Nov. 10, 1942. H. A. KAUFMANN 2,301,627

WINDOW ASSEMBLY

Filed Jan. 22, 1941 2 Sheets-Sheet 1

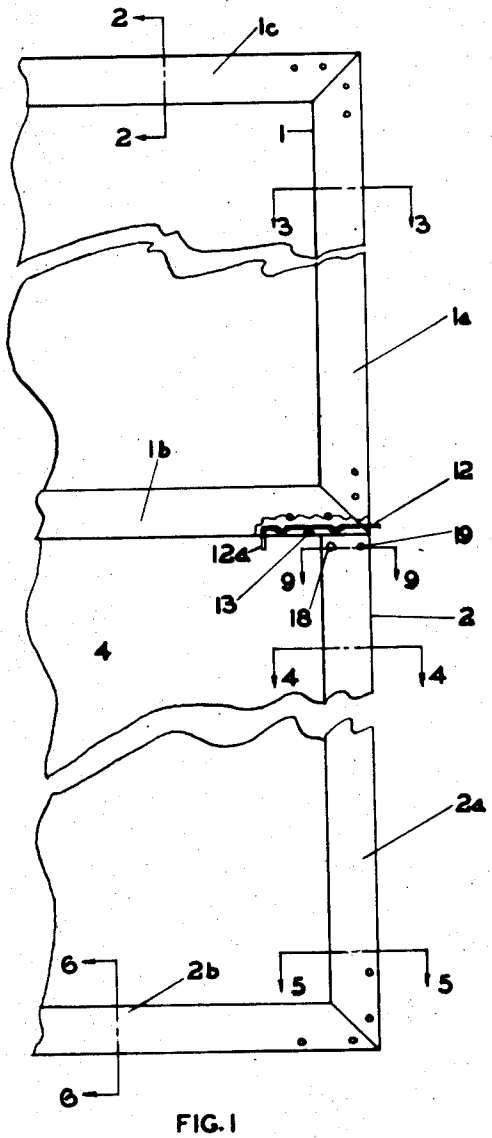


FIG. 1

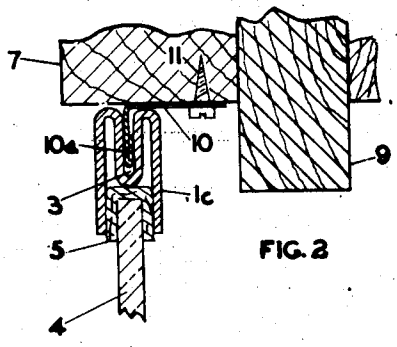


FIG. 2

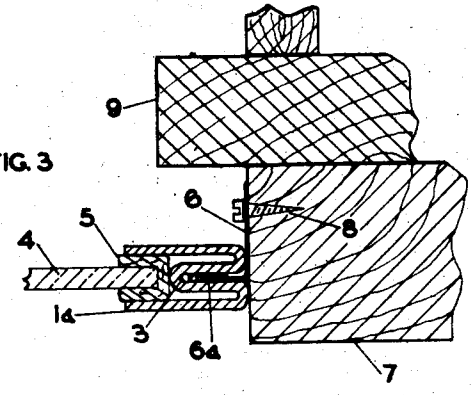


FIG. 3

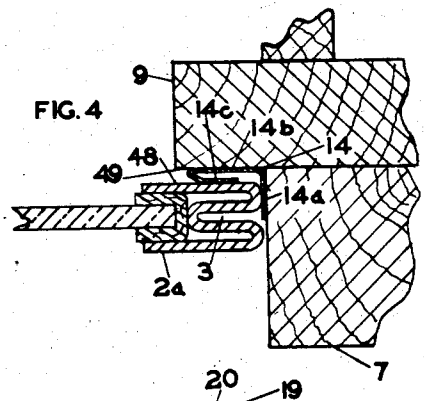


FIG. 4

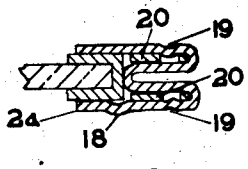


FIG. 9

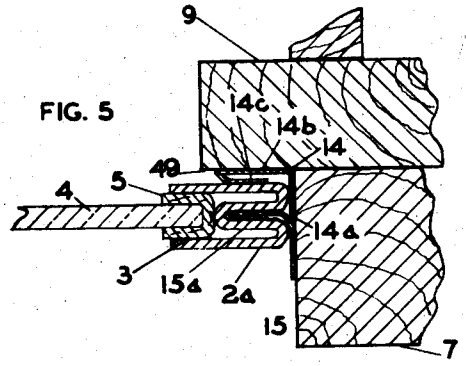


FIG. 5

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WINDOW ASSEMBLY

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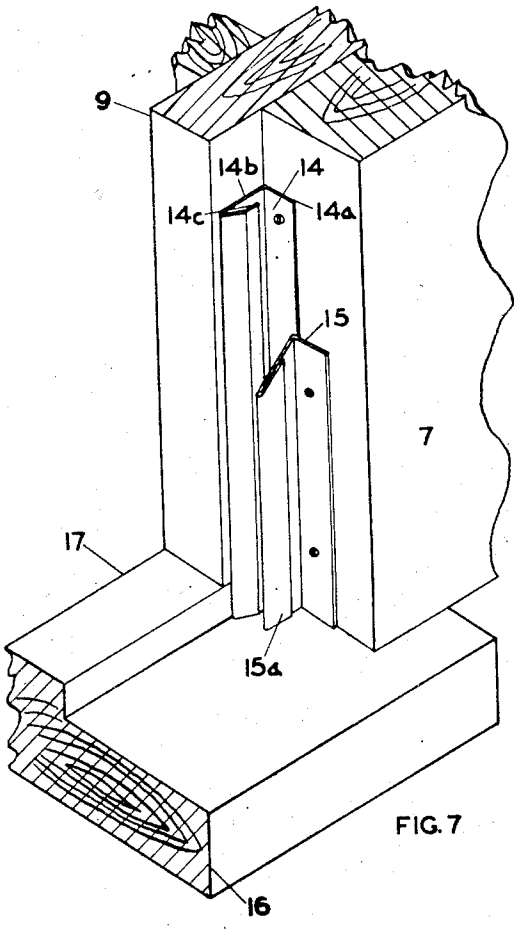


FIG. 7

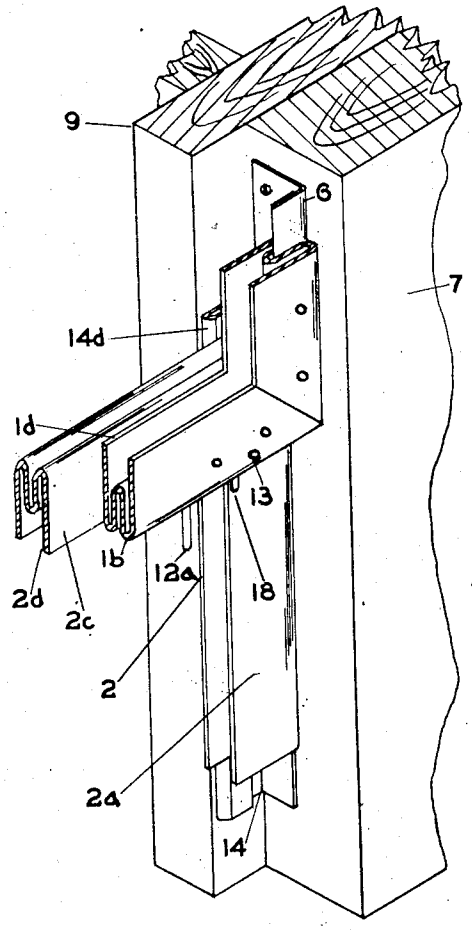


FIG. 8

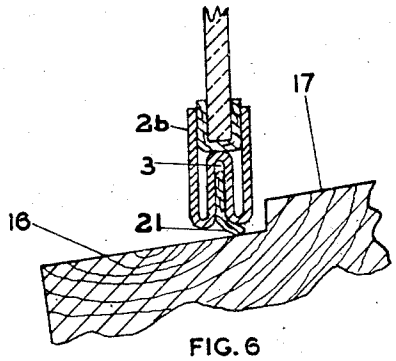


FIG. 6

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UNITED STATES PATENT OFFICE

2,301,627

WINDOW ASSEMBLY

Harry A. Kaufmann, Grosse Pointe Park, Mich.

Application January 22, 1941, Serial No. 375,405

7 Claims. (Cl. 20—55)

This invention relates to window construction and particularly to metal frame storm windows of the double hung type. For full explanation and claims relating to certain incidental disclosure herein unclaimed, reference is invited to my application Serial No. 322,793, now Patent No. 2,291,726.

Although the use of storm windows in various forms has long been common, there have been in the conventional and known types of storm windows many disadvantages. The wooden frame storm windows were clumsy to make, prohibitive in both expense and space occupied to make as double hung windows, they required installation and removal from the outside of the building, they usually fitted only imperfectly at best and in general their value was usually very delicately balanced against the expense and nuisance involved in using them. The known forms of metal frame storm windows solve some of the above difficulties, particularly those relating to space occupied, but are usually prohibitively expensive for the average user and even in the best installations they often rattle. Hence it was desired to create a storm window which was inexpensive to manufacture and install, easy to remove and reinstall and capable of receiving such operations from an operator located inside of the building, non-rattling, tightly fitted excepting for only a necessary minimum of breather space, and capable of being of the double hung type, occupying only a small space and presenting a neat appearance on both the inside and outside thereof. These desirable attributes have been secured by the within disclosed window.

Accordingly, a primary object of my invention is to provide a storm window of the double hung type which is inexpensive to manufacture, install, remove and reinstall.

A further object of my invention is to provide a storm window construction which can be readily adapted to windows of many shapes and sizes.

A further object of my invention is to provide a storm window which is neat in appearance from both the inside and outside of the building and which is easy to operate from open to closed positions and vice versa.

A further object of my invention is to provide a storm window of the double hung type having the above desirable attributes wherein the windows can be readily and easily installed and removed by an operator located inside of the building and wherein such operation may be effected without the manipulation of screws, catches, slides or other fastening devices.

A further object of my invention is to privde a storm window having the above named qualities which would fit tightly against the frame in which it was installed to prevent the passage of all air excepting only minimum essential "breathing."

A further object of my invention is to provide a storm window having the above named qualities which would occupy only a minimum of space.

A further object of my invention is to provide a storm window having the above named qualities which would be non-rattling.

These and various other desirable objectives and results will be apparent to those skilled in the art upon an examination of the following disclosure, taken with reference to the drawings.

In the drawings:

Figure 1 represents a broken view of a part of my window as seen from the outside of the building.

Figure 2 represents a section taken on the line 2—2 of Fig. 1.

Figure 3 represents a section taken on the line 3—3 of Fig. 1.

Figure 4 represents a section taken on the line 4—4 of Fig. 1.

Figure 5 represents a section taken on the line 5—5 of Fig. 1.

Figure 6 represents a section taken on the line 6—6 of Fig. 1.

Figure 7 represents a broken perspective view of a lower corner of the installation as seen from the outside of the building but having the window sashes removed in order better to show the mountings therefor.

Figure 8 represents a broken perspective view of a side of the window at the meeting rails thereof, showing the sashes at that point and the manner of their arrangement and mounting but showing said sashes with the glazing removed therefrom in order better to show the manner of mounting.

Figure 9 shows a section of the sash rail only (and glazing) taken at 9—9 of Fig. 1.

In the example of my invention chosen for disclosure, and illustration herein, there is shown a window adapted for residential use mounted upon a wooden frame. However, it will be apparent that the concept herein disclosed is not at all limited to the example chosen, but that such example is used solely by way of illustration and the invention is adaptable to many types of windows and uses, and that variations which will be incident to such variations in use will all be within the scope of my invention as more precisely defined in the hereinafter appended claims.

The window herein disclosed and described is intended to be located within the ordinary wooden window frame of a house, office building or apartment, and outwardly of the blind stop thereon. All of its parts are sufficiently small so that it fits neatly within this recess. It is of the double hung type in order that the well known advantages of draftless ventilation common to such windows may be obtained quickly and easily and without incurring the awkward appearance found when the lower ends of single frame windows are pushed outwardly to secure ventilation.

Referring now to the drawings, the numeral 1 represents an upper sash of a double hung storm window, which said sash has rails 1—*a*, 1—*b* and 1—*c*. (Of course, it will be understood that for the sake of simplicity in illustration the drawings show only one half of the window and that in all respects the other half of the window is identical with the half here shown.) These sash rails are all made in any convenient manner, provided only that they are thin enough so that two of them lying together, as at the meeting rails of the upper and lower sashes, do not occupy more space than is available between the blind stop of the ordinary wooden window frame and the outer extremity of said frame (Fig. 8). For this purpose I have found a rolled metallic sash rail of substantially W-shape to be satisfactory. Its cross-section is as appears in the drawings, its corners are bonded by the insertion of metal plates 20 at said corners and held by embossings 19. The glass, 4, is set into a strip fibrous material, 5, which holds it tightly. The details of this particular construction are more fully illustrated and explained in my application for Letters Patent, Serial No. 322,793, now Patent No. 2,291,726. However, so far as the particular invention herein disclosed is concerned, any form of sash rail, which has the transverse thinness above specified, will be satisfactory.

In the form shown, the sash is provided with a peripheral recess 3 for the reception of a sliding guide member 6—*a*. It will, of course, be understood that while this construction is here selected for illustrative purposes, it is by no means essential nor even necessarily preferred. A successful window may be built wherein the guide member 6—*a* is replaced by a U-shaped channel into which the entire rail 1—*a* fits bodily. This U-shaped guide actually has certain advantages in installation due to the greater ease of precise locating thereof, but either works well. There are, likewise, many other available forms of guide and supporting strips and many means of effecting their cooperation with the sash rails, but the form here has proved satisfactory and is selected for illustrative purposes as mentioned above.

Numeral 2 indicates a lower sash having rails 2—*a*, 2—*b* and 2—*c*. It is subject to the same requirements and free to the same liberties as is the upper sash.

A guide and supporting strip 6 is placed as shown in Fig. 3 to guide and hold sash 1 by the insertion of its portion 6—*a* into the recess 3 of sash rail 1—*a*. Member 7 represents a brickmold, frame member, or similar and corresponding member, depending upon the type of building upon which the window is being installed. Strip 6 is affixed to the window frame or brickmold 7 by any convenient means, such as suitably spaced screws of which that shown at 8 is one. Strip 6 is formed as a right angle as shown and preferably has a folded back portion on the leg 6—*a*. Strip 6 extends the full length of sash rail 1—*a* and it is set outward of the blind stop 9 a sufficient distance to provide clearance between itself and said blind stop for the lower sash 2 and the resilient strip 14, hereinafter described, which is associated with it.

On the upper portion of the window (Fig. 2), sash rail 1—*c* is received and held in weather sealed relationship by strip 10, whose construction is preferably identical with strip 6 and which is likewise held against frame or brick-mold 7 by any convenient means, such as suitably spaced screws of which that shown at 11 is one. This strip runs the full length of sash rail 1—*c* and may conveniently be mitered to fit a corresponding miter on the upper ends of strip 6 and the counterpart of strip 6 on the other side of the window. Strip 10, of course, does not have the supporting and guiding functions of strip 6, but it provides a weather seal between sash rail 1—*c* and the adjacent part of frame 7. Strip 10 is obviously placed the same distance outwardly of blind stop 9 as is strip 6.

Sash 1 is supported from falling by any convenient means such as rod 12 (Fig. 1) having manipulating handle 12—*a*, which rod is placed within the recess 3 of rail 1—*b* and retained therein by pin 13. This rod is readily slidable and is adapted to slide into an appropriate opening in the frame 7. This supporting means is preferably duplicated on the other side of the window, not shown.

Lower sash 2 (Figs. 1, 4 and 8) is located inwardly of upper sash 1 but likewise outwardly of the blind stop 9. It rests tightly against strip 14 which may be made of any resilient material such as bronze, resilient aluminum or stainless steel. Strip 14 has a portion 14—*a* which rests against frame 7 and is fastened thereto by any convenient means, such as screws; a portion 14—*b* which rests tightly against the outward face 49 of blind stop 9; and a return bent portion 14—*c* which contacts the inner face 48 of sash rail 2—*a* and exerts a light by definite pressure against it. Strip 14 extends the full length of sash 2 and also somewhat above it as shown in Fig. 8 at 14—*d*.

As indicated above, the outer face of rail 2—*c* of sash 2 contacts the inner face of rail 1—*b* of sash 1. Since sash 1 is held by strip 6 in fixed position so far as inward or outward movement with respect to the blind stop is concerned, the pressure of resilient strip 14 holds the meeting rails 1—*b* and 2—*c* of the sashes together in tight weather sealing relationship.

In this way the upper end of lower sash 2 is firmly held on the inward side thereof by the strip 14, which is backed by the blind stop 9, and on the outward side thereof by the rails of upper sash 1, but said lower sash 2 remains free to slide upward and downward. Strip 14, in addition to its pressure exerting and sealing functions, provides a protection for the wood of frame 7 and blind stop 9 against scraping of sash 2 in its sliding up or down.

Adjacent to the lower end of said lower sash 2 there is located strip 15 (Figs. 5 and 7), which is substantially similar to strips 6 and 10. It is affixed in any convenient manner, as by screwing, to frame 7 and is spaced from blind stop 9 such a distance that when recess 3 of sash rail 2—*a* is placed over portion 15—*a* of said strip 15, said sash rail will press tightly against resilient strip 14 and deform the same to cause it to exert a light pressure against said sash rail.

Obviously this distance will vary according to the transverse dimension of sash rail 2—*a*, but where the said rail is about $\frac{5}{16}$ of an inch in thickness and strip 14, at part 14—*c* thereof, in its undeformed state extends outwardly of the blind stop about ⅛ inch. I have found it suitable to place the center line of portion 15—*a* of strip 15 about $\frac{7}{32}$ inch from the outward surface 19 of blind stop 9. Strip 15 commences at the extreme lower limit of sash 2 on the top surface of window ledge 16 and extends upward for a distance of about one-eighth of the total length of lower sash 2 (Fig. 7). Of course, strips 14 and 15 are duplicated on the left-hand side of the window which is not shown in the drawings.

I have further found it advantageous, although not essential, to emboss a raised portion, or pimple, in the position shown at 18 (Figs. 1, 8 and 9), which is on sash rail 2—*a* and on the face thereof adjacent sash rail 1—*b* of sash 1 and located any distance away from the inner, or lower, line 2—*d* of sash rail 2—*c* extended, which distance is less than the transverse dimension of the sash rail 1—*b*. This pimple 18 serves several purposes. When sash 1 slides upward, as hereinafter more fully described, the said pimple causes sashes 1 and 2 to separate slightly to localize the scarring caused by sliding into the region of this pimple only, and thus to prevent the unsightly appearance occurring when the entire opposed surfaces of the sash rails scrape and mar each other. More important, however, it has been found that the individual sash rails sometimes do not abut precisely at the corners of the sashes, and hence when the lower sash has been raised and is again being lowered into its closed position, the edge 2—*d* sometimes catches on the edge 1—*d* and obstructs proper closing. This pimple 18 keeps the sashes far enough apart to prevent this catching when the edges 2—*d* and 1—*d* of said rails 2—*c* and 1—*b* are meeting each other, but then permits said rails to come tightly together in weathersealing contact, as hereinafter detailed, as soon as said edges 2—*d* and 1—*d* have passed each other.

Obviously, this pimple can be placed on a corresponding or inner face of the upper sash rail 1—*b* as well as upon the outer face of the lower sash as illustrated and above described.

In installing the windows, which can be done from the inside of the building, it is necessary only to affix strips 6, 10, 14 and 15 in positions as shown and described. This is done in any convenient manner, such as by the use of screws, and may obviously be done from the inside of the house. Then, with the operator still inside of the house, upper sash 1 is thrust outward of the blind stop by being turned lengthways and at an angle to the horizontal in order to pass said blind stop and then it is turned upward and recess 3 of rail 1—*a* (and its counterpart on the other side of the window) is led onto guide portion 6—*a* of strip 6 (and its counterpart on the other side of the window) and then the sash is pushed upwardly to the top, in which position portion 10—*a* of strip 10 will be fitted snugly into recess 3 of rail 1—*c* and the fastening means, as rod 12, may be placed in locked position. Upper sash 1 will then be firmly held in position and be weather sealed on both its side rails and its upper rail.

Next lower sash 2 is similarly turned lengthways and at an angle to the horizontal so that the operator inside of the building can thrust it outwardly past the blind stop. When the entire window is outwardly of the blind stop it is turned and its upper rail 2—*c* placed against the resilient strip 14 (and its counterpart on the other side of the window) adjacent the bottom rail 1—*b* of the upper sash (Fig. 8). With a little inward pressure applied to said lower sash 2, the portion 14—*c* of strip 14 is depressed and the upper rail 2—*c* of sash 2 is permitted to slide behind the lower rail 1—*b* of sash 1. The resiliency of strip 14, together with some natural resiliency in strip 6 and the retaining pins 12, will permit sash 2 to assume this position and, further, to be pushed upward until its bottom rail 2—*c* clears the top of strip 15, whereupon the bottom end of sash 2 is then moved inward until recess 3 of the side rail 2—*a* (and its counterpart on the other side of the window) is in alignment with guide or flange 15—*a* of strip 15. Sash 2 is then moved downward into position, whereupon the meeting rail 2—*c* is aligned with rail 1—*b* and the same is pressed by resilient strip 14 into weather sealing contact with rail 16 (Fig. 8). Thus the upper end of sash 2 is firmly retained between sash 1 and strip 14, which latter is backed by the blind stop 9, and the bottom end of said sash 2 is retained in position and tightly against strip 14 by the action of strip 15 (Fig. 5).

Obviously, both sashes can be removed by an operator inside of the building by reversing the procedure outlined above.

It is apparent that sash 2 can be raised a short distance for the purpose of ventilation if desired, at least for a distance equal to the length of strip 15. If, however, it is desired to raise sash 2 more than that, it can be pushed upward into the recess defined outwardly by the upper sash, inwardly by the blind stop and peripherally by the window frame or brickmold 7 and may be adjusted in various positions therein, and may be held in raised position by any convenient form of sash holding device (not shown). Likewise, for convenience in handle, handles may be placed on the inward side of sash rail 2—*b*, but since these are standard and may be supplied by any skilled mechanic, they are not shown in the drawings or described herein.

It will be observed (Fig. 6) that the lower rail 2—*b* of sash 2 is spaced from the blind stop portion 17 of window ledge 16 a distance equal to the space occupied by strip 14. Obviously, there may be placed between member 17 and rail 2—*b* a strip similar to strip 14 if it is desired to secure further weather sealing at this point. There may or may not be used a strip 21 placed within the recess 3 of rail 2—*b*, which, if used, may consist of many well known forms of strips made of rubber or similar material for providing further weather sealing between said rail 2—*b* and ledge 16. However, it has been found that some slight leakage of air is desirable between the outside and the space between the storm window and the main window in order to prevent steaming and fogging of said windows and that the leakage effected by omitting weather stripping at this point is sufficient for this purpose without losing any appreciable part of the benefit of the storm windows. Hence, strip 21 may be omitted if desired.

It is, of course, apparent that the windows herein disclosed might be made with many variations in size and in certain constructional details, many of which variations might even be improvements hereover, but which will all come

within the scope of the invention as more fully defined by the hereinafter appended claims. Such variations might be found in adaptations to fit brick or concrete walls instead of wood as might develop in apartment or factory application, installation of further sealing on the bottom rail of the window as suggested above or removal of some herein illustrated as used (such as the strip 10 fitting into the top rail 1—c), use of screen within one or both of the sash frames instead of glass, or use of thin wooden or plastic rails instead of metallic. Further, variations might be found in the shape of strips 6, 10, 14, and 15 and their manner of cooperation with the sash rails, for there are many known forms of guide strips and resilient strips which will effect the purpose herein desired, namely, guiding and supporting and weather sealing in the case of strips 6, 10 and 15, and exerting pressure, weather sealing and protecting the window frame against wear in the case of strip 14. Further variations might be had in locating spring contact means on the inside of the bottom rail of the upper sash.

Although this construction is primarily intended for storm window and/or screens, it is obvious that it may also be advantageously used as the only window for such constructions as a summer cottage at a lake.

All of such variations and others which may be suggested, except where otherwise specifically limited, will come within the scope of the invention as defined by the appended claims.

Having thus fully described my invention, what I claim as new is:

1. Storm window construction affixed to a wooden window frame having a blind stop and positioned outwardly of the said blind stop consisting of an upper sash having a peripheral recess in the top and side portions thereof; a lower sash having a peripheral recess in the sides thereof; both sashes being together of a thickness in a direction perpendicular to the plane of said window less than the distance from the outward surface of said blind stop to the outermost extent of the said window frame; a strip containing a right angular section and affixed by one leg of said right angle to the said window frame at the top of the opening therein in position to permit the other leg to lie within the said peripheral recess in the top of the upper sash; strips each containing a right angular section and affixed by one leg of said right angle to the said window frame at each of the sides of the opening therein in position to permit the other leg of each of said right angular sections to lie within the peripheral recess at the sides of said upper sash; releasable means to hold said upper sash against falling; said upper sash and said strips being spaced away from said blind stop sufficiently to permit the said lower sash and the hereinafter mentioned strip cooperating therewith to fit between said upper sash and said blind stop; a pair of resilient strips lying against the outermost surface of said blind stop and affixed thereto at an angle with the said outermost surface of said blind stop to engage under pressure the inner surface of the lower sash and said strips extending the full length of said lower sash and a short distance above same when same is in its closed position; and a pair of strips containing a right angular section located adjacent the lowermost end of the lower sash, each having one leg of the right angular section affixed to the side walls of the opening of the window frame and the other respective leg lying within a peripheral recess at the sides of the said sash, said strips being placed with respect to the respectively adjacent resilient strips so that the sash is held by them against the said resilient strips to deform the same and cause them to exert a pressure against the inner surface of said lower sash, whereby the upper end of the lower sash is held in weatherscaling relationship by the said resilient strips against the bottom portion of the said upper sash and the lower end of the lower sash is held in weather sealing relationship by the said resilient strips against the said above named lower sash peripheral-recess-engaging strips.

2. In window construction a storm window affixed to a window frame having a blind stop and positioned outwardly of the said blind stop comprising: An upper sash; a lower sash; both sashes together being of thickness to enable them to lie against the said blind stop on the outward side thereof without extending beyond the window frame; strip means affixed to the window frame at the top of the opening thereof engaging the top rail of said lower sash to retain same in operative position; a pair of strip means affixed to the window frame one at each side of the opening thereof engaging the respectively adjacent side rails of said upper sash to retain same in operative position; releasable means to hold said sash against falling; said sash and said strips being spaced from said blind stop as hereinafter specified; a strip lying against the outermost surface of the blind stop and against the adjacent portion of the window frame and having a resilient portion thereof lying at an acute angle with the said outermost surface of said blind stop, said strip extending the full length of said lower sash and slightly above the same when the same is in its normal closed position; a strip affixed to the window frame and engaging the lower sash at the sides thereof and holding said lower sash tightly against the resilient portion of said last-above-named strip, said strip being of an extent of less than one-half the corresponding extent of said lower sash; the upper end of said lower sash and said strip which carries the resilient portion, said strip having the angle thereof partially deformed towards the blind stop, lying snugly between said blind stop and said upper sash, said upper sash and associated members being the sole means to hold said upper end of said lower sash against said resilient portions; whereby said upper sash is held in weather sealed relationship by the strips associated therewith to the said window frame and the lower sash is held in weathersealing relationship against said strips with the resilient portion at its upper end by said upper sash and at its lower end by the above mentioned strips engaging the sides of the lower sash.

3. In window construction, means for mounting a pair of sashes in a main window frame having a blind stop thereon and positioned outwardly of the said blind stop comprising: An upper sash and a lower sash, each having means effective for cooperation with a strip at each of the sides thereof; a pair of strip means mounted one upon each side of said frame and slidably engaging each respective side of said upper sash in a manner to retain same against displacement perpendicular to said blind stop; releasable means to support said upper sash against falling; said upper sash, its guiding strips and said pair of supporting releasable means being spaced from said blind stop as specified below; a resilient strip affixed at an angle with the outermost face of the

blind stops on each side of the frame and arranged to engage and guide the inner surface of the side rails of the lower sash; means associated with the side rails of the lower sash near the lower end thereof to hold the said lower end of the lower sash tightly against said resilient strips; said lower sash at its upper end and said resilient strips nearest adjacent thereto in slightly deformed position fitting snugly between the bottom rail of said upper sash and said blind stop and the said upper sash and the members associated therewith being spaced away from said blind stop sufficient to accommodate said lower sash and resilient strip accordingly and to provide the sole means for holding said lower sash at its upper end against said resilient strip, whereby said upper and lower sashes may be both readily installed, removed and reinstalled from the interior of the building.

4. In window construction, means for mounting a lower sash and an upper sash in a window frame having a blind stop thereon and said sashes positioned outwardly of the said blind stop comprising: a resilient strip mounted upon said blind stop on the outermost surface thereof and at an angle therewith; means slidingly engaging said lower sash and holding the lower end thereof tightly against said resilient strip; means slidingly engaging the upper sash and holding the same within the upper portion of said window opening and spaced away from said blind stop a distance sufficient to allow said lower sash and said resilient strip in its operating position to lie tightly between said upper sash and said blind stop; releasable means to support said upper sash against falling, a part of said lower sash and resilient strip lying between a part of said upper sash and said blind stop.

5. In window construction, means for mounting a pair of sashes in a window frame having a blind stop thereon and said sashes positioned outwardly of said blind stop comprising: A lower sash and an upper sash; said lower sash being positioned adjacent the said blind stop and said upper sash positioned to locate the inner surface of its bottom portion against the outer surface of the upper portion of the lower sash; means slidably engaging the lower sash at its lower portion to hold the same against movement perpendicular to the face of the blind stop but permitting movement parallel thereto and said means being of extent less than one-half of the corresponding extent of the lower sash; means slidably engaging the sides of said upper sash to hold the same against movement perpendicular to the face of the blind stop and in contact with the lower sash as above specified but permitting sliding movement parallel thereto; and means to hold said upper sash against falling, said upper sash being the sole means by which the said upper end of the lower sash is held in position, on the outward side thereof; resilient means mounted on the said blind stop and bearing against the said lower sash on the inward side thereof.

6. In window construction including a pair of sash having contacting sections when said sash are in their closed position, means inoperative when the window is closed and operative when the window is open for holding said sash spaced apart comprising: a pair of raised portions on one sash, one such portion being on each vertical side of said sash, and being on the vertical surface thereof nearest the other sash but located thereon out of the section of said one sash which is contacted by said other sash when said sash are in their closed position.

7. In window construction including a pair of sash having contacting sections when said sash are in their closed position, means operative only when said window is open for holding said sash spaced slightly apart comprising: a pair of raised portions on one sash located on the vertical surface thereof nearest the other sash.

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