartment 21 and oven 14 above the same. The strip 26 extends the full width of the two ovens 13 and 14, whereas the strips 27 and 28 are individual to the two ovens and the compartments therebeneath, the strip 27 extending be-

tween strips 23 and 24 and the strip 28 extending between strips 24 and 25. The general arrangement of the strips 23—28 forms the subject matter of a divisional application, Serial No. 488,118, filed May 24, 1943. All of these strips 23—28, as hereinafter more clearly appears, cooperate with the outer peripheries of the oven doors 15 and 16 and doors or closures 18 and 19, having wiping contact therewith for sealing purposes.

The oven doors 15 and 16 each comprise an outer porcelain enameled panel 29, the marginal flange 30 of which has a telescoping fit over the marginal flange 31 of an inner porcelain enameled panel 32, the space between the panels 29 and 32 being filled with insulating material, as indicated at 33. The doors or closures 18 and 19 are similarly constructed. The flanges 30 define the outer peripheries of the doors 15, 16, 18, and 19, and are flat and smooth and, therefore, adapted for good wiping sealing contact with the sealing strips 23—28. All of these strips have generally C-shaped sections arranged to be compressed by contact with the edges of the doors as they are closed, as indicated at 24*a*, 25*a*, 26*a*, and 28*a*, it being understood that the portion 23*a* of the strip 23 is like the portion 25*a* of the strip 25 and that the portion 27*a* of the strip 27 is like the portion 28*a* of the strip 28.

The strips 23 and 25 are both substantially S-shaped in cross-section and carried on the rearwardly projecting vertical flange 34 of the porcelain enameled jacket ends 35, as clearly appears in Figs. 2, 5, and 6. The C-shaped portion 36 of each of these strips 23 and 25 receives the flange 34 with a close fit, the longitudinal edges 37 thereof being curled outwardly to facilitate entering the flange 34 and the flange being thereafter gripped under the inherent spring tension in the strips, it being understood that the strips 23 and 25 are of suitable spring metal. The tight friction fit of the strips 23 and 25 on the flanges 34 may be relied upon to prevent endwise displacement of the strips from their assembled positions without other provisions. However we may provide additional spring clips 38 of heavier gauge spring metal superimposed on the portions 36 of the strips 23 and 25 at opposite ends thereof, and, if desired, also at intermediate points along the length of said strips, whereby to insure good anchorage of the strips without necessitating riveting or welding or other fastenings. The clips 38 will preferably have one end portion 37*a* curled outwardly to facilitate their application to the strips 23 and 25, as indicated in Fig. 6.

The strip 26 is likewise S-shaped in cross-section, as clearly appears in Fig. 3, its C-shaped portion 39 receiving the rearwardly bent flange 40 of the panel 9 and likewise having an outwardly curled longitudinal edge 41 to facilitate entry of the flange 40 when the strip 26 is being assembled on the panel 9. The strip 26, like the strips 23 and 25, is formed from spring metal and the portion 39 has sufficient spring tension to grip the flange 40, but we may provide additional spring clips 38 superimposed on the ends of the strip 26, similarly as in the case of the strips 23 and 25, to insure good anchorage of the strip 26, and these additional clips may be provided only at the ends if desired or also at one or more intermediate points along the length of the strip 26. A sheet metal strip 42 secured, as indicated at 43, to the front end of the hollow insulated oven top wall 44 serves to secure a strip of asbestos, or other fire-proof packing material, 45 in place in tight contact with the upper C-shaped portion 39 of the strip 26 from above, the full length of the strip, whereby to prevent seepage of hot gases from either of the ovens 13 and 14 upwardly behind the strip 26 and into the burner box compartment 10. In the past where no oven door seals were provided and no sealing means corresponding with the packing strip 45, the hot gases escaping from the oven into the burner box compartment and out through the openings 46, through which the front ends of the drip pans 12 project, caused objectionable heating of the handles 47 on these drip pans and also objectionable discoloration of the exposed front ends of these pans. The sealing of the doors would, of course, only increase the flow of the hot gases out through the openings 46 were it not for the provision of the packing strip 45.

The strips 24, 27, and 28, which forms the subject matter of another divisional application, Serial No. 488,119, filed May 24, 1943, are all adapted to be secured in place in a similar manner, namely, by means of sheet metal strips 48 of L-shaped cross-section, each of the strips 24, 27, and 28 being of generally P-shaped cross-section, the loop of the letter P being C-shaped, as indicated at 24*a* and 28*a* in Figs. 2, 3, and 4, to receive the one leg 48*a* of the strips 48, while the leg of the letter P, indicated at 24*b* and 28*b*, is engaged by the other leg 48*b* of the L-shaped strips 48 for anchorage of the strips 24, 27, and 28 to the front of the range. Thus the L-shaped strip 48 cooperating with the sealing strip 24 is fastened by screws 49 to the vertical parting rail 50 forming a portion of the front frame of the range, a front corner rail 51 of which also appears in Fig. 2. The strip 48 is slotted, as indicated at 52, to facilitate entry under the heads of the screws 49. The strip 24 is held against lateral displacement with respect to the strip 48 by means of the beaded edge 53 which engages the edge of the leg 48*b* of the strip 48. The leg 48*b* is widened only at the points where it is anchored by the screws 49, and at those points the bead 53 is cut away to permit extension of said portions beyond the bead. However, the strips 48 provided in connection with the sealing strips 27 and 28 can be of uniform width throughout the length thereof, there being no need for the provision of any bead 43 on the sealing strips 27 and 28. Screws 54 are shown fastening the strips 48 to the horizontal parting rails 55 that also form parts of the front frame of the range along with the rail 50 and corner posts 51. The strips 27 and 28 and their fastening strips 48 preferably have registering openings 56 provided therein, as indicated in Fig. 3, in register with the lower portions of the horizontal channels 57 provided in the parting rails 55, whereby to permit drainage of condensation that is apt to collect behind the strips 27 and 28, especially in the preheating of the ovens. Where no provision is made for the drainage of condensation, there is likelihood of the parts rusting. Where the oven doors were not provided with seals, the condensation collecting on the inner side of the doors trickled down and collected along the bottom of the doors, but where the sealing strips have contact with the bottom edges of the doors, this provision for drainage of the condensation is considered desirable if not absolutely essential.

It should be clear from the foregoing description that we have provided simple and inexpensive sealing strips, which by wiping contact with the outer peripheries of the doors and com-

pression in the closing of the doors effectively seal the ovens against the objectionable seepage and heat losses around the doors, thus protecting the porcelain enameled front panels against discoloration and avoiding the necessity for so much attention in the way of cleaning to keep the same presentable. It is also clear that the application of the sealing strips 23—28 in the manner herein disclosed requires little or no change in the construction of the range otherwise. The effectiveness of the sealing action is furthermore not dependent upon close accuracy in the alignment of the various parts going to make up the range front, there being easily enough yield in the resilient compressible and expansible sealing strips 23—28 to compensate for whatever irregularities may occur in the spacing of parts involved in the sealing action.

It is believed the foregoing description conveys a good understanding of the objects and advantages of our invention. The appended claims have been drawn with a view to covering all legitimate modifications and adaptations.

We claim:

1. In a seal structure to minimize air flow between the edges of a swinging closure and its surrounding frame, a spring metal sealing strip of generally S-shaped cross-section providing one longitudinal portion of generally C-shaped section opening forwardly relative to the frame, the frame having a substantially vertical inturned flange for entry in and support of the C-shaped portion of said strip thereon, the remaining longitudinal portion of said strip being of C-shaped section opening rearwardly toward the frame and disposed between said inturned flange and the edge of said closure and being arranged to be compressed by engagement of the vertical edge portion of the closure on the adjacent side thereof, and one or more spring clips of generally C-shaped form for clamping the sealing strip on said inturned flange, said clips being superimposed on the first mentioned longitudinal portion of the strip to compress the same into tight frictional engagement with the flange.

2. In a seal structure to minimize air flow between the edges of a swinging closure and its surrounding frame, a spring metal sealing strip of generally S-shaped cross-section providing one longitudinal portion of generally C-shaped section opening forwardly relative to the frame, the frame having a substantially horizontal inturned flange for entry in and support of the C-shaped portion of said strip thereon, the remaining longitudinal portion of said strip being of C-shaped section opening rearwardly toward the frame and disposed between said inturned flange and the edge of said closure and being arranged to be compressed by engagement of the horizontal edge portion of the closure on the adjacent side thereof, and one or more spring clips of generally C-shaped form for clamping the sealing strip on said inturned flange, said clips being superimposed on the first mentioned longitudinal portion of the strip to compress the same into tight frictional engagement with the flange.

3. The combination of a frame, a hinged closure therefor, a panel forming a fixed closure for said frame having an inturned flange on the lower edge thereof in closely spaced substantially parallel relation to the upper edge of said hinged closure, a spring metal sealing strip mounted on said flange and having a resilient edge portion slidably engaging the upper edge of said hinged closure, and other sealing means on the frame above the rear edge portion of the inturned flange aforesaid.

4. The combination of a frame, a hinged closure therefor, a panel forming a fixed closure for said frame having an inturned flange on the lower edge thereof in closely spaced substantially parallel relation to the upper edge of said hinged closure, a spring metal sealing strip of generally S-shaped section disposed horizontally between the upper edge of the hinged closure and the panel thereabove with the upper C-shaped portion of the strip receiving the inturned flange for support of the strip thereon, said strip having the lower C-shaped portion compressed between the flange and the upper edge of the hinged closure by slidable engagement with the upper edge of said closure, and sealing means carried on the frame and engaging the top of the sealing strip from above the inturned flange aforesaid.

5. A structure as set forth in claim 4, including one or more spring clips of generally C-shaped form for clamping the sealing strip on said inturned flange, said clips being superimposed on the upper C-shaped portion of the strip to compress the same into tight frictional engagement with the flange.

6. A metallic sealing strip construction for application to flanged metal frame members and the like, comprising a spring metal sealing strip of generally S-shaped cross-section providing one longitudinal portion of generally C-shaped section adapted for frictional engagement with a flange on the frame, and another longitudinal portion of C-shaped section for compression as a seal portion connected with the first mentioned longitudinal portion, and one or more spring clips of generally C-shaped form for clamping the first mentioned longitudinal portion of the strip on the flange, said clips being superimposed on said longitudinal portion to compress the same into tight frictional engagement with the flange.

7. A seal structure adapted for use between a closure member and a frame, said frame including a flange in closely spaced substantially parallel relation to the edge of the closure member, said seal structure comprising a spring metal sealing strip of generally S-shaped section having one C-shaped portion thereof receiving the flange for support of the strip thereon, the other C-shaped portion of the strip being arranged for insertion between the flange and the edge of the closure, and other sealing means on the frame on the far side of the flange in relation to the closure member engaging the first mentioned C-shaped portion of the strip.

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