

[54] WINDOW ARRANGEMENT

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52/172, 2, 406, 302, 303, 304; 49/477

[56] References Cited

UNITED STATES PATENTS

2,825,941 3/1958 Lux et al. 49/477

3,303,615 2/1967 O'Neal 49/477
3,714,745 2/1973 O'Neal 52/2
3,796,010 3/1974 Carlson 49/477

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[57]

ABSTRACT

A modification to virtually eliminate air leakage (in a window arrangement which has both a double-hung inner window and an outer storm window, but considerable leakage). The modification adds a flexible clear plastic bag between the inner and outer window, inflated to enough pressure to make the bag firmly contact the trim between the windows.

3 Claims, 4 Drawing Figures

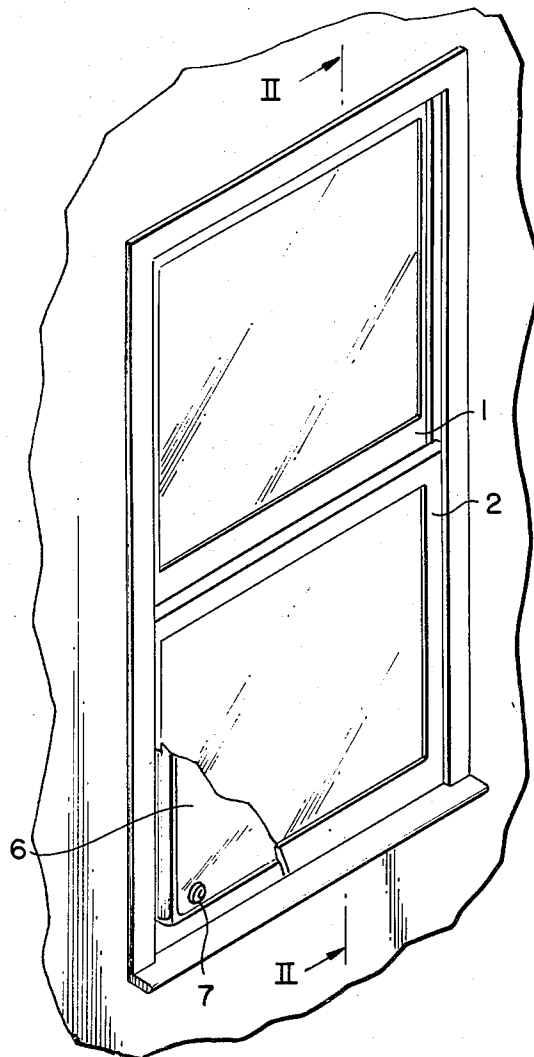


FIG. 1

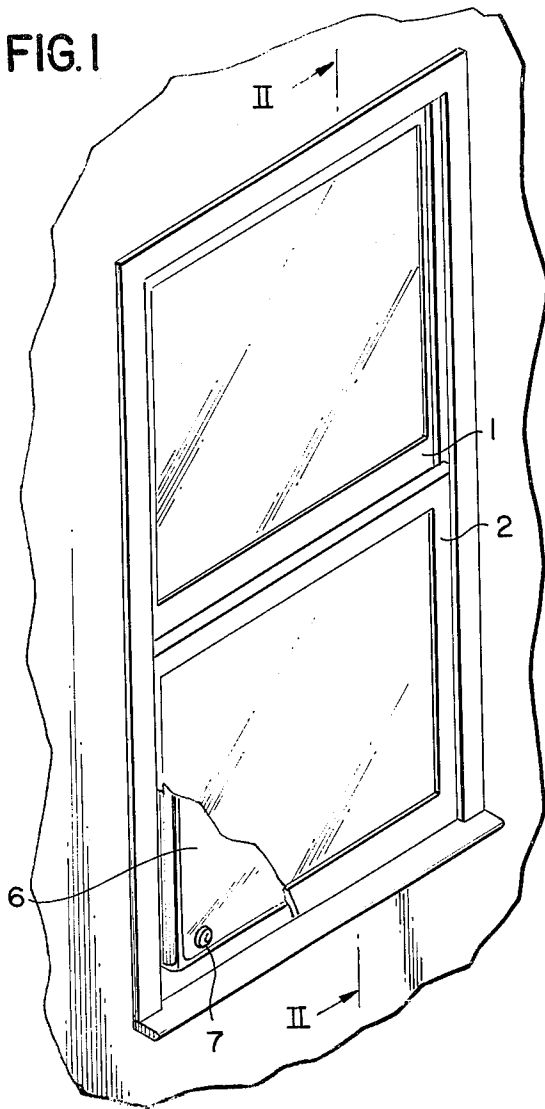
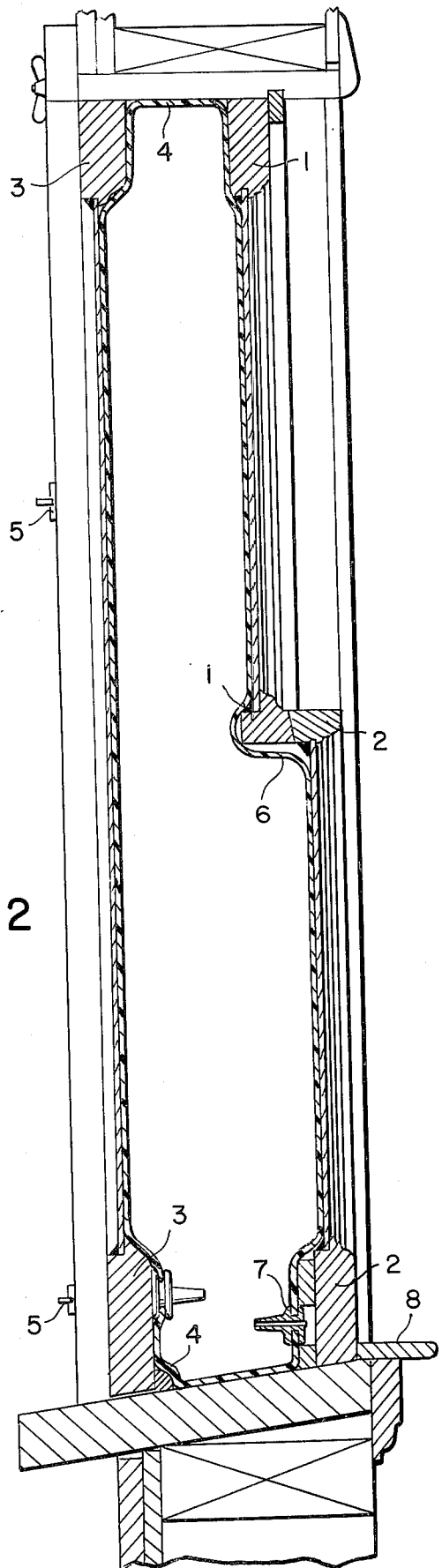


FIG. 2

FIG. 4

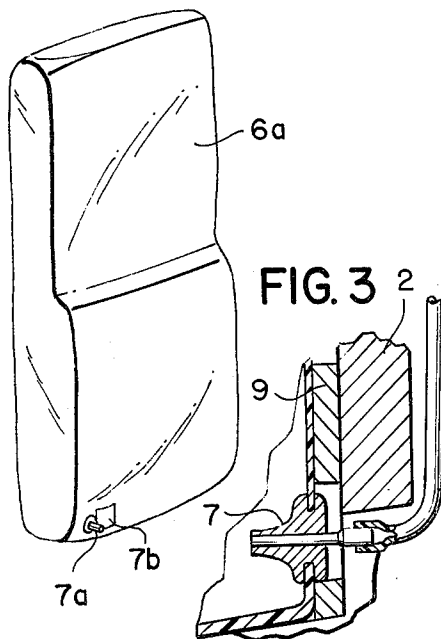
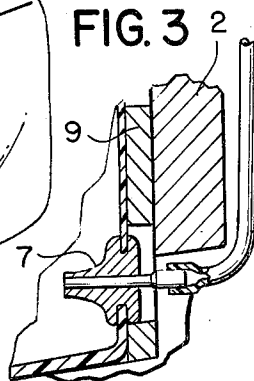


FIG. 3



WINDOW ARRANGEMENT

This invention relates to window arrangements for eliminating, or greatly reducing, air leakage and also reducing heat transfer, and especially to a modification which can very easily and quickly be made in existing drafty window arrangements of a certain type commonly found in older houses.

It is well known that drafts and air leakage are somewhat reduced by storm windows and that these also reduce conductive heat transfer. Hence many older buildings whose windows fit poorly have both the usual double-hung all-year windows and also a seasonally-attached set of storm windows and still they leak air.

The present invention is primarily intended for application to a window arrangement which includes both (A) a permanently built-in set as a double-hung window; and also (B) a temporary seasonally-installed and removed outer window element consisting of a glazed single fixed sash, known as a storm window.

I believe my invention could also be used (with partial benefits) to improve an existing arrangement having only a doublehung inner window and a screened outer window element but no storm window—if the screening is strong enough and firmly enough attached to support a steady pressure of about 0.03 to 0.045 pounds per square inch (i.e. about 1 or 1½ inches of water) and if the screen has no jagged portions to puncture my proposed plastic bag.

The invention is best understood from the following description together with the drawings, in which FIG. 1 is a partially cut-away pictorial view of my window arrangement as seen from inside the house, FIG. 2 is a vertical section of this arrangement along line II—II, FIG. 3 is an enlarged detail of the valve and adjacent parts of FIG. 2; but with the lower sash of the double hung window very slightly open to provide access to the valve, FIG. 4 is a pictorial view of a slightly modified form of inflatable bag used in the window arrangement of my invention.

Referring to FIGS. 1 and 2, glazed upper sash 1 and glazed lower sash 2 (mounted for vertical sliding motion) constitute a conventional double-hung window. A fixed glazed, single-sash storm window 3 held against stop moldings 4, by five finger-turnable hold-down cleats 5 (only three are visible in FIG. 2) substantially reduces conductive heat transfer and also somewhat reduces air leakage through the whole arrangement. But in accordance with my invention an airtight plastic bag 6 fills the inter-window space between the inner double-hung window (consisting of sashes 1 and 2, mounted for vertical sliding motion) and the outer storm window 3. This inter-window bag 6 is made of flexible, transparent, and reasonably clear plastic (e.g., clear polyethylene or very clear vinyl plastic two to twelve mils thick) sealed to form an airtight envelope. Preferably this is shaped like the inter-window space but is slightly larger in size (especially in height and width) so that when inflated it will firmly touch the upper, lower, left and right side surfaces of the trim inside the inter-window space. A valve 7 like that on a modern U.S. football is provided in the lower portion of the bag 6 so that its hole will be slightly above sill trim piece 8, and thus can be seen and reached with an inflation needle when sash 2 is very slightly open—so as to provide an opening of only three-sixteenths to five-sixteenths of an inch between the top of sill trim piece

8 and the bottom of the bottom cross piece of lower sash 2.

It is desirable that the inflation should be performed with the storm window fastened in place, and with the double hung window "substantially closed" (either fully closed or at least almost fully closed) in order to avoid the possibility that the bag may bulge up into the crack between the medial cross-pieces, i.e., between the lower cross-piece of the upper sash and the upper cross-piece of the lower sash). In all cases when the valve is to be accessed by slightly opening just one sash of the inner window, it is preferred that the valve be positioned opposite one of the two extremal cross-pieces (i.e., opposite the top cross-piece of the upper sash or the bottom cross-piece of the lower sash). In the embodiment of FIGS. 1 and 2, the latter position has been chosen, and the hole in the valve is about one-eighth to one-fourth inch above sill trim piece 8.

To install the bag, both sashes are half opened, and the bag (with inflating needle, terminating in a flexible mouth tube, already inserted in valve 7) is inflated to about one-third volume and then draped behind the two sash to hand in roughly final position, and while in that position is inflated to about 75 percent to 85 percent volume. The upper sash is then carefully closed, and the lower sash closed so that it touches the shank of the inflating needle as shown in the enlarged detail of FIG. 3. The bag 6 is then fully inflated to firmly touch the whole periphery of the window frame between the inner window and the storm window. To prevent the bag from bulging out beneath the bottom of sash 2, at least the lower portion of the bag should be quite stiff and somewhat slippery (or at least non-clinging). If it is not stiff enough, a strip 9 of hardboard or waxed carton-board (with an opening to surround the valve) may be placed between the bag and the bottom crosspiece of sash 2 as shows in FIGS. 1, 2 and 3, and may be partially supported by two putty knives or knife blades during final inflation and (after the needle has been withdrawn) during the initial closing motion of sash 2. But this supporting strip 9 may be omitted if the bag has adequate stiffness in its corresponding lower portion.

The valve 7 is made of a rubberlike material resistant to oil and grease and is formed as it tends to flatten and close its opening when the needle is withdrawn, but if this closure does not provide a sufficiently tight seal (at the very low inflation pressure here recommended) it should be fitted with a heavy fibrous grease to assure a tight seal.

An alternate form of valve 7a similar to a valve commonly used in beach balls, is illustrated in FIG. 4 (which also clearly shows that the bag 6 is preferably formed with roughly the same shape as the interwindow space between storm window 3 and the double-hung window 1 and 2.) Valve 7a comprises a rubberlike tube whose diameter and wall thickness are proportioned so that the tube, when bent fairly sharply, kinks and flattens, thus sealing itself. A patch 7b has three of its sides heat-sealed to the outside of bag 6, thus forming a pocket with its open side facing the valve 7a. Valve 7a is long enough to extend well past sash 2 for easy mouth inflation with no tool. After inflation is complete, the tubular valve is bent to kink it thus sealing it, and is tucked into the pocket 7a to keep it kinked.

I claim,

1. In a wall of a headed building exposed to winter cold and winds an air leakage inhibiting heat-transfer minimizing winterized window arrangement comprising (1) a vertically-slideable two-sash glazed inner window of conventional wooden double-hung type, permanently built into said wall, (2) a seasonal, conveniently removable and replaceable, single sash, glazed outer window element of so-called "storm window" type, (3) a transparent and clear air-tight inter-window bag of flexible plastic positioned in between the doublehung sash and said storm window, and (4) an inflation valve connected to said window bag for inflating of said bag to a low pressure and for subsequently sealing said, said window valve being positioned to permit inflation with said double hung window substantially closed, the shape of said interwindow bag being generally similar to the shape of the interwindow space between said inner and outer windows, but the size of said bag being slightly larger than said interwindow space, whereby said bag when inflated presses against the top, bottom and side trim surfaces between said inner and outer

windows to block air flows through said window arrangement.

2. A window arrangement according to claim 1, wherein said valve is of a rubbery material of such wall thickness and diameter as to seal when kinked and wherein said bag comprises a patch applied on its exterior surface adjacent said valve and forming a pocket into which said tubing can be tucked to maintain it in kinked condition.

3. A window arrangement according to claim 1 wherein said valve is attached to a portion of said bag opposite an extreme cross-member of one of said double hung sashes so as to permit access thereto when said sash is only very slightly open, and wherein at least the portion of said bag which lies against said extreme cross member is sufficiently stiff and non-adherent to permit closure of said sash after the bag is inflated and sealed, without pinching said bag between said extreme cross-member and the adjacent trim.

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