United States Patent [19]

Nally

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[54] **STORM WINDOW**

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[52] **U.S. Cl.** **52/2**; 52/202; 52/404

[51] **Int. Cl.**[2] **E06B 3/28**

[58] **Field of Search** ..... 52/171, 203, 202, 304, 52/404, 406, 2; 296/84 C, 95 R, 95 C; 49/62

[56] **References Cited**

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2,524,105	10/1950	Hacker	49/62
2,896,272	7/1959	Latenser	52/2
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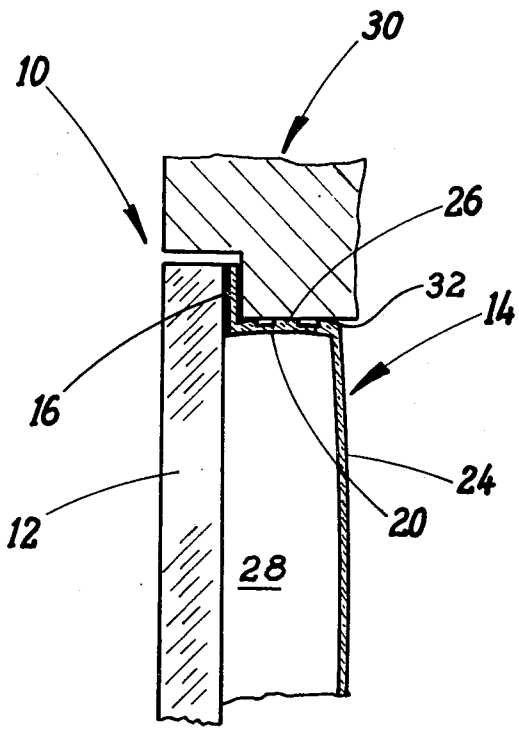
828,126	2/1938	France	52/203
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Primary Examiner—John E. Murtagh

[57] **ABSTRACT**

A storm window comprising a rigid self supporting transparent sheet having a second flexible transparent sheet overlying and peripherally attached thereto to provide an inflatable dead air space for preventing heat loss through a window opening.

7 Claims, 3 Drawing Figures



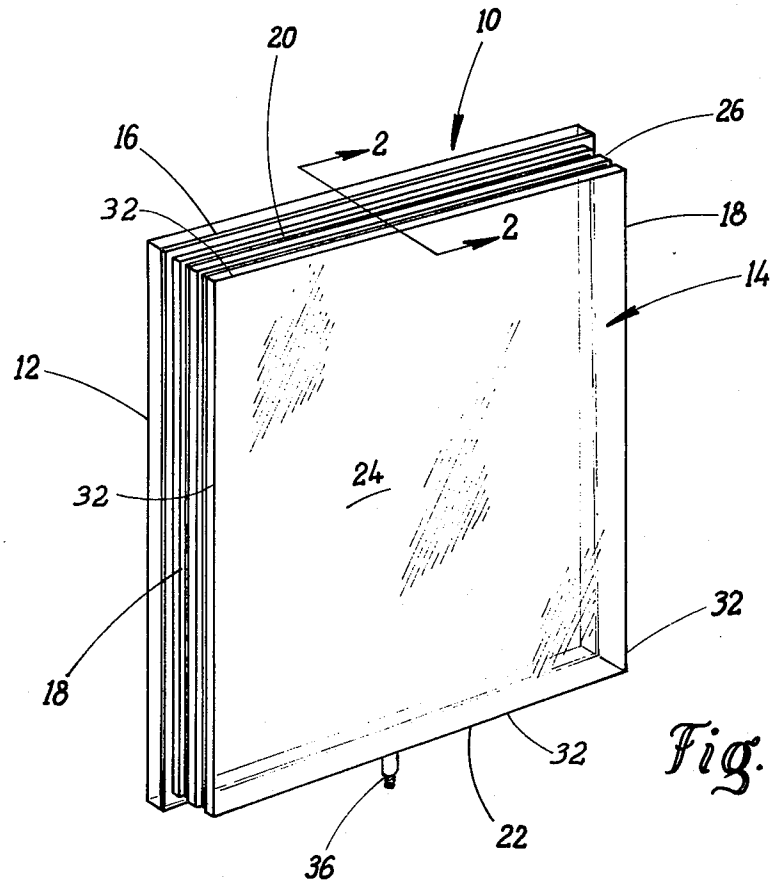


Fig. 1

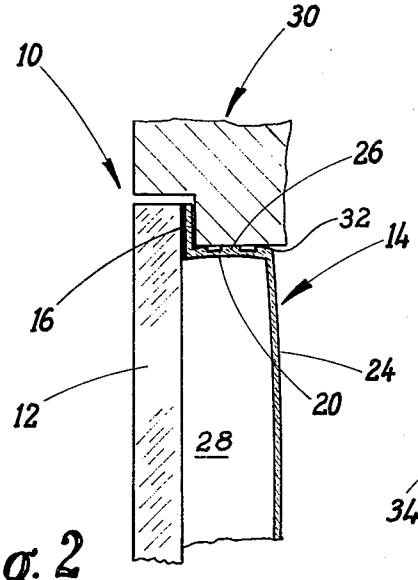


Fig. 2

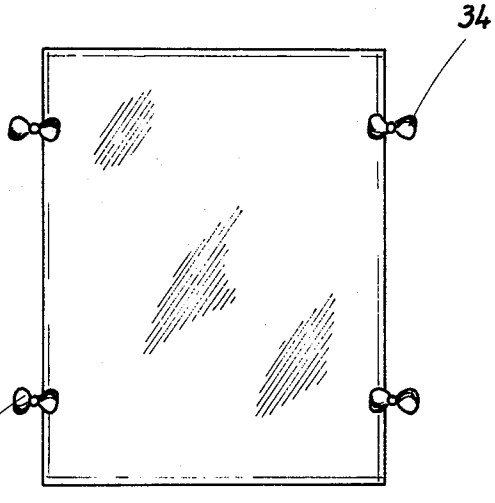


Fig. 3

STORM WINDOW

BACKGROUND OF THE INVENTION

It has long been the goal of home economists and industrial designers to devise a simple, inexpensive, straightforward storm window which would be easy to install, efficient and attractive. It has further been an objective to such designers to provide a dependable storm window which could be used either interiorly of the normal window or exteriorly thereof. Prior art attempts such as those shown in U.S. Pat. No. 2,935,769 and 2,896,272 were not acceptable since in the first instance the devised panes must be used in conjunction with the glass already in the window and thus they do not provide a positively sealed dead air space which is inflatable. Also, they are not usable alternatively on either the inside or the outside of the window because they depend upon the glass holding structure itself for their support. Also, the storm window must be employed in sections, one for each window pane and thus are time consuming to install. In some instances, two flexible sheets were suggested but these too are unsatisfactory since they do not have a definite shape. Thus, when inflated, they tend to bulge in the center to the extent that they are virtually impossible to maintain adjacent a window in an opening.

Similarly, the storm window shown in U.S. Pat. No. 2,080,394 is plagued with weaknesses among which are: firstly, the single sheet attached over the window is not a positively sealed air space and, secondly, the arrangement is unsightly since it involves nailing a frame of boards to the window frame. Further, the employment of boards and nails is not suitable for use on the exterior of a window frame which has been decorated.

Similarly, U.S. Pat. No. 2,825,941 fails to provide a suitable arrangement for heat insulating a window opening.

The invention of this application overcomes the above prior art deficiencies and provides an inexpensive, readily constructed, easily employed storm window which is effective in heat insulating a window opening.

SUMMARY OF THE INVENTION

In the instant invention, there are several features which deserve special mention because of the uniqueness of their combined contribution to the overall effectiveness of the storm window. Firstly, it should be noted that the storm window is designed to be a cubic rectangle when inflated. This feature gives the advantage of providing a dead air space which is uniform in thickness and which provides edge surfaces and top and bottom surfaces which are about equivalent in depth to the thickness of the dead air space. These sides and top and bottom surfaces abut against the window sill in which the storm window is inserted to give a maximum of sealing surface. As explained earlier, the cubic rectangular shape of the dead air space also permits the storm window to be fully inflated in situ without bulging to the extent that the bladder portion abuts the window glass and forces the storm window out of the window opening. This arrangement further allows a positive seal to be effected since inflation in situ allows the above sides and top and bottom to fit the contour of the window frame. Of course, the window upon being fully inflated is held in place by the air pressure

within the dead air space acting upon the sides and top and bottom to force them into tight gripping relationship with the window frame.

The feature of having a storm window which is made up of a solid self supporting sheet and a bladder sheet provides the advantage that it may be inserted easily even if the whole window opening is not easily within reach of the installer. Thus, he may support the storm window in its position in the window opening by one corner of the self supporting sheet and upon inflation it will be secured in place without the installer ever having had access to the upper portion of the window opening.

Also, the self supporting sheet which would be most remote from the window glass present in the window opening is tough and weather resistant to the extent necessary to protect the glass and storm window bladder from the elements.

Also, the storm window of this invention can be used to protect the windows of a home from flying objects during storms or from vandalism.

More specifically, the invention includes: A storm window comprising: a rigid self supporting transparent sheet of material sized to be positioned over a window opening and a transparent flexible bladder portion attached to and cooperable with said transparent sheet to form an inflatable dead air space for providing a see-through heat insulator across said window opening. Advantageously, the bladder portion is preshaped to form a cubic rectangle when inflated and has sides and a top and bottom which include gripping means integral therewith. Also, the bladder is advantageously hermetically parimetrically sealed to the rigid transparent sheet to define the inflatable dead air space. Preferably, the self supporting sheet and the bladder are made of the same material with the former sheet being about **10** to about 100 times the thickness of the latter sheet.

DESCRIPTION OF THE DRAWING

FIG. **1** is a perspective view of the storm window of this invention.

FIG. **2** is a partial cross sectional view taken along the line **2—2** of FIG. **1** showing how the storm window coacts in relation to a window frame.

FIG. **3** shows an alternative means of securing the storm window of the invention over a window opening.

DESCRIPTION OF THE PREFERRED EMBODIMENT

FIG. **1** shows storm window **10** comprised of a rigid self supporting transparent sheet **12** and a bladder **14.** Transparent sheet **10** is secured to a flexible transparent bladder **14** by a parimetric heat seal **16.** Bladder **14** is made up of sides **18,** top **20** and bottom **22** integral with back **24.** Transparent sheet **10** cooperates with bladder **14** to define a dead air space **28** as best seen in FIG. **2.** Sides **18,** top **20** and bottom **22** all include gripping surfaces such as striations **26.**

Hence, it can be seen that upon inflation of dead air space **28,** sides **18,** top **20** and bottom **22** will tend to bow outwardly and grip the inside surface of the window sash **30** into which it has been inserted (see FIG. **2**). Preferably, bladder **14** includes seams **32** which perform a shaping function when the dead air space is inflated. If it is desired, the storm window **10** may be held in position over a window opening by utilizing fas-

teners **34** to supplement the fastening function of striations **26** of sides **18,** top **20** and bottom **22.**

In use, the storm window of this invention is placed over a window opening, the bladder **14** being sized to fit within the sash of the window and the transparent sheet **12** being sized to cover the window opening. The bladder is then inflated with air to create a dead air space therein. Inflation of the bladder causes the top, bottom and sides thereof to expand and abut against the inside surface of the window opening thereby securing it in position in covering relationship thereto.

In the alternative, it is possible to position the storm window on the inside of the window opening in substantially the same way as described above for positioning the storm window on the outside, if the outside is inaccessible.

It should be noted that although the storm window of this invention has been described in terms of a self supporting sheet and a bladder being parimetrically sealed together it is possible to include an air tight frame member therebetween.

The transparent materials suitable for use in fabricating the transparent sheet and bladder include various polymeric resinous materials such as polyethylene, polystyrene, polypropylene, acrylonitrile, butadine styrene, polyvinylchloride and combinations of one or more of these.

It should further be noted that it may be desirable to select the same material for both the self supporting transparent sheet and the bladder. In this regard, it then appears that the self supporting transparent sheet must be thicker than the transparent sheet comprising the bladder portion. Preferably, the self supporting sheet is in the range of about 10 to about 100 times as thick as the sheet defining the bladder. Of course, the sheet defining the bladder portion may vary in thickness as required for a suitable top, bottom, side or back portion. However, most frequently the sheet defining the bladder will be of uniform thickness throughout. In the alternative, it may be desirable to fabricate the self supporting sheet of glass and hermetically seal the transparent polymeric bladder thereto. In such an instance, the bladder and the glass may be of more nearly the same thickness. Various means can be employed to inflate the dead air space **28.** One expedient method is to provide a valve means such as that shown at **36** in the drawing.

Having thus described the invention, what is claimed is:

1. A storm window comprising: a rigid self supporting transparent sheet held in position over a window opening and a transparent flexible bladder portion having sides, edges and a back portion to define with said transparent sheet a cubic rectangularly shaped inflatable dead air space, said edges and said sides including gripping means integral therewith to enhance the attachment of said storm window over said window opening the combination thereby providing a see-through heat insulator across the window opening.

2. The apparatus of claim **1** including a parimetric hermetic seal between said sheet means and said bladder portion to seal said dead air space.

3. The apparatus of claim **1** wherein said transparent sheet is in the range of about 10 to about 100 times the thickness of said bladder portion.

4. The apparatus of claim **1** wherein said edges and said sides are of a uniform thickness and are comprised of a single sheet of polymeric resinous material.

5. The apparatus of claim **1** wherein said transparent sheet is glass and said bladder is comprised of a single sheet of polymeric resinous material.

6. The apparatus of claim **1** wherein said transparent sheet and said transparent bladder portion are made of the same material.

7. The apparatus of claim **6** wherein the sheet and bladder respectively are comprised of polyethylene, polypropylene, polystyrene, acrylonitrile, butadine styrene, polyvinylchloride or copolymers thereof.

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