Sept. 10, 1940. E. F. CHAFFEE 2,214,222

WINDOW CONSTRUCTION

Filed April 11, 1938

Fig-1-

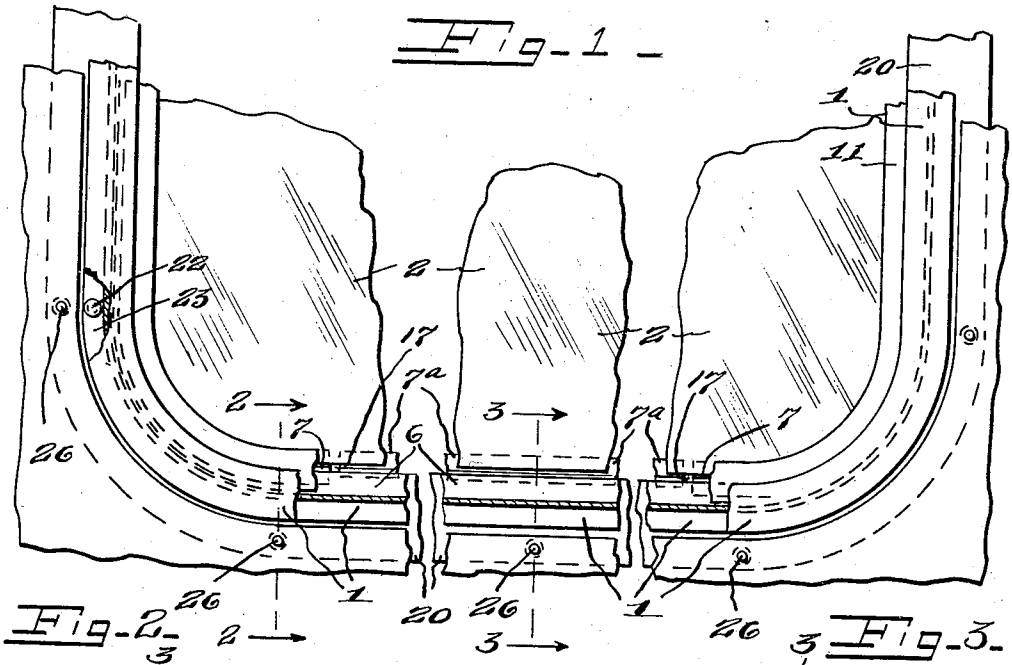


Fig-2-

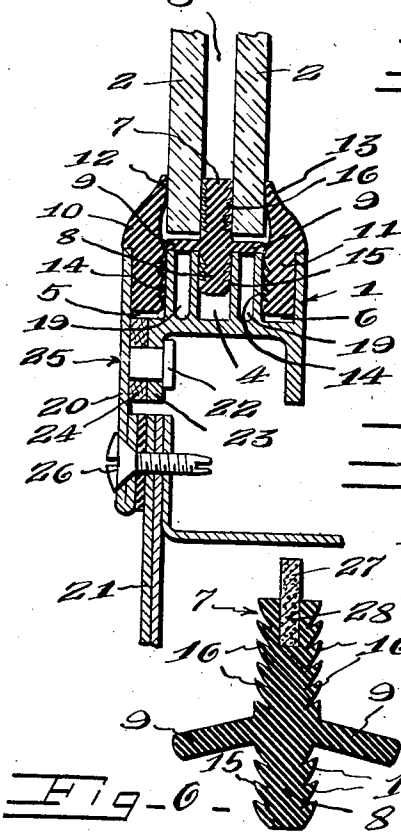


Fig-3-

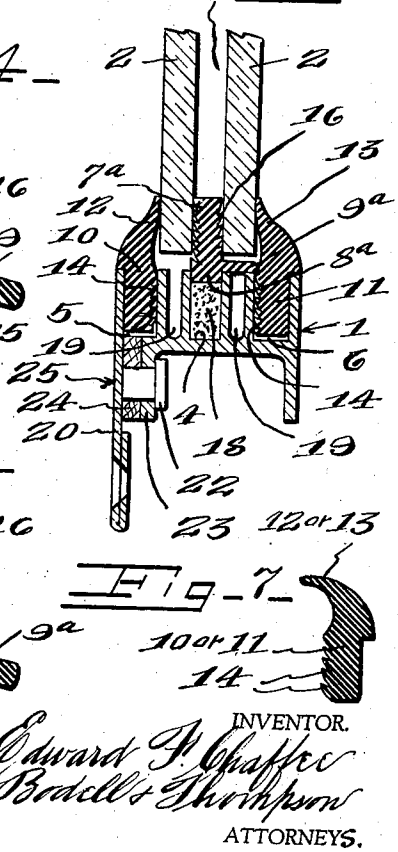


Fig-4-



Fig-5-

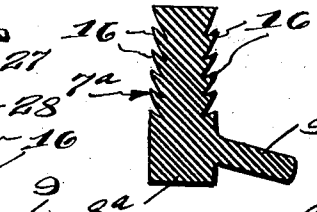


Fig-6-

Fig-7-

INVENTOR.

BY Edward F. Chaffee
Bodell & Thompson

ATTORNEYS.

Patented Sept. 10, 1940 2,214,222

UNITED STATES PATENT OFFICE

2,214,222

WINDOW CONSTRUCTION

Edward F. Chaffee, Syracuse, N. Y., assignor to The O. M. Edwards Company, Inc., Syracuse, N. Y., a corporation of New York

Application April 11, 1938, Serial No. 201,292

11 Claims. (Cl. 189—64)

This invention relates to double window constructions, such as are used in railway cars, buses, and other structures, particularly windows for air-conditioned rooms or interiors. In such windows, the air or other gases is trapped in the space between the glass panes and sealed therein. Also, provision is made for absorbing the moisture from the air sealed between the glass panes. However, due to varying outside air pressure, there is a slow seepage of outside air into the space between the glass panes when the pressure of the outside air is comparatively high or the barometer reading is high, and also a seepage or breathing of air from between the glass panes outward, when the pressure of the outside air is low or the barometer reading low. When the air pressure is low outside of the double sash, there is an outward pressure on the glass panes, and the glass panes in turn exert a pressure on the sealing means or tend to loosen the glass panes in the sealing means, and also when the outside air pressure rises, the pressure thereof on the outside of the glass panes tends to loosen the glass panes in the sealing means. Hence, under the former condition, there is a flow of conditioned air outward from the space between the glass panes, and under the latter condition, a flow of outside air containing moisture into the space between the glass panes. Regardless of moisture-absorbing materials, there gradually accumulates enough moisture in the space between the glass panes to cause them to cloud.

The invention has for its object a construction of sealing means for the glass panes of a double sash, which compensates for the differential pressure between the outside atmosphere and the atmosphere between the glass panes, and thus reduces, to a minimum, the seepage of air into and out of the space between the glass panes.

It further has for its object a particularly simple construction by which a moisture-absorbing material, for preventing clouding of the window panes of the double window, is applied to or embodied in the window construction or sash.

It further has for its object a construction by which the moisture-absorbing material is made accessible for removal and replacement by means permitting the demounting of one glass panel from the sash.

It further has for its object an arrangement of glazing strips and an intermediate spacing strip, all of a resilient compressible material by which the glass panels are assembled with the sash, and either glass panel removable, and further, such a construction in which the moisture-absorbing material is accessible for removal and replacement upon removal of the glazing strip and the corresponding glass panel.

It further has for its object a particularly simple means for welding a sash to the window frame where the sash is of a material or metal not weldable by electro-welding or spot-welding and the window frame is of such a metal.

Other objects appear throughout the specification.

The invention consists in the novel features and in the combinations and constructions hereinafter set forth and claimed.

In describing this invention, reference is had to the accompanying drawing in which like characters designate corresponding parts in all the views.

Figure 1 is a fragmentary elevation, partly in section, of a window embodying this invention.

Figures 2 and 3 are sectional views taken respectively on lines 2—2 and 3—3, Figure 1.

Figure 4 is an enlarged sectional view through the major portion of the spacer.

Figure 5 is a similar sectional view through the remaining portion of the spacer.

Figure 6 is a modified form of the spacer.

Figure 7 is a view of one of the glazing strips showing the form thereof before being compressed into operative position against the glass pane.

The illustrated embodiment of the invention in a double window construction comprises, generally, a sash, glass panels spaced apart with an air space between them, a spacer between the margins of the glass panels, the sash being formed with a recess or channel for receiving a moisture-absorbing material and the spacer being formed with passages leading from the recess into the space between the glass panels, and means for mounting or securing the glass panels assembled in the sash including a removable strip operable to permit the removal of one of the panels to give access to the spacer, the recess and the moisture-absorbing material.

1 designates the sash, which is formed up into generally rectangular form, here shown as having rounding corners. 2 designates the glass panels mounted to have an air space 3 between them.

In the illustrated embodiment, the glass panels are held in place so that each of them can be demounted without demounting the other, but, in so far as certain features are concerned, as for instance, for giving access to the moisture ab-

sorbing material to be presently referred to, one glass panel only need be demountable.

The means for holding a glass panel assembled with the sash is composed of elements of compressible resilient material for cushioning the glass panel. Also, the intermediate spacer between the glass panels is also of resilient compressible material.

In the illustrated embodiment of the invention the sash is formed up with an intermediate inwardly facing recess or channel 4 extending entirely around the same and alined with the space between the panels 2 and also with similar recesses or channels 5, 6 located to the outward of the planes of the panels 2.

7 designates the spacer extending between the margins of the panels 2 and having a base flange 8 extending partly into the intermediate channel 4, the spacer including a major part which is formed with laterally extending flanges 9 on opposite sides thereof extending crosswise of the edges of the panels 2 and a minor remaining part 7a formed with a flange 9a on one side thereof only extending across the edge of one panel 2 only, this panel being the one that is removed when it is desired to give access to the moisture-absorbing material in the recess or channel 4. Also, the base flange 8a of the minor portion 7a is of less depth or extends a shorter distance into the recess or channel 4 than the base flange 8 of the major portion. In order that the flanges 9 and 9a may lie flatwise on the surfaces of the sash opposed to the edges of the glass panels 2, these flanges are initially inclined or tensioned, as shown in Figures 5 and 6.

The means for holding the glass panels assembled with the sash includes glazing strips 10, 11 having base flanges fitting in the channels 5, 6 and head portions 12, 13 pressing against the outer sides of the glass panels 2 respectively. Hence, these head portions and the spacer 7 with its flanges 9, 9a form channels or grooves for receiving the margins of the glass panels 2. The base flanges of the glazing strips are shown as formed with inclined barbs 14 arranged to prevent creeping or looping of the glazing strips out of the channels 5, 6, especially at the rounding corners. Likewise the base flange 8 of the major portion of the spacer 7 is formed with similar barbs 15.

The portion of the spacer between the margins of the glass panels 2 is also formed with barbs 16 on opposite sides thereof coacting with margins of the glass panel to prevent creeping of the spacer out of the recess or channel 3. The glazing strips and the spacer are formed of a resilient compressible material, as rubber, for cushioning the glass panels 2 and relieving them of shocks and strains. The rubber is as impervious as possible. Preferably, the major portion of the spacer extends along the sides and top rail of the sash and part way along the ends of the bottom rail and the minor or remainder portion 7a extends along the intermediate portion of the bottom rail. The moisture-absorbing material is located in the channel 4 in the bottom rail below the remainder portion 7a of the spacer, and passages are provided from the channel 4 in the bottom rail through the spacer into the space between the panels 2. Preferably, the passages are provided by making the minor portion 7a separable from the major portion and leaving spaces which provide passages 17 between the opposing ends of the major and minor portions of the spacer.

The head portions 12, 13 of the glazing strips are of the form shown in Figure 7 and are distorted or tensioned, when placed in the position shown in Figures 2 and 3, so that they press against the margins of the glass panes and have a compensating movement. Also, the barbs 16 have a compensating movement to follow up the glass panes when the pressure between the same tends to separate them further and to compress when the glass panes tend to shift toward each other under the influence of high outside pressure. Hence, due to the heads 12, 13 of the glazing strips and the barbs of the spacing strip, the glass panes are always held tightly at their margins, and hence leakage of the air from between the glass panes outward, when the outside air pressure is low and the seepage of air inward into the space between the glass panes when the outside pressure is high, is eliminated or reduced to a minimum, so that the air between the glass panes can be kept free of moisture over a long indefinite period of time. As each of these barbs 16 are continuous, they have a line contact with the margins of the glass panes, providing successive lines of defense against air passing out of or into the space between the glass panes.

18 designates the moisture-absorbing material which is usually activated alumina.

In operation, the spacer strip is placed in position with the activated alumina 18 in the channel 4 of the bottom rail. The glass panels are then placed in position, and finally the glazing strips placed in position. The incline of the barbs 14 permits the ready insertion of the glazing strips in the sash but prevents creeping, working out or crawling of the glazing strip out of the channels 5, 6. Likewise the barbs 15 prevent creeping or working out of the spacer from the channel 4. The barbs 16 coact with the glass panels and extend and compress laterally to compensate for movement of the glass under variation in pressure of the outside atmosphere, and together with the heads of the glazing strips hold the air sealed between the glass panels or compensate for such variations in the pressure of the outside air. They also prevent working outward of the spacer but permit the glass to shift, within limits, if it does not snugly fit the channel formed by the glazing strips and the spacer. When the activated alumina becomes inactive or has absorbed maximum moisture and must be renewed, the glazing strip 11, which is on the interior of the car or structure, is removed, and the adjacent panel removed, so that the minor portion 7a of the spacer can be removed, making the activated alumina 18 accessible for removal and replacement by fresh alumina. The removal of the minor portion 7a of the spacer is possible because there is no flange extending under the other glass panel 2. The portion 7a of the spacer of the glass panel 2, which has been demounted, and the corresponding strip 11 is then replaced.

The body of the sash 1, which is of an aluminum alloy, or a metal that can not be readily electro or spot welded, is secured to a facing strip 20, which is secured to the outer member 21 of the structure around the window opening or frame. The facing strip is usually steel. Heretofore, the practice has been to secure the facing strip to the body of the sash by screws. The screws are numerous and hence unsightly.

One of the features of the invention is the securing of this face plate to the body of the sash by welding, and as here shown, the body of the sash is provided with steel plugs 22 at intervals extending therethrough or through a peripheral flange 23 on the body and also through a non-me-

tallic heat insulating strip **24**, with the ends of the plugs flush with the surface of the strip **24**. The facing strip or plate **20** is spot welded at **25** to the ends of the plugs **22**. The strip **24** is for the purpose of preventing the exchange of heat between the face plate **20** on the outside of the structure and the sash **1**. It is usually of a material known to the trade as "masonite." The facing strip or plate **20** is secured to the car body as by screws **26** fastened through the margin thereof into the car body **21**.

In Figure 6, the activated alumina **27** is shown as located in a groove **28** formed in the portion of the spacer extending between the glass panes so that the entire edge portion of the activated alumina is exposed in the space between the glass panes **2**.

What I claim is:

1. A double window construction comprising a sash, glass panels spaced apart with an air space between them, a spacer between the margins of the glass panels, the sash being formed with a recess for a moisture-absorbing material, and the spacer covering the recess and at least a portion thereof being readily removable for giving access to the recess, the spacer being formed with passages from the recess to the space between the glass panels, means for securing the glass panels assembled in the sash including a removable strip operable to permit the removal of one of the panels to give access to the spacer.

2. A double window construction comprising a sash and glass panels spaced apart with an air space between them, the sash being provided with a channel for receiving a moisture-absorbing material, the channel being alined with the space between the panels, a spacer between the margins of the glass panels and arranged in line with the channel and covering the same, the spacer having passages therethrough from the channel into the space between the panels, at least a portion of the spacer being readily removable to give access to the recess, and means for holding the glass panels assembled with the sash including a removable glazing strip coacting with one of the panels, whereby when the strip and the adjacent panel is removed, the spacer is accessible.

3. A double window construction comprising a sash and glass panels spaced apart with an air space between them, the sash being provided with a channel alined with and of substantially the same width as the space between the glass panels, for receiving in a portion thereof a moisture-absorbing material, a spacer interposed between the margins of the glass panels and extending into the channel, the spacer being provided with passages therethrough opening into the channel for permitting the air in the space between the panels to contact the moisture-absorbing material located adjacent the bottom of the channel, and removable glazing strips interlocked with the sash and coacting with the outer faces of the panels respectively.

4. A double window construction comprising a sash and glass panels spaced apart with an air space between them, the sash being provided with a channel alined with the space between the glass panels for receiving in a portion thereof a moisture-absorbing material, a spacer interposed between the margins of the glass panels and extending into the channel and forming a cover therefor, the spacer being provided with passages therethrough opening into the channel for permitting the air in said space to contact the moisture-absorbing material located adjacent the bottom of the channel, at least a portion of the spacer being readily removable for giving access to the channel, and means for retaining the glass panels assembled with the sash including a demountable glazing strip interlocked with the sash and coacting with the margin of one of the glass panels, whereby upon removal of the glazing strip, one of the glass panels may be demounted giving access to the spacer.

5. A double window construction comprising a sash and glass panels spaced apart with an air space between them, the sash being formed with an intermediate channel alined with the space between the panels and with inwardly facing channels located outside the planes of the panels, a spacer extending between the margins of the glass panels and also into the intermediate channel, and removable glazing strips located in the other channels respectively and coacting with the outer sides of the margin of the glass panels.

6. A double window construction comprising a sash and glass panels spaced apart with an air space between them, the sash being formed with an intermediate channel alined with the space between the panels and with inwardly facing channels located outside the planes of the panels, the intermediate channel opening into the space between the panels beyond the planes of the edges of the glass panels, a spacer extending between the margins of the glass panels and also into the intermediate channel, and removable glazing strips located in the other channels respectively and coacting with the outer sides of the margins of the glass panels, the glazing strip and the spacer being of resilient compressible material.

7. A double window construction comprising a sash and glass panels spaced apart with an air space between them, the sash being formed with an intermediate channel alined with the space between the panels and with inwardly facing channels located outside the planes of the panels, a spacer extending between the margins of the glass panels and having a base portion extending into the intermediate channel, and removable glazing strips located in the other channels respectively and coacting with the outer sides of the margin of the glass panels, a portion of the spacing strip having laterally extending flanges extending across the edges of the panels.

8. A double window construction comprising a sash and glass panels spaced apart with an air space between them, the sash being formed with an intermediate channel alined with the space between the panels and with inwardly facing channels located outside the planes of the panels, a spacer extending between the margins of the glass panels and also into the intermediate channel, a portion of said channel receiving a moisture-absorbing material, and removable glazing strips extending in the other channels respectively and coacting with the outer sides of the margins of the glass panels, a main portion of the spacer having laterally extending flanges on opposite sides thereof extending across the edges of the panels, and a second portion being formed with a laterally extending flange on one side only extending across the edge of one glass panel only, the second portion forming a cover for that portion of the intermediate channel in which the moisture-absorbing material is located, the spacer having passages opening from the portion of the channel in which the moisture-absorbing material is located into the space between the panels, all whereby upon removal of

one glazing strip, the adjacent panel and the second portion of the spacer, access is obtained to the moisture-absorbing material.

9. A double window construction comprising a sash and glass panels spaced apart with an air space between them, the sash being formed with an intermediate channel alined with the space between the panels and with inwardly facing channels located outside the planes of the panels, a spacer extending between the margins of the glass panels and also into the intermediate channel, a portion of said channel receiving a moisture-absorbing material, and removable glazing strips extending in the other channels respectively and coacting with the outer sides of the margins of the glass panels, a main portion of the spacer having laterally extending flanges extending across the edges of the panels, and a second portion being formed with a laterally extending flange on one side only extending across the edge of one glass panel only, the latter portion forming a cover for that portion of the intermediate channel in which the moisture-absorbing material is located, said second portion of the spacer being separate from the main portion and having its ends spaced apart from the opposed ends of the main portion providing passages between the portion of the intermediate channel in which the moisture-absorbing material is located, and the space between the panels, all whereby upon removal of one glazing strip, the adjacent panel and the second portion of the spacer, access is obtained to the moisture-absorbing material.

10. A double window construction comprising a sash, glass panels spaced apart with an air space between them, the sash being provided with a recess opening into the space between the panels, a spacer extending between the margins of the glass panels and also into the recess, the greater portion of the spacer being formed with laterally extending flanges on both sides thereof extending across the edges of the glass panels and the remainder of the spacer being formed with a lateral flange on one side only thereof extending across the edge of one of the panels, the spacer having base portions extending into the recess and the portion of the recess covered by said remainder portion of the spacer receiving a moisture-absorbing material, the spacer being formed with passages leading from the recess into the space between the panels, and means for holding the glass panels assembled with the sash including a removable glazing strip coacting with one of the glass panels, and located so that when the glazing strip and the adjacent glass panel is removed, the remainder portion of the spacer may be removed to give access to the moisture-absorbing material.

11. A double window construction comprising a sash, glass panels spaced apart with an air space between them, the sash being provided with a recess opening into the space between the panels, a spacer extending between the margins of the glass panels and also into the recess, the greater portion of the spacer being formed with laterally extending flanges on both sides thereof extending across the edges of the glass panels and the remainder of the spacer being formed with a lateral flange on one side only thereof extending across the edge of one of the panels, the spacer having base portions extending into the recess and the portion of the recess covered by said remainder portion of the spacer receiving a moisture-absorbing material, said remainder portion being separate from the major portion of the spacer and arranged with its ends spaced from the opposing ends of the major portion, thereby providing passages leading from the recess to the space between the glass panels, and means for holding the glass panels assembled with the sash including a removable glazing strip coacting with one of the glass panels, and located so that when the glazing strip and adjacent glass panel is removed, the remainder portion of the spacer may be removed to give access to the moisture-absorbing material.

EDWARD F. CHAFFEE.