May 27, 1958 T. P. HOUSLEY 2,835,935

HURRICANE SHIELD

Filed Dec. 5, 1955 2 Sheets-Sheet 1

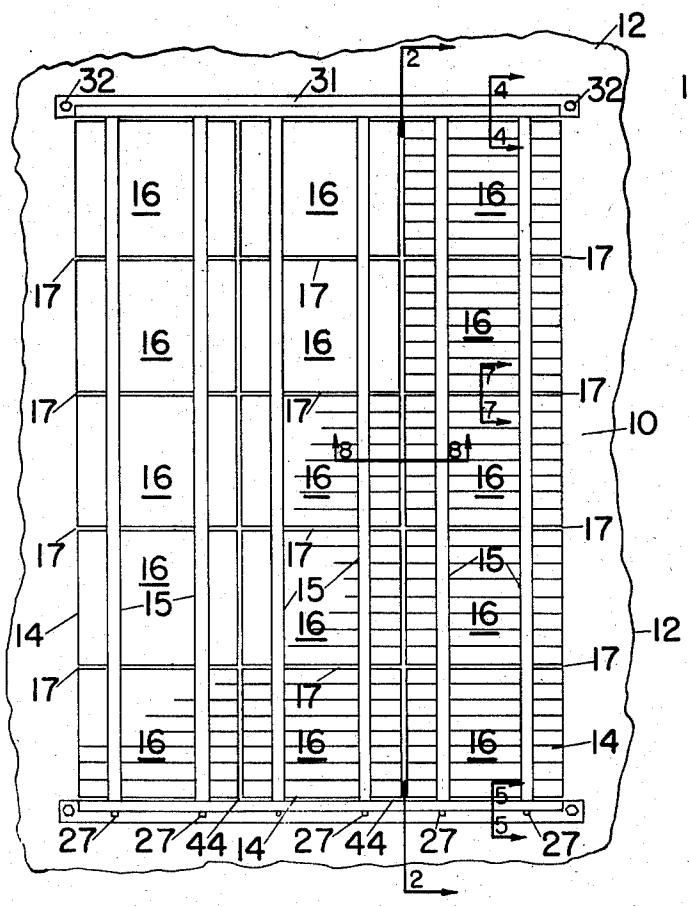


FIG. 1

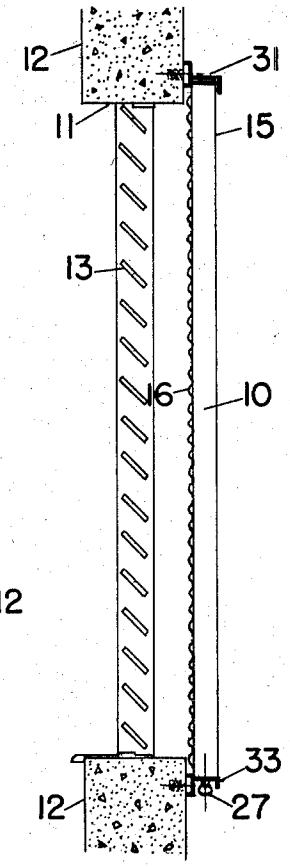


FIG. 2

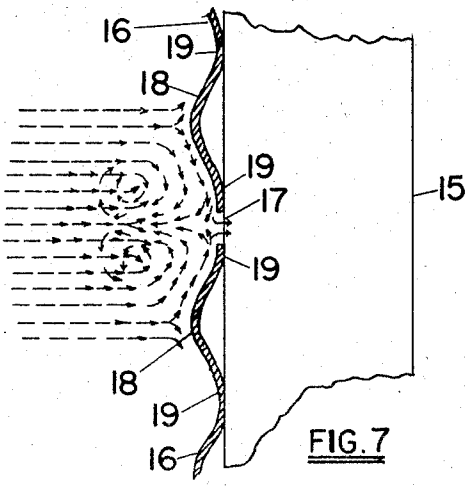


FIG. 7

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2 Sheets-Sheet 2

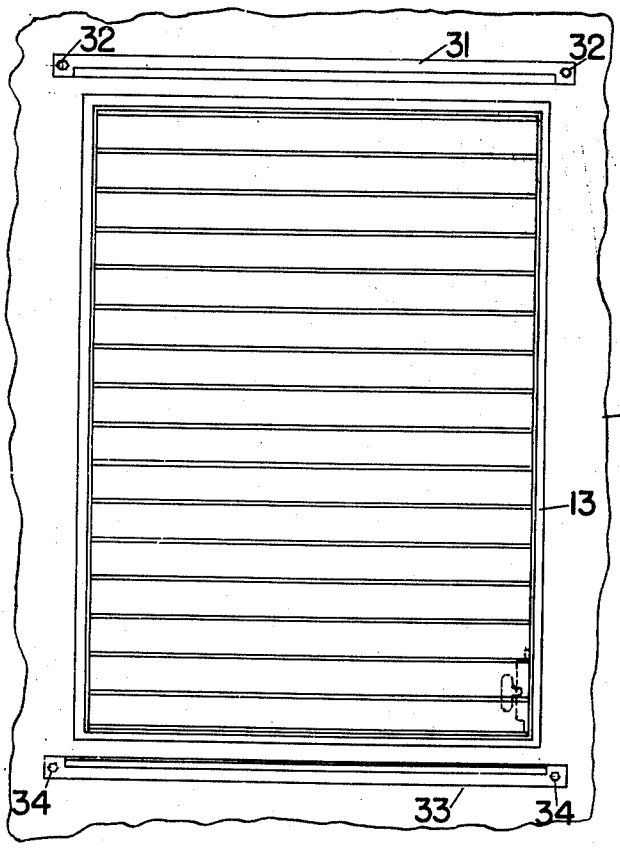


FIG. 3

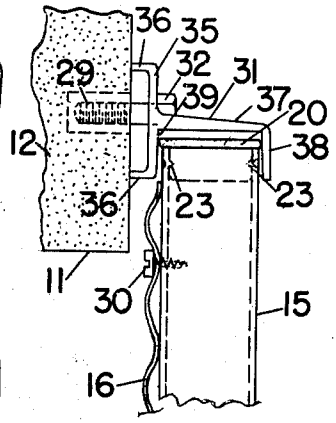


FIG. 4

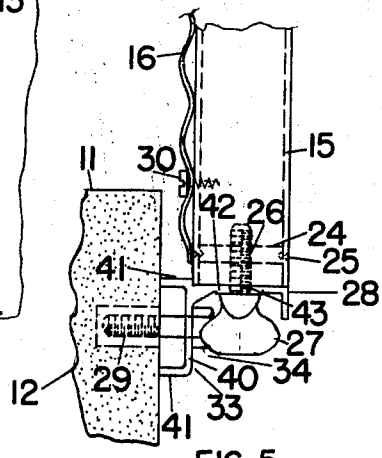


FIG. 5

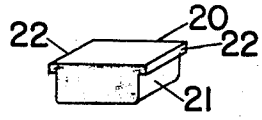


FIG. 6

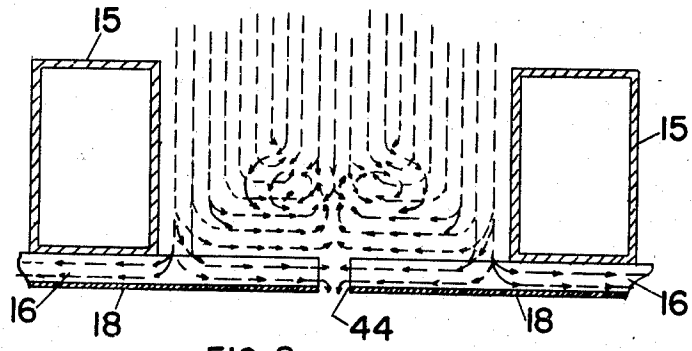


FIG. 8

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HURRICANE SHIELD

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2 Claims. (Cl. 20—58)

This invention relates to the protection of window and door structures and is more particularly directed to hurricane shields.

A principal object of the present invention is to provide a shield constructed of light weight material sections or units thereby rendering the shield light in weight, easy to handle and to erect in position to cover a window opening and yet is structurally extremely strong to be able to withstand high wind pressures and flying debris which accompanies storms to the intensity of hurricanes.

A further object of the present invention is the provision of a hurricane shield characterized as above which is provided with a plurality of slots to permit the stabilization of the air pressure against the outer surface of the window, eliminating the dangerous and often destructive fluctuation of wind pressures against the windows or glass paneled doors during a hurricane and the like, also to permit light to pass therethrough yet excluding rain by the creation of a turbulence of air motion at the position of the slots.

A still further object of the present invention is to provide a hurricane shield described as above which requires simple overhead and base rails mounted on the building above and below the window opening for receiving the sections of the shield, which rails may remain permanently on the building while the shield may be removed therefrom and stacked or otherwise stored for future use.

A still further object of the present invention is to provide a hurricane shield which is inexpensive in cost and requires little or no maintenance or servicing.

With these and other objects in view the invention will be best understood from a consideration of the following detailed description taken in connection with the accompanying drawings forming a part of this specification, with the understanding, however, that the invention is not confined to any strict conformity with the showing of the drawing but may be changed or modified so long as long as such changes or modifications mark no material departure from the salient features of the invention as expressed in the appended claims.

In the drawings:

Figure 1 is a front elevational view of a hurricane shield embodying my invention shown mounted over a window opening in a building wall.

Figure 2 is a cross sectional view taken along the line 2—2 of Figure 1.

Figure 3 is a front elevational view similar to Figure 1 with the shield removed, but with top and bottom rails in place to receive the shield units.

Figures 4 and 5 are enlarged fragmentary sections taken along the lines 4—4 and 5—5, respectively Figure 1.

Figure 6 is a perspective view of a rubber cap.

Figure 7 is a fragmentary sectional view taken along the line 7—7 of Figure 1 showing a turbulence at the horizontally disposed slots created by a wind impinging on the outer surface of the shield.

Figure 8 is a similar view taken along the line 8—8 of Figure 1 showing the turbulence created at the vertically disposed slots by a strong wind.

Referring now to the drawings wherein like numerals are used to designate similar parts throughout the several views, the numeral 10 refers generally to a shield shown mounted over a window opening 11 in a building wall 12. Although there is shown a jalousie window 13 enclosing the window opening 11, any type or kind of window may be utilized as the window used forms no part of the instant invention and the jalousie window 13 is shown only by way of illustration.

Each hurricane shield 10 is constructed of a plurality of sections or units 14 each of which are identical in construction. Although the hurricane shield 10 is shown as consisting of three units 14, any number of units 14 may be used depending solely upon the size of the hurricane shield 10, which in turn depends upon the size of the window opening.

Each unit or section 14 consists of a pair of vertically disposed bars or braces 15 which extend the full height or length of the hurricane shield 10. The bars 15 to provide strength yet light in weight may be of hollow rectangle cross sections as produced by the extrusion process. Mounted on the inner wall of the bars 15 and extending an equal distance on either side of the bars 15 are a plurality of rectangular shaped sheet metal plates 16 of equal size, positioned one above the other in spaced relation to each other thereby providing a horizontally disposed slot 17 therebetween. Each of the plates 16 consists of a series of horizontally disposed alternating ridges 18 and grooves 19. The plates 16 terminate as best shown by Figure 7 at their upper and lower ends in a semi-groove at the slots 17, whose function is described in detail hereinafter. The plates 16 are secured to the bars by screws 30 though they may be welded or fastened by any conventional or other satisfactory manner.

Mounted at the top portion of each of the bars 15 is a cap 20 made of rubber or a rubber like resilient material and having a body portion 21 of such dimensions to permit it to fit snugly within the ends of the bars 15. The caps 20 are further provided with a shoulder 22 which extends outwardly on either side of the body portion 21, which shoulders 22 extend beyond the ends of the bars 15 when the caps 20 are positioned thereon. The rubber caps 20 are secured in position on the bars 15 by crimping the walls thereof inwardly as at 23 or by the use of screws, rivets and the like. At the bottom end of each of the bars 15 is a nut 24 crimped as at 25 to secure same in position therein and provided with a threaded bore 26 to receive a shouldered thumb screw or bolt 27.

Means are provided for removably mounting the units 14 of the shield 10 over a window opening 11 consisting of a head rail 31 mounted by bolts 32 above the opening 11 and a sill rail 33 mounted by similar bolts 34 below the opening 11.

The head rail 31 consists of an elongated base member 35 with a pair of leg portions 36 extending along the lower and upper edges of the base member 35 in contact relation with the wall 12. Extending outwardly at approximately the mid portion of the base member 35 is a horizontally disposed flange member 37 with a depending flange 38 extending vertically from the free edge of the flange 37 to form a channel 39 slightly larger than the width of the bars 15 but smaller than the width of the top portion of the rubber caps 20. The head rail 31 is secured by bolts 32 extending through a bore at each end of the base member 35 and threadedly received by metallic plugs 29 positioned in bores formed in the concrete wall 12.

The sill rail 33 is somewhat similar in construction to the head rail 31 consisting of an elongated base mem-

ber 40 having a pair of leg portions 41 which bear against the wall 12 on which the sill rail 33 is mounted by bolts 34. At the upper portion of the base member 40 there extends a flange 42 which operates as a support for the units 14 of the shield 10. A depending flange 28 extending vertically from the free end of the flange 42 is provided for strengthening the latter. A plurality of bores 43 are positioned at approximately the mid portion of the flange 42 and at appropriate positions therealong to permit the receiving of the wing bolts 27 in order to fasten the shield units 14 to the sill rail 33. Each unit 14 is secured on the rail 33 by bolts 27 so as to mount the units 14 in spaced relation to the adjacent units 14 thereby providing vertically disposed slots 44 of substantially the same size as the slots 17.

The function of the slots 17 and 44 is to permit light and air to enter or to see therethrough. However, rain driven by wind is almost completely prevented from entering through the slots 17 and 44 by virtue of the turbulences that are created by the wind impinging on the arcuate surfaces presented by the plates 16 as is illustrated and best shown in Figures 7 and 8.

When the wind strikes the plates 16 the air will travel in the direction of the grooves 19 and thereby setting up a kind of eddy current or turbulence at the slots 17 as shown by Figure 7. In addition, the bars 15 serve to entrap air therebetween causing the air to flow as shown by Fig. 8 to create the aforementioned turbulence at the position of the slots 44. This turbulence of air forms a barrier in the path of the air directed toward the slots 17 and 44 so that air laden with rain would be almost fully impeded from entering the slots 17 and 44. Some of the air which has already impinged on the plate 16 will enter the slots 17 and 44. However, the air entering the slots 17 and 44 will have been almost completely separated from the rain it previously carried upon its impingement against the plate 16. The amount of rain entrained by the wind which does penetrate the slots and impinges on the window is negligible.

The hurricane shield 10 is mounted over the opening 11 by placing the individual units 14 one at a time in position on the rails 31 and 33. This in accomplished by placing the upper end of the bars 15 in the channel 39 of the head rail 31 and then swinging the lower ends of the unit 14 in the direction of the sill rail 33. As the bottom ends of the bars 15 engage the flange 42 of the sill rail 33, the upper ends of the bars 15 will be forced upwardly into the channel 39 until the rubber cap 20 becomes firmly wedged between the base member 35 and the depending flange 38. It is to be noted that the overall height of the shield units 14 are slightly shorter than the distance between the support flange 42 of the sill rail 33 and flange member 37 of the head rail 31 to permit the aforementioned swinging action of the unit 14 in positioning same properly in the head rail 31 and on the sill rail 33. Now the wing bolts 27 are placed through the bores 43 in the support flange 42 and threaded in the threaded bore 26 of the nut 24 until its shoulder is in tight engagement with the under surface of the support flange 42.

To remove the shield 10 from its position over the

window opening 11, all that need be done is to remove the wing bolts 27 by unthreading them from the nuts 24. The units 14 are then swung outwardly at their lower ends to remove the lower ends thereof from their resting position on the sill rails 33 and the upper ends will then slide downwardly away from the channel 39. The units 14 which weigh approximately six pounds each for the average window may now be stacked or nested in a storage space.

What I claim as new is:

1. A hurricane shield structure for external disposition with respect to window and door openings comprising a head rail having a depending channel portion and a sill rail, means securing said head rail and said sill rail exteriorly above and below the opening respectively, a plurality of removable shield units disposed across said opening and extending between said channel portion and said sill rail, each of said shield units comprising a pair of vertically disposed elongated brace members, a plurality of plates secured to said elongated members in vertically spaced relation with each other to form horizontally disposed air and light admission slots therebetween, each of said plates having horizontally disposed alternate ridge and groove portions with innermost parts of successive groove portions bounding each of said slots, each of said slots being smaller in width than one of said groove portions, each of said shield units being mounted in spaced relation to an adjacent unit to form vertically disposed slots therebetween, a resilient member mounted on the upper end of said elongated members and frictionally engaging said channel portion of said head rail, and fastening means removably securing said sill rail and said lower portion of said elongated members.

2. A hurricane shield structure for external disposition with respect to window and door openings comprising a head rail having a depending channel portion and a sill rail, means securing said head rail and said sill rail exteriorly above and below the opening respectively, a removable shield unit extending vertically across said opening and between said channel portion and said sill rail, said shield unit comprising a pair of vertically disposed elongated brace members, a plurality of plates secured to said elongated members in vertically spaced relation with each other to form horizontally disposed air and light admission slots therebetween, each of said plates having horizontally disposed alternate ridge and groove portions with innermost parts of successive groove portions bounding each of said slots, each of said slots being smaller in width than one of said groove portions, a resilient member mounted on the upper end of said elongated members and frictionally engaging said channel portion of said head rail, and fastening means removably securing said sill rail and said lower portion of said elongated members.

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