Nov. 13, 1934. A. V. JOHNSON 1,980,864

METAL SASH PROTECTION

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Fig. 1.

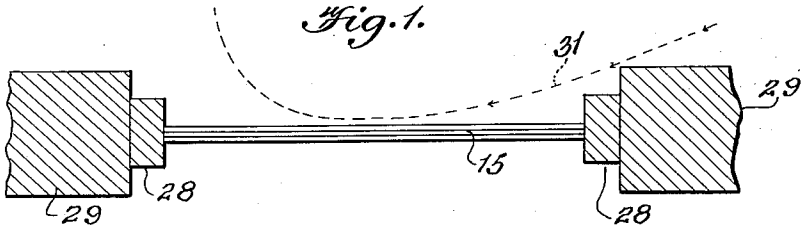


Fig. 2.

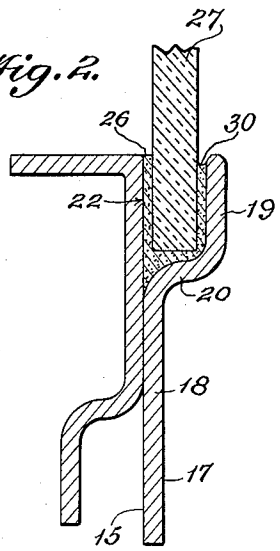


Fig. 3.

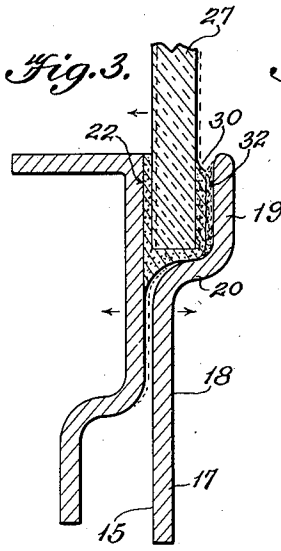
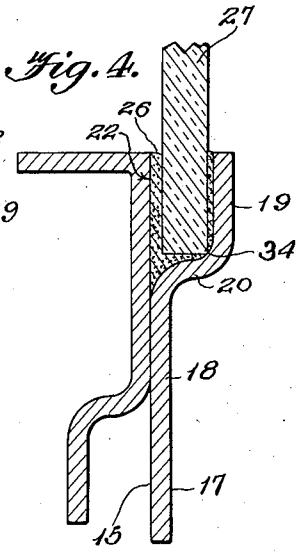


Fig. 4.



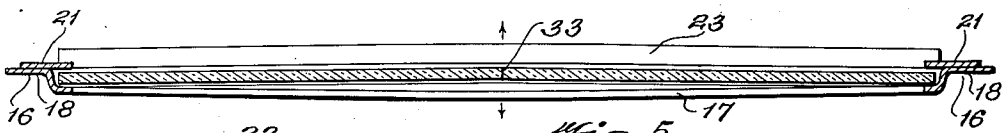


Fig. 5.

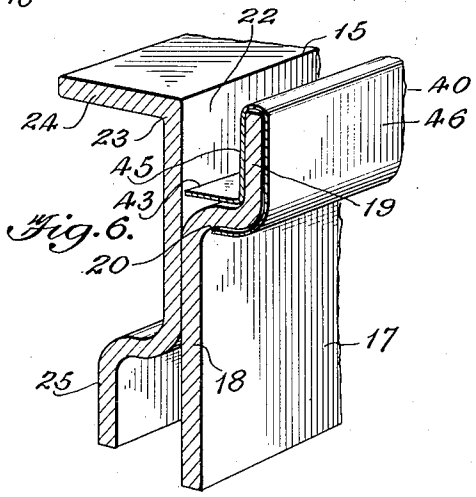


Fig. 6.

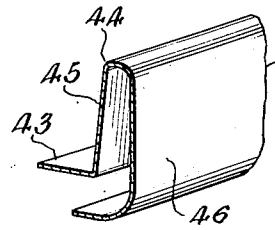


Fig. 7.

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Fig. 8.

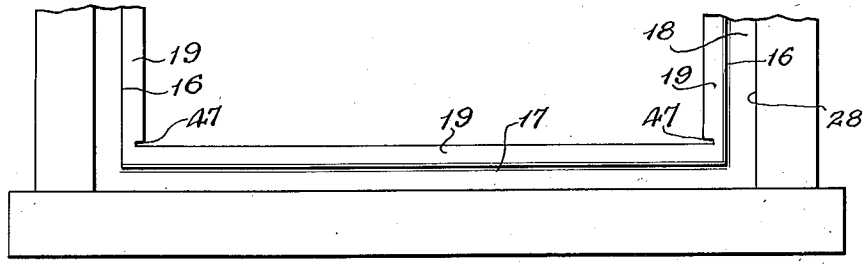


Fig. 13.



Fig. 9.

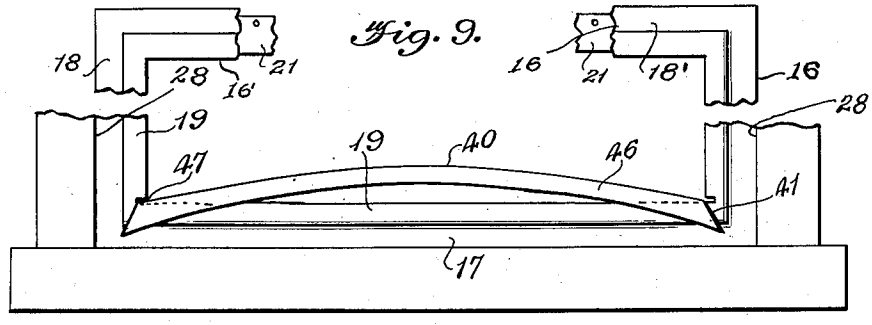


Fig. 10.

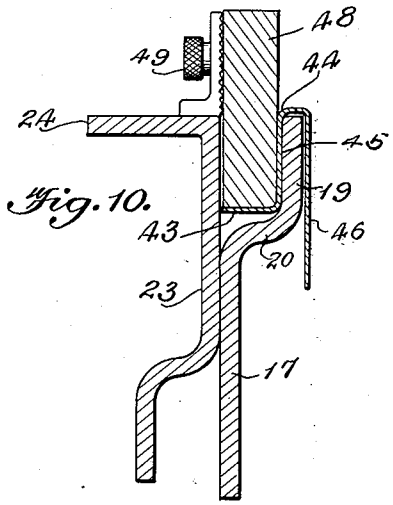


Fig. 11.

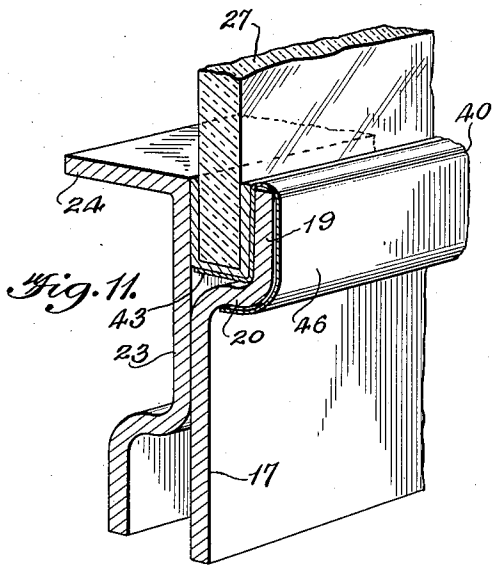
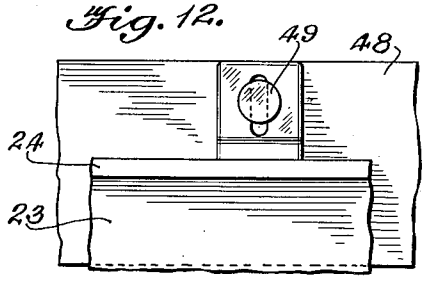


Fig. 12.



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UNITED STATES PATENT OFFICE

1,980,864

METAL SASH PROTECTION

Alfred V. Johnson, New York, N. Y.

Application March 23, 1934, Serial No. 717,047

5 Claims. (Cl. 189—64)

The invention relates to means for protecting metal sash dash and particularly ferric metal sash dash from corrosion, and particularly aims to provide a protective device applicable to such sash generally without requiring modification of the general design and assembly practice in such manufacture.

The advantage of using special corrosion-resistant alloys is of course well understood, and window sash of non-ferrous or other so-called non-corrosive metals are available. But the expense for sash of such materials is prohibitive in most cases, with the consequence that the bulk of metal sash is of rolled steel stock, and great expense is involved in replacement and repair thereof, particularly the glass therein. Electroplating with copper has not prooved satisfactory.

One form of such sash 15 (a sliding sash) very largely used is illustrated in the figures, and whether one or a plurality of lights are used in each sash, similar effects are observed resulting in deterioration of the bottom bar of each opening or "light" and breakage of the glass. This sash includes sides stiles 16, a top bar 16', and a bottom bar 17, all mortised and welded into a unitary frame at the corners. Each of these members has grooves 22 formed therein to receive the glass, the inner walls of the grooves on the stiles and bottom bar being removable plates. The bottom bar and each stile consists of a planiform body portion 18 having an inner edge portion offset outwardly, forming an outer planiform flange 19 parallel to the plane of and connected to the body of the member by the shoulder 20. The top bar of the sash illustrated is similar to the stiles, but may conform to conventional practice in such sash. On the side stiles and top bar simple planiform plates 21 are detachably secured to the inner faces of the body portion 18, projecting beyond the shoulder 20 and with their inner edges alined with the inner edges of the flanges 19 and so forming the grooves 22. There is similarly secured to the bottom bar 17 a plate 23 the body portion of which is planiform and corresponds to the plates 21. Its upper edge, however, is formed with an integral horizontal stiffening flange 24 on a level with the top edge of the offset flange 19 of the bottom bar, and the lower edge of the plate 17 may also be formed with an offset depending flange 25 as a stiffening. The side stiles being usually engaged in grooves of the window frame do not require stiffening.

In installing lights in this type of sash, the plates 21 and 23 are removed, putty 26 applied to the flanges 19 and shoulders 20 and in the glass-receiving space of the bottom bar, after which the glass 27 is put in place by inserting its upper edge in proper position in the bottom bar and the body of the glass moved to position embedded in the putty on the stiles and top bar. Sufficient putty being over the edges of the glass, the plates 21 and 23 are then put in place.

Such a sash being mounted in a window opening 28 of a building 29 is exposed at its outer side to rain and wind and low temperatures. The putty disintegrates, and is blown away a little at a time, until a recess is formed therein as at 30 in Figure 2. This erosion occurs principally midway of the window, due to the projecting wall portions of the building protecting the lateral portions from wind and rain, as indicated in Figure 1, where the dotted line 31 indicates the path of the wind. Water can then stand in the recess 30 and—freezing—hastens the erosive process. At the same time severe corrosion of the inner surface of the flange 19 occurs. Initially, the oxide is washed out in small particles by rain, or blown away by the wind along with the powdered putty, and as rust scales from below the putty, water gains access more and more readily to the deeper surfaces of the flanges 19 where the product of oxidation becomes a compacted, ever-increasing mass. The chemical action involved in forming of the oxide is irresistable by the sash structure and as the bulk of the oxide increases (as at 32, Fig. 3), a severe pressure is set up between the flange 19 and the putty. Usually this bulky accumulation of oxide occurs principally at the middle of the bar 17. It finally springs the flange 19 outward, opening a crack between the flange and the putty, and so increasing the area and rapidity of corrosion, which finally extends to the innermost part of the bar, the inner plate 23 then becoming corroded also. The piece 17 is finally severely distorted and bent outwardly at its middle, and in a few years its central portion is completely destroyed.

Before the bar 17 is destroyed, however, and while it still has substantial strength at least over a substantial part of its length, the severe pressure which the iron oxide has exerted, reacting between the flange and the glass often results in breakage of the glass, due to unequal stresses and particularly bending strains. This may occur by a flexing of the member 23 slightly when the pressure inward is sufficient to bend the glass and the inner plate 23, or may result from progress of corrosion on the inner plate 23 next the

glass. In this latter case, the major oxidation of the plate 23 occurring at its middle part, and the flange 19 having been so weakened as to offer no support, the middle portion of the glass is forced outward, while its side portions are held by the less corroded parts of the plate 17, and it cracks near the middle (as indicated at 33, Fig. 5), or at two places adjacent the lateral limits of maximum corrosion. At this writing, one hundred and sixty windows in the Cunard Building, #25 Broadway, in New York city, are broken, hundreds already have been replaced, and there are hundreds more now in a delicate condition; and from applicant's own observation the number showing signs of the malady run into thousands, notwithstanding continual repairs.

It will be noted in Figure 4 that in fitting the glass to such sash heretofore, there is excessive liability of the edge of the glass resting against the curving face of the shoulder 20 (as at 34, Fig. 4). In the operation of the sash shocks and strains are thus transmitted directly from the metal to the glass, resulting in fracture in many instances. It is my purpose to remedy this, at the same time that damage from corrosion is eliminated.

The effects of corrosion are negligible on the stiles 16, and top members of sash, and it is therefore a purpose of my invention to take advantage of this fact to enable the remedying of deterioration of such sash and other objections thereto with a novel structural device having special advantage for such uses.

Additional objects, advantages and features of invention reside in the construction, arrangement and combination of parts involved in the embodiment of the invention as will be understood from the following description and accompanying drawings, in which

Figure 1 is a horizontal section through a window opening of a building.

Figure 2 is a vertical section through the bottom bar of a standard metal sash, with the glass in place.

Figure 3 is a similar view after the sash has been in use for a time, showing the effect of erosion.

Figure 4 is a view similar to Figure 2 showing a mal-adjusted glass.

Figure 5 is a horizontal section through the sash and glass of Figure 3, looking down.

Figure 6 is a section in perspective of the bottom bar of a sash on which my invention has been incorporated.

Figure 7 is a similar view of my protective device.

Figure 8 is an elevation of the lower part only of a window having a sash prepared for application of my invention.

Figure 9 is a similar view showing the manner of applying my invention.

Figure 10 is a cross section of the bottom bar of Figure 9 showing the manner of adjusting and forming the protective device to the sash.

Figure 11 is a section in perspective of the bottom bar of a sash in which my invention is incorporated, with the glass in place.

Figure 12 is a detail fragmentary elevation from the left of Figure 10.

Figure 13 is a fragmentary detail of the stock strip.

My invention is applicable to windows of various constructions where there is an exterior or interior glass-retaining flange, and is adapted to deep or shallow glass holding grooves, as will be seen hereinafter. The essential feature is a strip 40 of non-corrosive metal, such as copper, zinc, or alloy, preferably ductile, although in certain forms it may be hard rolled copper or bronze completely preformed and with sufficient spring action to permit it to be opened to receive the part to be protected, and to spring to initial form or into close fitting engagement with the work.

It is important in some aspects that the protective device as thus far perfected, retains itself in place by a clasp action, or at least by resistance of the metal to distortion of the article as applied.

After glazing of a sash, however, the protective element is retained securely in place by the glass itself.

The protective metal strip 40 is formed of simple rolled stock, and for use on sash such as described the strip would be about two and one-quarter inches in width. The ends are trimmed with an outer miter edge 41 extending over nearly one-half the width of the strip, and inner end edge 42 at right angles to the length of the strip. The inner edge portion of the strip is bent sharply at right angles to the remainder to form a rest flange 43 the width of which should be slightly less than the front-to-back width of the glass-receiving groove 22 of the sash. At a line 44 parallel to and spaced from the first bend less than the distance from the top edge of the flange 19 of the bottom bar of the sash to the bend forming the junction between this flange 19 and the shoulder 20, the strip is again bent at right angles, but in the opposite direction from the first bend, so that between the bends a wall 45 is formed adapted to lie against the inner face of the flange 19, while an apron piece 46 is projected horizontally outward over the top edge of the flange 19, and the rest lies horizontally in the lower part of the groove 22, but above the shoulder 20. The strip 40 is preferably performed with the flange 43, and may be preformed with the bend at 44 if desired, but the latter may be accomplished incident to applying the strip to the work, as will appear. The bend 44 is located at the inner end of the miter 41. A downward bend spaced outward of the one 44 may be preformed as in Figure 10, to position the apron 46 parallel to the wall 45.

The stock for the strip may be 24 gauge soft copper, or thinner or thicker as discretion dictates. Owing to the fact that the device will be subject to but very little wear, very thin metal may be used and the thickness need only be sufficient to insure retention of the apron portion in place, as will appear.

To apply the protective device to a sash, the plate 23 being removed, a short horizontal kerf or slot 47 is formed in the flange 19 of each stile 16 directly in line with the top of the flange 19 of the bottom rail 17. The strip should be of a length equal to or slightly greater than the distance between the inner ends of the opposed kerf 47 so that the strip may be bowed and its ends inserted in the respective kerfs with the parts 43 and 45 disposed in the groove 22 of the bottom bar 17. The ends of the strip should be tightly fitted against the inner ends of the kerfs. The plate 23 is then secured in place and a fitting strip or wedge 48 snugly set in the groove resting on the flange 43, and the apron portion 46 of the strip then bent sharply, downwardly and against the outer face of the flange 19, its extreme edge portion being turned inward close against and under the shoulder 20 as snugly as possible.

With the protector preformed as in Figure 10, the fitting strip 48 may not be required.

My protector may be used on sash having a T-shaped bar with upstanding flange at the inner side only.

If the bend 44 has not been pre-formed, the holding device 48 may be gauge having adjustable stops 49 thereon to engage the top of the plate 23 and determine the depth in the groove 22 at which the flange 43 will be held. The stops would be secured by thumb screws 50. The strip would then be planiform from the flange 43 including the wall 45 and apron 46 and being set with the flange 43 in the groove, the gauge device 48 would be set on the flange 43 and pressed downward, carrying with it the strip 40 until the stops 49 engage the plate 23, after which the apron 46 would be bent outwardly over the edge of the flange 19, then downwardly and inwardly under the shoulder 20.

After placing of the strip 40, the glazing of the sash is proceeded with in accordance with familiar practice, the plates 21 being removed to admit the glass.

After application of my strip as described, it will retain itself in place during shipment of the sash, without the putty or glass being in place.

It will be seen that by the practice of the invention as disclosed, the glass is carried by a suspended support consisting of the rest flange 43 which is clear of the rigid shoulder 20 or any other rigid part of the sash, and in consequence any shocks incident to slamming of the sash in either raising or lowering of the sash will not be communicated from the frame to the glass with severity, or at a point of limited bearing between the glass and bottom bar. Neither will there be liability of severe compression of the glass or tensile strain thereof incident to unequal expansion and contraction of the stiles.

The protector device will prevent access of moisture to the bottom bar and will eliminate the losses due to corrosion thereof as now experienced, with a minimum of expense and without requiring radical departure from common practice in manufacture of such sash as heretofore carried on.

I claim:—

1. A metal window sash comprising a frame including a bottom bar having outer and inner wall portions forming a groove to receive the edge portion of a pane of glass, and including side stiles and a top bar adapted to retain respective edges of such a pane of glass, a rest and protector member of resilient sheet metal comprising a rest flange extending from the said outer wall across the groove in spaced relation to the bottom of the groove, a protector wall portion integral with said flange and extending upwardly beside the outer wall of the bar, and an apron integral with said protector wall and extending outwardly and downwardly over the said outer wall of the bar whereby a pane of glass may be resiliently supported in the groove and the groove parts protected from damage by corrosion.

2. The structure of claim 1 in which the said bar comprises a planiform body portion, said outer wall being integral with and off-set outwardly therefrom, and said apron being extended below the said outer wall of the bar and curved inwardly thereunder, whereby the rest and protector member will be retained by resilient clasping action of the protector wall and apron, and whereby the apron is stiffened and access of water thereunder prevented.

3. A window sash comprising a frame including upright members and a bottom bar grooved to receive edge portions of a pane of glass, short kerfs cut in the outer walls of the grooves of the upright members in line with the top of the groove of the bottom bar, a flexible resilient protector having a length equal to the distance between the far ends of the slots sprung into said kerfs and having a wall portion extending downwardly into the groove of the bar, an integral rest flange thereon spaced above the bottom of the groove and extending across the groove, and an apron portion integral with the upper edge of said wall and extending outwardly and downwardly over the bar a distance.

4. A window sash comprising a frame including upright members and a bottom bar grooved to receive edge portions of a pane of glass, short kerfs cut in the outer walls of the grooves of the upright members in line with the top of the groove of the bottom bar, a flexible resilient protector sprung into said kerfs and having a wall portion extending downwardly into the groove of the bar, and an apron portion integral with the upper edge of said wall and extending outwardly and downwardly over the bar a distance.

5. A combined support and protector for metal sash consisting of a non-corrodible sheet metal member having an inner wall part and an outer apron part, the two being adapted to receive therebetween the wall of a glass receiving groove, the said inner wall being of less height than the wall of the groove and a rest flange integral with the lower edge of the said wall adapted to extend across the groove in spaced relation to the bottom of the groove, whereby the rest is suspended in the groove and adapted to yieldingly support a pane of glass.

ALFRED V. JOHNSON.