Nov. 21, 1961 P. F. ALBEE, JR 3,009,515

STORM WINDOW CONSTRUCTION

Filed March 24, 1960 2 Sheets-Sheet 1

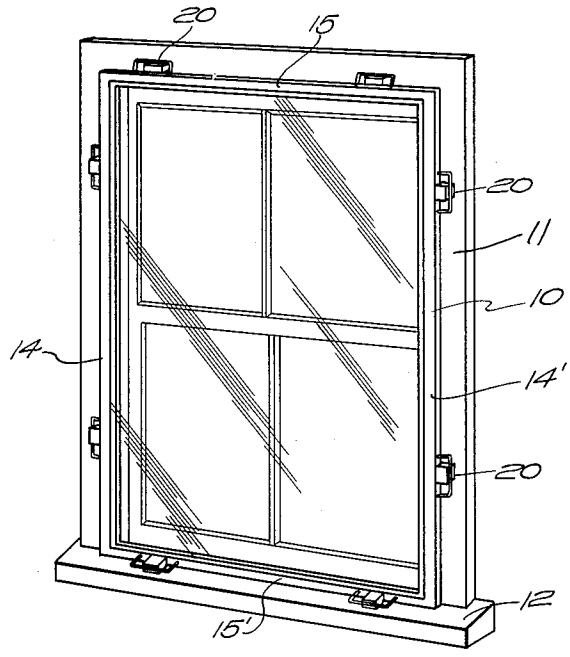


FIG. 1

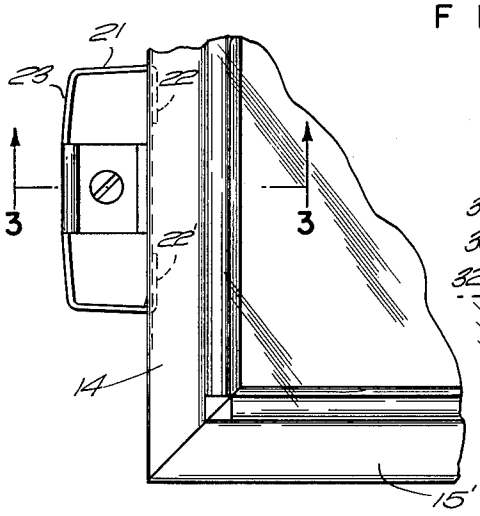


FIG. 2

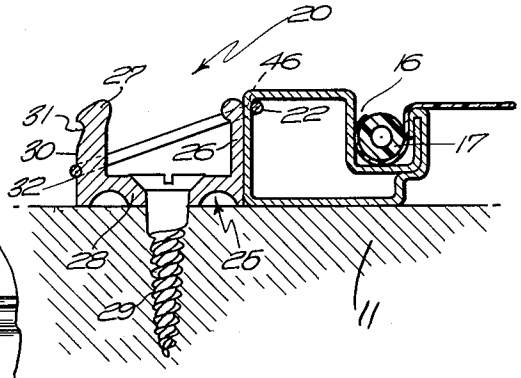


FIG. 3

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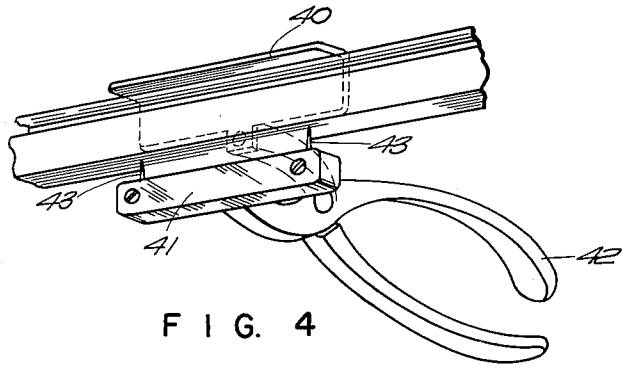


FIG. 4

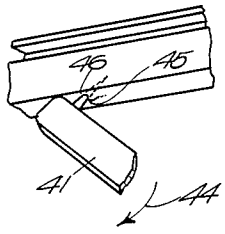


FIG. 5

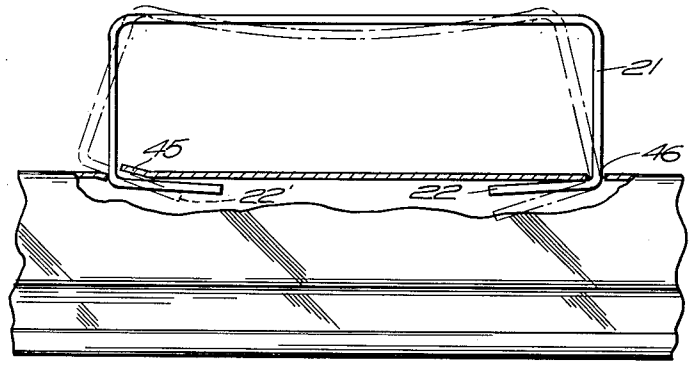


FIG. 6

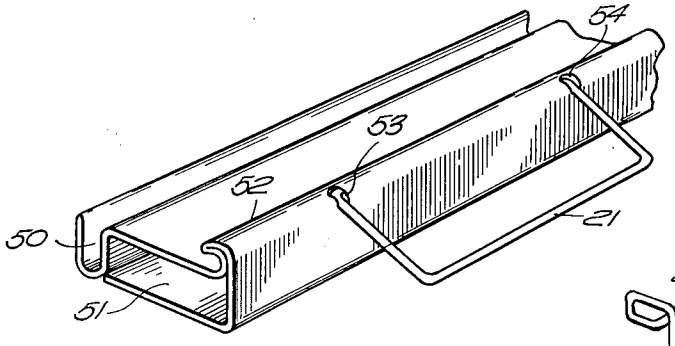


FIG. 7

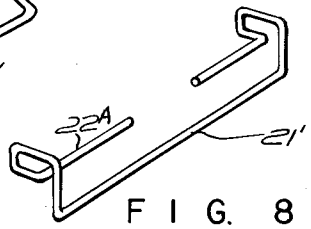


FIG. 8

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STORM WINDOW CONSTRUCTION

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2 Claims. (Cl. 160—369)

This invention relates to a storm window construction and more particularly to the method of using plastic sheet material as the window material in conjunction with lightweight metal frame together with means for successfully anchoring the frame to an existing window casing. It has been previously proposed to utilize sheet plastic material as a substitute for glass in connection with storm window construction. Such storm window has the desirable properties of being lightweight and inexpensive in construction. However, certain problems arise with the use of a plastic material, for it has undesirable thermo properties in that when it is subjected to cold temperatures, it tends to shrink and conversely expand under warm temperatures. To compensate for these properties, it has been necessary to use a rigid strong frame and insert the plastic into such a frame in a stretched condition at 70° F. This will in general maintain a stretched condition of the plastic. It is apparent, however, that when such means are utilized, some of the effective advantages of manufacturing a storm window with plastic sheet material are lost. Not only does the weight of the entire unit increase with the large rigid frame, but also the price of the unit increases to a point where there is no apparent advantage of a plastic frame over a glass glazed frame storm window unit.

It is therefore an object of the present invention to make a storm window frame unit of such a construction as will lend itself to overcoming some of the disadvantages noted above.

A further object of the invention is to provide a lightweight storm window frame unit which when installed can conform to the contours of the window frame.

A still further object of the invention is to provide a storm window frame unit with a novel fastening device which will maintain the plastic sheet material in a stretched condition and will further accommodate the thermo-size variations that take place.

With these and other objects in view, the invention consists of certain novel features of construction as will be more fully described and particularly pointed out in the appended claims.

In the drawings:

FIGURE 1 is a perspective view of a storm window unit of the invention installed on the outside of an existing double hung window;

FIGURE 2 is an enlarged plan view of a portion of the storm window frame showing the anchoring means therefor;

FIGURE 3 is a sectional view taken on lines 3—3 of FIGURE 2;

FIGURE 4 is a perspective view showing the application of a tool to form suitable holes in the frame for attachment of the fastening means;

FIGURE 5 is a detached perspective view of an operation in connection with forming the attachment holes in the frame;

FIGURE 6 is a partial plan view of a frame with parts broken away showing the method of attaching a fastening means thereto;

FIGURE 7 is a perspective view of a modified cross section of a storm window frame with fastening means; and

FIGURE 8 is a perspective view of another fastener for use with the frame of FIGURE 7.

In proceeding with the invention, there is preferably

extruded a metallic frame which can be further joined together at the corners thereof in any suitable fashion so as to form a rectangular unit. Such an extruded frame is particularly characterized by having a channel formed in at least one fashion thereof into which channel there may be anchored plastic sheet material in a suitable fashion so as to form a complete unit. Some form of anchoring means are associated with the frame, which anchoring means take the form of a generally U-shape spring member or wire bale that is integrally fastened therein. A keeper is provided to work in association with the wire bale which keeper is fastened to the existing window structure in a suitable manner.

Referring now to the drawings 10 generally designates a storm window made in accordance with the invention which is attached to the outside frame 11 of an existing window casing that has the usual sill 12. The storm window 10 is made of generally rectangular form to conform to the shape of the window to be covered and of slightly larger size than the window opening so as to overlap the same. It is composed of two sets of sides 14, 14' and 15, 15' which in the example shown meet generally at right angles one to the other. These sides may be formed of an extruded metallic material that can take the form of an open box with a channel such as 16 therein or any other suitable shape which provides the necessary channel 16 for the anchoring of plastic sheet material through the use of a spline such as 17 or any other device. The sides need not be of a large cross-section or thick material for reasons which will presently appear. Spaced at suitable intervals around the periphery of the frame are a plurality of anchoring means 20. These anchoring means are shown in more detail in FIGURES 2 and 3 and will be seen to consist of a U-shaped wire bale 21 having inturned ends 22, 22' and an anchoring bar 23. The inturned ends 22, 22' are provided to anchor the bale to the side sections of the frame and are adapted to be passed through apertures cut in this frame as will more fully appear. Associated with the wire bale 21 is a keeper device generally designated 25 which in the present embodiment is shown as a U-shape piece of material having upstanding arms 26, 27 and a base section 28 through which a screw 29 or other fastening means may be passed. The outer face 30 of the arm 27 is provided with two notches 31 and 32 which will serve to secure the bar portion 23 in adjusted position.

It is essential to the proper operation of the anchoring device that not only should a force be exerted perpendicular to the planal extent of the plastic sheet material stretched thereacross, but also that a force should be exerted toward the existing window casing so as to firmly anchor and seal the storm window unit thereagainst. To this end, it will be noted that the wire bale 21 has been anchored to the frame in a position remote from the surface engaging portion thereof. To successfuly accomplish this result, a tool such as shown in FIGURE 4 is preferably employed which tool consists of a pair of pivoting jaws 40 and 41 operated by a handle 42. The jaw 40 is somewhat L-shaped in form and is adapted to engage the face engaging surface of the frame and the inner edge thereof while the other jaw 41 is provided with a pair of spaced piercing pins 43. These pins are located with respect to the body of jaw 41 so that when the jaw 40 is aligned as described the pins will normally strike the outer edge of the frame near the upper corner thereof. The pins 43 are also spaced a distance equal to the spacing of the legs of the wire bale 21 that is being used and it will be readily understood that when pressure is applied to the handle 42 that holes will be pierced in the frame. After the piercing has taken place, the jaws may be opened and the tool should be withdrawn from

the frame in a rocking motion so that the jaw **41** rocks away from the frame as shown by the arrow **44** in FIGURE 5 while the pins **43** remain partially engaged in the pierced hole. This will therefore tend to raise the stock on the face of the frame as at **45** and slightly depress the stock on the opposite side of the hole formed by the piercing operation as at **46**. By performing this operation in this fashion, the insertion of the bale members **21** is greatly facilitated.

Alternately, notches may cut into the frame at the edge which presents itself outward and upward relative to the frame when installed. When notches are cut by a hack saw or the like a similar hole to that formed by the punching operation is achieved.

Referring now to FIGURE 6, a bale member **21** may be taken and one inturned end **22** thereof as shown to the left of FIGURE 6 may be first inserted in one of the holes formed. The member will now tend to remain in the hole while the entire bale member is sprung somewhat in the position shown in broken lines and the other end **22'** will now be in an angular position to pass underneath the raised portion **45**. The pressure can then be released from the wire bale and the operation has then been completed. With the pressure released, the inturned ends **22** tend to align themselves parallel to the edge of the frame. Thus, it will be seen that by providing the raised portion **45** through the pivoting disengaging operation of the piercing pliers, a rather quick assembly may be had. Similarly the saw cut affords easy assembly due to the width of the cut slot relative to the wire bale diameter.

Also it should be pointed out here that the bale member **21** is inserted into the frame member at an upper portion of the frame as it lies on the window. This therefore gives an angularity to the bale member when it is clamped in the position such as shown in FIGURE 3, and achieves the result of pulling the frame outwardly as well as against the window casing. Under certain circumstances, that is particularly where the frame member must abut a surface that is generally perpendicular to the planal extent thereof, the ends of the bale member must be inserted at a location which is on the face of the frame member and adjacent the spline channel **16**. Such an alternate location is shown in the lower part of FIGURE 1 where the side **15'** of frame **10** is shown as abutting a sill. The angularity of the bale member is still achieved in this installation but of course not as great as by using the installation method of FIGURE 3; nevertheless, it is sufficient to draw the frame portions outwardly to some degree and force the frame against the window casing for a seal.

In FIGURE 7 there is shown a modified form of frame channel which can be utilized in lieu of the extruded shape shown in the previous figures. To this end, there is provided a spline channel **50** that is located to one side of a generally box-like formation **51** that is provided with a curved lip section **52**. This curved lip section is of a shape whereby two spaced hacksaw cuts therethrough can be provided along the arcuate portion thereof such as at **53** and **54**. These cuts can be made deep enough so that an aperture is made through the curved lip section walls, and as a result, a bale member **21** of identical construction to that previously described may be inserted in a similar fashion to the manner in which it is inserted in connection with the description of FIGURE 6. It will be apparent that by utilizing this modification a special tool is not required and it accordingly has some advantages from this standpoint. Otherwise the arrangement is identical to that previously described and operates in conjunction with a keeper device such as **25**. FIGURE 8 shows an alternate bale member **21'** which may readily be used with the channel of FIG. 7. In this form the bale has arcuate inturned ends **22A** which hook over the lip section **52** and thus eliminate the necessity for cutting the frame.

What is basically accomplished in the disclosure of this invention is the tensioning of the metallic frame of a plastic storm window. The tensioning member is formed in a fashion whereby it is normally installed with a slight tension and exerts sufficient force on the plastic sheet material so that as the air temperature increases, the plastic will be stretched to form a flat surface. Similarly, as temperature decreases, sufficient stretchability is allowed to the frame so that undue tension is not placed on the plastic as it effectively reduces itself in size. By way of example to illustrate the forces involved with polyvinyl chloride sheet, a 36-inch stretch of material will contract 1—1½ inches in a temperature range of 70°–20° F. Also the arrangement herein disclosed obviates the usual solution to the problem of increasing the cross section of the frame for the plastic window so that more rigidity can be had to resist the forces of the plastic tending to contract. In practice after a window has been installed in accordance with the teachings of this invention, a distinct bend can usually be seen in the frame which is being exerted by the spring tension of the spring bale **21**. Also since a light cross section frame is used it conforms to the irregularities of the window casing and does not require additional caulking to effect a seal. For best installation practice it has been found desirable to install the fasteners approximately thirty inches apart which by experience has shown will hold a frame such as the extruded shape disclosed in FIGURE 3, and perform the desired results insofar as the plastic window sheet material is concerned.

Accordingly, by virtue of providing a novel clip member which can be installed on a window frame so as to extend therefrom at approximately a 30° angle, full utilization of a sheet plastic storm window can be had which will automatically take care of temperature variations as well as high velocity winds and afford a tight seal against a window casing.

I claim:

1. In combination with a window having a casing presenting a surface in a single plane, a storm window unit mounted on said casing and comprising a frame having sides slightly elastically bendable in a plane parallel to the plane of said surface, a sheet of elastic material stretched across said frame and secured thereto, a plurality of spring means on said sides of said frame intermediate its ends, each fastened at one end to and extending away from its side of said frame at an acute angle to the said planes and toward said casing, the spring means being fastened at their other ends to said casing whereby the spring means through slight relative bending of the said sides of the frame maintain the elastic material in a taut condition and also pull the frame against the said surface of the casing.

2. A construction as in claim 1 wherein said spring means comprise a U-shaped bale, the legs of the bale being attached to the frame at a location distant from the casing surface, a keeper fastened to the casing surface and having an upstanding portion provided with at least one notch more closely adjacent the caisng surface than the location of said bale on said frame, the bight of the U engaging the said notch.

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