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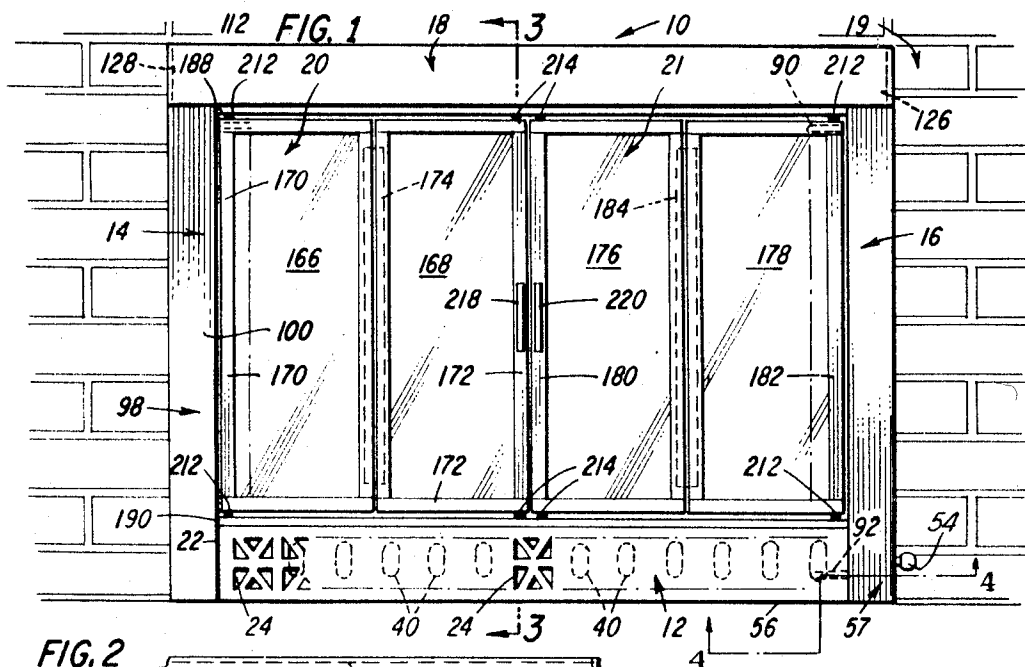
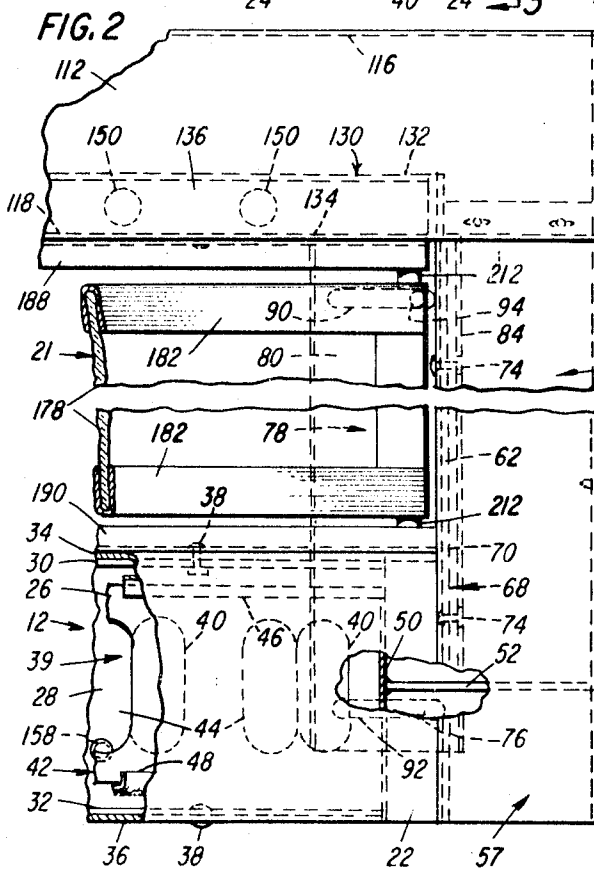
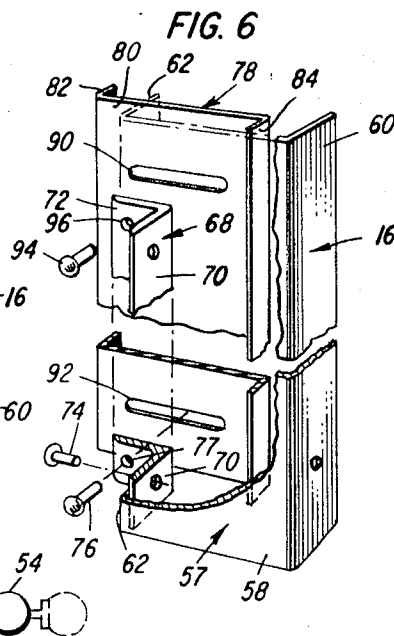
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GLASS FIREPLACE SCREEN HAVING IMPROVED DRAFT CONTROL

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2 Sheets-Sheet 1



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GLASS FIREPLACE SCREEN HAVING IMPROVED DRAFT CONTROL

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9 Claims

ABSTRACT OF THE DISCLOSURE

An apparatus for installation in the opening of a fireplace is described which includes a rectangular framework adapted to surround the fireplace opening and to define an opening for access into the fireplace. Mounted in the access opening is closure means comprised of a plurality of glass or like movably mounted panels. The apparatus is characterized by improved means for sealing the fireplace against unwanted air leakage and to permit control of the draft entering the fireplace by means of sealing portions projecting from the framework adapted to abut the facing around the fireplace opening. Adjustable sealing members of generally Z-shaped configuration are provided at the sides of the framework to assure effective sealing over a range of fireplace opening widths for apparatus having a framework of fixed overall dimensions.

The invention

The present invention relates to a fireplace accessory, and more particularly to a closure device adapted to be fixedly mounted in front of the fireplace opening having two or more hinged and/or sliding glass doors and an improved structure for controlling the draft entering the fireplace. The improved structure of this invention is especially advantageous since it permits convenient adjustability of the screen to seal effectively, fireplaces with a moderately large range of opening sizes.

Among the more popular fireplace accessories employed in recent years are the so-called glass firescreens. Such devices are characterized by a rigid frame fitted against the masonry defining the fireplace opening and including suitable means for supporting two or more glass door elements slidingly or pivotally mounted to provide access to the interior of the fireplace.

Some of the reasons for the popularity of glass firescreens are the possibility for more uniform burning of the wood or other fuel employed in the fireplace, and more uniform radiation and convection of heat through the glass panels than can be achieved with customary wire mesh screens. In addition, because the fireplace opening is substantially closed when the fireplace is in use, the normal substantial draft drawn to the fireplace through the large fireplace opening is avoided with resulting increased comfort to those in the vicinity of the fireplace.

While the use of fireplaces and analogous structures undoubtedly predates written history, fireplace design remains an art which is surprisingly complicated considering the relative simplicity of the resulting structure. Proper design of the internal fireplace structure and selection of proper dimensions relative to the overall size of the fireplace remains a significant factor in achieving satisfactory operation. Minor design errors can easily result in a fireplace in which smoke from the burning fuel is vented principally into the room rather than through the chimney.

The use of a glass firescreen completely covering the fireplace opening offers a solution to these difficulties, but may add complications to an already complex situa-

tion. In fact, it has been found that an improperly designed and fitted glass firescreen may produce unsatisfactory results even in a properly designed fireplace. One of the principal difficulties is found to reside in properly fitting the screen to seal the fireplace opening, thus to control the draft which is allowed to enter the fireplace through draft openings in the firescreen. In principle, one can design a single properly fitting glass firescreen, given the exact dimensions of the fireplace opening. However, such an approach is practical only on a small scale, and in any event, is quite costly. The alternative, of course, is for the dealer to stock glass screens of many sizes or at least to provide several different sizes of screens having built-in adjustability to fit a range of fireplace openings.

While the latter is an attractive approach, previous adjustable glass firescreens have not been completely effective in preventing unwanted air leakage or in fitting the intended range of the fireplace sizes with a satisfactorily attractive appearance. The problem is particularly acute in the construction of glass firescreens adjustable to fit fireplace openings having a range of widths.

The present invention overcomes the above described difficulties by the employment of an overall rigid frame and adjustable sealing members attached to the side portions of the frame. The sealing members are of generally Z-shape, and are adapted not only to cover the rough masonry around the fireplace opening and thereby produce an attractive appearance for the installed glass screen, but also and more significantly, effectively to seal the glass frame to the fireplace opening to prevent undesired air leakage.

Accordingly, it is a general object of the present invention to provide an improved construction for a glass fireplace screen.

It is a related object of this invention to provide an improved glass fireplace screen which is adjustable to accommodate use in fireplaces having a variety of widths.

It is a further related object of this invention to provide an improved glass fireplace screen as described above, adapted to provide a covering for the rough masonry around the fireplace opening thereby to improve the appearance of the installed fireplace screen.

It is another general object of this invention to provide an improved glass fireplace screen adjustable to fit a variety of fireplace openings while still effective to seal the screen to the fireplace opening to prevent undesired air leakage.

It is an additional object of this invention to provide an improved glass fireplace screen as described above having a substantially rigid outer frame and including adjustable side sealing members of generally Z-shaped configuration for engaging the masonry of the side walls of the fireplace opening and for effectively sealing the opening against undesirable air leakage.

The exact nature of this invention as well as other objects and advantages thereof, will become apparent from consideration of the following detailed description and the accompanying drawings in which:

FIGURE 1 is a front elevation, partially broken away, illustrating the overall features of the improved glass fireplace screen of this invention.

FIGURE 2 is an enlarged fragmentary view of the right hand side of FIGURE 1, partially broken away to show the details of the construction;

FIGURE 3 is a vertical cross section taken along the broken line 3—3 in FIGURE 1;

FIGURE 4 is a fragmentary bottom view of the lower right hand corner of FIGURE 1, partially in section, with the portion in section taken along line 4—4 in FIGURE 1, and with handle 54 omitted;

FIGURE 5 is an enlarged fragmentary front view of the lower right-hand corner of FIGURES 1 and 2, illustrating the improved construction of the present invention;

FIGURE 6 is an enlarged fragmentary view of a portion of FIGURE 5 with certain portions cut away to illustrate further details of the construction; and

FIGURE 7 is a fragmentary sectional view showing an alternative construction for portions of the apparatus shown in FIGURES 5 and 6.

Referring now particularly to the drawings, the improved glass fireplace screen of the present invention, generally indicated at 10, comprises a horizontal riser frame 12, at the bottom, a pair of vertical side frames 14 and 16, and a horizontal top frame 18. The above elements are rigidly secured together and attached to the masonry 19 surrounding the fireplace opening as described in detail below to provide the outer framing of the firescreen and also to support a pair of movable doors 20 and 21, which open to provide access to the interior of the fireplace.

Riser 12 is comprised of a decorative facing plate 22 formed of any suitable material, e.g., polished brass or steel. The facing plate includes a plurality of spaced openings 24 of any desired configuration to allow unimpeded inflow of air as described hereinafter.

As illustrated in FIGURES 3 and 5, riser 12 further comprises a horizontally elongated supporting channel member 26 formed of a suitable material such as steel, and having a wide web portion 28 and a pair of short outwardly extending flanges 30 and 32 at the top and bottom respectively. Facing plate 22 is attached to horizontal supporting channel member 26 by means of a pair of inwardly bent flanges 34 and 36 which overlie corresponding flanges 30 and 32. Flanges 30 and 34 and flanges 32 and 36 are connected together in any suitable fashion, e.g., by welding, or by means of a plurality of spaced rivets 38 (see FIGURES 2-4) to form a horizontally elongated draft regulation chamber generally denoted at 39 in FIGURES 3 and 5.

Web portion 28 of horizontal supporting channel member 26 is provided with a plurality of enlarged apertures 40 which serve as draft inlets. Draft regulation is accomplished by a rectangular plate 42 having a plurality of apertures 44 of like number and configuration as apertures 40 in supporting channel web portion 28. Draft regulating plate 42 is slidably retained adjacent to web portion 28 by a pair of horizontally elongated retaining lugs 46 and 48 attached, as by welding, to supporting channel web portion 28. Plate 42 is terminated at its right hand end in a short outwardly extending flange 50 (see FIGURE 2) to which is attached, as by welding or otherwise, an elongated rod 52. The latter passes through a series of aligned apertures in right hand side frame 15 and terminates in an attached control handle portion 54. As will be appreciated, movement of handle 54, as shown in FIGURE 2, permits selective alignment of the apertures 40 and 44 in horizontal support web portion 28 and draft regulating plate 42 to adjust the effective size of the air inlets in draft regulation chamber 39. Since the construction to be described below substantially seals the fireplace opening against uncontrolled air inflow, it will be appreciated that positioning of draft regulating plate 42 provides an easily controllable adjustment of the effective fireplace draft.

As illustrated in FIGURE 5, horizontal riser 12 terminates adjacent to vertical side frames 14 and 16 and is attached thereto as described below to provide a neat finished appearance for the lower corners of the firescreen. With reference to FIGURES 4-6, side frame 16 is comprised of a vertical channel 57 formed of brass or the like, and finished to present an attractive appearance. Channel 57 extends upward from the fireplace hearth 56 as shown, and includes a facing plate 58 and a pair of flanges 60 and 62 extending rearwardly toward the fire-

place wall 19. A vertically elongated insulating member 64 of rectangular cross section, cemented or otherwise secured to outer flange 60 and to the inner surface 66 of facing plate 58, abuts the fireplace wall, as shown in FIGURE 4, when the firescreen is installed.

Side frame 16 further includes a vertical angle member 68 having equal legs 70 and 72 with leg 70 extending outwardly from the plane of the fireplace opening and with leg 72 extending generally parallel to the fireplace opening.

Angle member 68 extends upward from hearth 56 and is secured to channel 57 in any suitable fashion, as by a plurality of spaced rivets 74 extending through inner flange 62 and angle member leg 70. Riser 12 is attached to side frame member 16 as by a rivet 76 extending through horizontal supporting channel web portion 28 and through leg 72 of vertical angle member 68.

Side frame 16 further includes a vertically elongated sealing member 78 of generally Z-shaped cross section, terminating short of the ends of angle member 68. Sealing member 78 includes a rectangular web portion 80 parallel to the fireplace opening, and a pair of oppositely extending flanges 82 and 84 bent so as to extend toward and away from the fireplace opening, respectively.

As illustrated in FIGURE 6, sealing member web portion 80 includes a pair of narrow transverse slots 90 and 92 at the upper and lower ends thereof. Rivet 76, extending through aperture 77 in vertical angle member leg 72 (and through horizontal supporting channel web portion 28 as shown in FIGURE 3), also extends through slot 92 while a similar rivet 94 passes through an aperture 96 in leg 72 and through slot 90 to secure sealing member 78 to side frame 26. Slots 90 and 92 are slightly wider than the diameter of the shank portions of rivets 76 and 94 so that sealing member 78 may be slidably adjusted relative to angle member 72.

Left hand side frame 14 is of substantially identical construction to that of side frame 16 except for appropriate mirror reversal. Thus, as shown in FIGURE 3, side frame 14 includes a vertical channel 98 of which a facing plate 100 and inner flange 102 are visible, a vertical angle member 104, of which leg 106, parallel to the fireplace opening, is visible, Z-shaped sealing member 108, of which inwardly extending flange 110 is visible, as well as other portions corresponding to the described portions of side frame 16 omitted from the drawings in the interest of simplicity. Since the above described structure and the assembly thereof is substantially identical to that previously described in detail, no further description is deemed necessary.

As will be appreciated, firescreen 10 is installed with the web portions of adjustable sealing members 78 and 108 abutting the fireplace outer facing 86. The position of sealing members 78 and 108 is then adjusted so that the inwardly extending flanges 82 and 110 engage the inner surface 88 of the fireplace opening to seal the opening tightly and to give a finished appearance to the vertical edges 99 of the masonry around the fireplace opening.

The use of slidably adjustable sealing members 78 and 108 permits accommodation of a range of fireplace widths by a single size firescreen. The degree of adjustability is determined by the width of slots 90 and 92 in sealing member 78 and of the similar slots in sealing member 108. Thus, while the overall transverse dimension of firescreen 10 depends upon the width of riser 12 and side frames 14 and 16, the maximum width of the fireplace which can be accommodated is determined by the distance between sealing member flanges 82 and 110 when the latter are positioned with the innermost ends of the respective adjusting slots engaged with the connecting rivets, while the minimum size fireplace that can be accommodated is determined by the distance between flanges 82 and 110 when the outermost ends of the adjusting slots are in contact with the connecting rivets.

Finally, the frame work of firescreen 10 is completed by top frame member, 18, illustrated in detail in FIGURES 2-4.

Upper frame 18 extends transversely the entire width of the firescreen framework and is arranged to overlie the upper portions of side frames 14 and 16 to produce a finished appearance for the structure. Upper frame 18 comprises a horizontally elongated metal front plate 112 having a facing 114, a pair of unequal flanges 116 and 118 extending inwardly from the top and bottom edges of facing 114. Attached to top flange 116 is a horizontally elongated insulating member 122 cemented to the inner surface 124 thereof, adapted to abut the lintel 120 at the top of the fireplace opening. As will be appreciated, the height of the fireplace opening, determined by the lower surface 121 of lintel 120, may be subject to some variation upward or downward as long as it does not exceed the distance from the fireplace hearth to the top of upper flange 116. Preferably, however, the height of the fireplace opening is at least about 1/2 inch less than the distance from the hearth to flange 116 in order to assure effective control of air leakage.

As shown in FIGURES 3 and 4, facing 114 terminates at its ends in a pair of rearwardly extending flanges 126 and 128 at the right and left sides, respectively, of firescreen 10. Flanges 126 and 128 are formed in any convenient manner, and extend rearwardly a sufficient distance to overlie outer flange 60 of right side channel 57 and the corresponding outer flange (not shown) of left side channel 98. If desired, these flanges may be secured together as by welding at 129, (see FIGURE 4) on the right hand side of firescreen 10, and at the corresponding location (not shown) on the left side.

Disposed between facing 114 and flanges 116 and 118, is an elongated metal channel member 130 of generally J-shaped cross section, having an upper flange 132, a somewhat shorter lower flange 134, and a vertical web portion 136. The outer end 138 of flange 132 is welded to the inner surface 140 of front facing panel 114. Channel 130 is also secured to side frame members 114 and 116 as by welding web portion 136 to the transversely extending leg 72 of right hand vertical angle member 68, and to the upper end 144 of transversely extending leg 106 of left hand vertical angle member 104.

Lower flange 134 of channel member 130 is vertically aligned with, or preferably slightly above lower flange 118 of front facing 114 and terminates sufficiently short of the latter to form an air passage 146 into the interior of the cavity 148 defined by facing plate 114 and J-shaped channel member 130. Web portion 136 of channel 130 includes a plurality of circular apertures 150 at spaced intervals along its length which serve as supplementary draft openings. However, it will be understood that air inlets 150 may be dispensed with, if desired, and if a sufficient draft is created when draft inlets 40 and 44 in riser 12 (see FIGURES 2 and 5) are fully aligned. Similarly, supplementary draft openings 150, while shown as relatively small circular apertures, e.g., of approximately 1/2 inch diameter, may be replaced by larger or smaller openings of any other desired configuration if necessary.

The above described structure provides the outer framework as well as the draft control means for the improved firescreen 10 of the present invention. This structure is supported within the fireplace opening in any convenient fashion, but preferably in such a manner as to prevent movement which might impair the sealing efficiency. One suitable mounting structure comprises a series of L-shaped metal brackets 152 (see FIGURE 3) having vertical arm portions 154 and elongated horizontal arm portions 156 secured to horizontal supporting channel web portion 28 in any suitable fashion such as by screws 158. Each of supporting brackets 152 are anchored within the fireplace as by a lag bolt 160 and a cooperating anchor 162 secured in a recess 164 in fire-

place floor 159. A sufficient number of supporting brackets 152, e.g., 3-4, is provided to anchor firescreen 10 rigidly in position within the fireplace opening. Then, by adjustably positioning slidable sealing members 78 and 108, the entire firescreen structure is rigidly secured to the walls of the fireplace to provide an effective air seal and an attractive finished appearance.

The construction and attachment of fireplace doors 20 and 21 is best illustrated in FIGURES 1-3, and 5. Fireplace door 20 is comprised of a pair of panels 166 and 168, formed of heat resistant glass or other transparent thermally conductive material, each surrounded by rectangular metal frames 170 and 172, respectively, connected by means of a vertically elongated hinge 174 disposed on the inside of the door as illustrated in FIGURE 1. Similarly, door 21 comprises a pair of glass or like panels 176 and 178, surrounded by rectangular metal frames 180 and 182, respectively, and connected by means of a vertically elongated hinge 184. Panel frames 170, 172, 180, and 182, are comprised of four U-shaped channels 186 of appropriate size to completely surround each of the glass panels, as illustrated in FIGURES 3 and 5.

Doors 20 and 21 are pivotally and slidably secured within the opening between riser 12, side frames 14 and 16, and top frame 18, by means of a top retaining channel 188, and a like bottom retaining channel 190. Retaining channel 188 includes a front flange 192, a back flange 194, and a web portion 196, while channel 190 includes a front flange 198, a back flange 200, and a web portion 202. The ends of flanges 192, 194, 198, and 200 are turned inwardly upon themselves to form a series of elongated strengthening ribs 204, 206, 208, and 210 as illustrated in FIGURES 3 and 5.

Attached at the outer ends of the top and bottom of rectangular frames 170 and 182 are four like hinge pins 212 such as shown in FIGURE 5. Similarly, four guide pins 214 are secured to the top and bottom of rectangular frames 172 and 180 at the inner ends thereof. Pins 212 and 214 are retained within channels 188 and 190 for movably supporting doors 18 and 20. Pins 212 are positioned in shallow pivot bearings 216 to prevent sliding movement of the outer ends of doors 20 and 21. Guide pins 214 are freely movable within channels 188 and 190 as shown in FIGURE 3. Thus, when doors 18 and 20 are opened, as by handles 218 and 220, panels 166 and 168, and similarly panels 176 and 178, fold outwardly toward each other to provide access to the interior of the fireplace.

The dimensions of door panels 166, 168, 176, and 178 are sufficiently large to clear the front flanges 192 and 198 of retaining channels 188 and 190, while rear flanges 194 and 200 extend upwardly and downwardly a sufficient distance to slightly overlie the edges of the horizontal portions of the panel frames. This construction serves not only to prevent inward buckling of doors 18 and 20 with resulting strain on hinges 174 and 184, but also further to seal the fireplace opening against unwanted air leakage at the top and bottom. Similarly, outer door panels 166 and 178 are sufficiently wide to overlie the transversely extending leg 72 and 106 of vertical angle members 68 and 104, to prevent unwanted air leakage at the sides.

While the above described structure is the preferred embodiment of the improved glass fireplace screen of the present invention, it will be understood that substantial modification within the scope of the invention is contemplated. For example, in FIGURE 7, there is illustrated at 16' suitable modification of the vertical frame members 14 and 16. Modified side frame member 16', though slightly less rigid, has the advantage of greater simplicity and corresponding reduction in cost. Frame member 16' includes a vertically extending U-shaped channel member 58' serving as a face plate and terminating in a pair of rearwardly extending flange portions 60' and 62' at the outer and inner ends respectively. In contrast to the

above described embodiment, the vertical angle member 68 is removed and in its place is substituted an extended portion of flange 62' which is inwardly bent at 221 to form an additional flange 222. Flange 62' and additional flange 222 cooperate to serve the function of legs 70 and 72 respectively of angle member 68 in the above described embodiment. Thus, rivet 76', extending through an opening 224, engages with a Z-shaped sealing member 78', identical to sealing member 78. As will be appreciated, for the modified embodiment shown in FIGURE 7, a riser corresponding to riser 12 can be attached to side frame 16' in the manner previously described, i.e., by means of rivet 76' (see FIGURE 4) or in any other convenient or desired manner.

Moreover, numerous other variations will be readily apparent which provide the desired transverse adjustability combined with control of undesired air leakage and an attractive finished appearance over a range of widths for the fireplace opening.

Thus, the present embodiment is therefore considered in all respects illustrative, and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description and all changes which come within the meaning and range of equivalency of the claims are therefore intended to be embraced therein.

What is claimed is:

1. Closure apparatus for a fireplace opening, comprising: a generally rectangular framework having bottom, side and top members; means for rigidly securing said framework around said fireplace opening; said side members including fixed supporting members, and means to minimize air leakage into said fireplace from around said closure apparatus comprising adjustable sealing members, said sealing members comprising vertically elongated portions adapted to engage the facing of the fireplace wall around said fireplace opening, and rearwardly depending flanges at the inner edges thereof to engage the interior of the fireplace wall, said sealing member being slideable relative to said fixed supporting members to adapt the same for use in fireplace openings of a range of sizes; said bottom member including means for adjusting the draft into the fireplace; said bottom, side and top frame members cooperating to define an access opening to the interior of said fireplace, and closure means mounted in said access opening comprising a plurality of thermally conductive panels adapted to be engaged to close said access opening, and movable to permit displacement thereof; said framework including projecting portions cooperating with said heat-conducting panel to minimize air leakage when said panels are engaged.

2. Fireplace closure apparatus as defined in claim 1 wherein each of said side members is comprised of a vertically elongated facing having a pair of rearwardly-depending flanges defining a recess behind said facing; said supporting members depending transversely from the one of said flanges nearest said fireplace opening, the other of said flanges being of sufficient width to terminate proximate said fireplace facing when said fireplace closure is properly installed; and wherein each of said adjustable sealing members is formed by a Z-shaped member having a web portion defining the portion adapted to engage the facing of said fireplace wall, and a pair of oppositely-depending flanges, said oppositely-depending flanges being vertically elongated and disposed at opposite sides of said web portion, said Z-shaped member being movably mounted with one of said flanges extending into said fireplace opening to engage the interior of the fireplace side wall and the other of said flanges extending outwardly into the recess in said facing.

3. Fireplace closure apparatus as defined in claim 2 wherein said Z-shaped members include a plurality of relatively narrow transverse slots across the web portions thereof, and further including means projecting from said

fixed supporting members and slidably engaged within said transverse slots to permit adjustment of the position of said Z-shaped members relative to said fixed supporting members.

4. A fireplace closure as defined in claim 3 wherein said draft regulating means comprises a plate member having a plurality of spaced apertures, said apertures defining draft inlet ducts through the bottom member of said framework, and means cooperating with said plate member for adjustably closing said apertures to control the draft into said fireplace.

5. A fireplace closure as defined in claim 4 wherein said means for adjustably closing said apertures comprises a further plate member having a plurality of spaced apertures therein similar to the apertures in said first plate member, means for slidably supporting said further plate member adjacent said first plate member and means attached to said further plate member for varying the degree of alignment between the apertures in said two plate members to vary the effective size of the draft inlets.

6. A fireplace closure as defined in claim 1 further including first and second horizontally elongated retaining channels secured to said bottom and said top frame members respectively, said channel members including web portions abutting said bottom and said top frame members, and unequal vertically depending flanges, the ones of said flanges closest to the interior of said fireplace being wider than the exterior ones of said flanges, and wherein said closure means includes a plurality of supporting pins projecting from the bottom and top of each said closure panels, said pins being received within said retaining channels, said wider ones of said retaining channel flanges overlying the backs of said closure panels to reduce air leakage.

7. Fireplace closure apparatus as defined in claim 1 wherein each said side member includes a vertically elongated channel member having a web portion and flange portions depending toward said fireplace wall, the outer of said flange portions abutting said wall, and the inner of said flange portions defining the sides of said access opening, and wherein said supporting members comprise angle members having first legs secured to the inner ones of said channel member flange portions and second legs secured to said sealing members, said second legs and said sealing members slightly overlying the sides of said closure means to minimize air leakage when said closure panels are engaged.

8. Fireplace closure apparatus as defined in claim 7 wherein said sealing members include a plurality of transverse slots, and wherein said second legs include a plurality of means projecting therefrom, and passing through said slots, the ends of said projecting means including means for permanently securing said sealing members to said supporting members, said slots being slightly over-size relative to said projecting means to permit transverse movement of said sealing means with respect to said angle members.

9. Fireplace closure apparatus as defined in claim 8 wherein said bottom member, said sealing members, and said angle members are permanently secured together by said means projecting from said second leg.

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FREDERICK KETTERER, Primary Examiner

U.S. Cl. X.R.

49—505; 160—116

UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,457,907

Dated July 29, 1969

Inventor(s) W. D. Brunig

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Col. 2, line 63, "screen screen" should read --screen--.

Col. 3, line 54, "frame 15" should read --frame 16--.

Col. 4, line 64, "memembr" should read --member--.

Col. 6, line 14, "fo" should read --of--.

Signed and sealed this 27th day of November 1973.

(SEAL)
Attest:

EDWARD M. FLETCHER, JR.
Attesting Officer

RENE D. TEGTMEYER
Acting Commissioner of Patents