Feb. 24, 1959 F. O. BERG 2,874,423

COMBINED WINDOW AND SCREEN ASSEMBLY

Filed March 19, 1956

Fig. 1

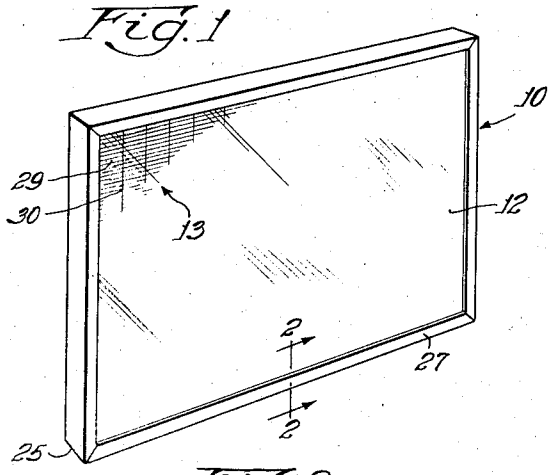


Fig. 2

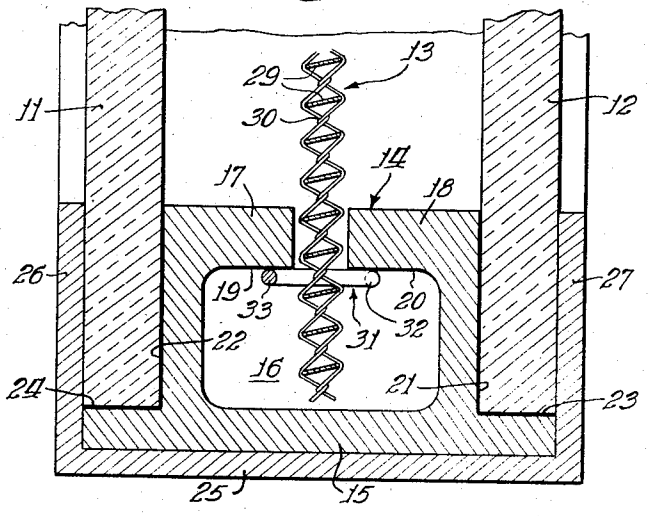


Fig. 5

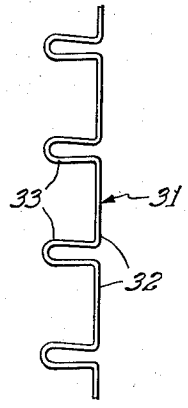


Fig. 3

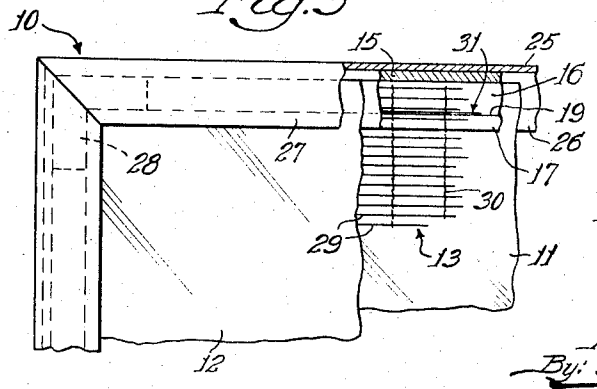
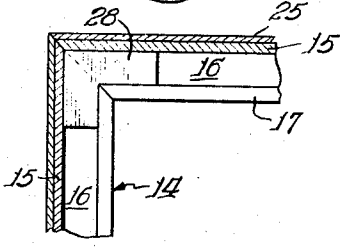


Fig. 4



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COMBINED WINDOW AND SCREEN ASSEMBLY

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2 Claims. (Cl. 20—56.5)

The present invention relates generally to improvements in windows and more particularly to improvements in multiple glass sheet glazing units comprising spaced parallel sheets of glass and having shade screen means disposed between the sheets of glass.

It is conventional practice to utilize glazing units comprising spaced parallel sheets of glass mounted within suitable framing devices in a manner so as to effectively and substantially seal the glass sheets with respect to the framing members in order to provide a dead air space between the glass sheets. Such glazing units have been found to be particularly effective in diminishing heat loss from buildings in cold climates and likewise to be effective when it is desired to maintain a cooler temperature within buildings than prevails outside. However, it has been found in modern building structures, where it is the general practice to employ rather large expanses of glass and wherein it is rather impractical to provide shading devices, such as roof overhangs, hedges, etc., that during those periods of the year when the sun is at a low angle relative to the horizon, a substantial amount of radiation into the building through the glazing units occurs and in some instances the radiation is sufficient to increase the temperature inside of the buildings to the point of extreme uncomfortableness. To avoid this undesirable phenomenon the glazing units are usually shaded in some way or another, such as by awnings or canopys, for example.

The inherent drawback to multiple glazing units when used in modern buildings having such large expanses of light admitting areas, as mentioned above, has already been recognized and it has been proposed to mount a shade screen, such as is shown in the patent to Ewing, 2,194,222 between the two spaced parallel sheets of glass. Various means for mounting such shade screen between the glass sheets have been proposed but heretofore none of these mounting means has proved to be particularly effective or economical.

The principal object of the present invention is, therefore, to provide an improved means for mounting shade screen of the type disclosed in the aforementioned patent to Ewing 2,194,222, between two parallel panes of glass in such a manner that all of the desirable features of sealed multiple glazing units are retained and the shade screen is held in position between the glass panels by means which render the overall assembly of the unit simple and economical and which means provide a quality product.

Other objects and advantages of the present invention will become apparent from the following detailed description thereof, when taken in conjunction with the accompanying drawings, wherein:

Fig. 1 is a view illustrating a glazing unit of the general type to which the present invention is particularly applicable;

Fig. 2 is a sectional view taken substantially along the line 2—2 of Fig. 1 and illustrating the structural details of the mounting means comprising the subject matter of the present invention;

Fig. 3 is an enlarged fragmentary view, partially cut away showing the construction of a corner of the combined glass and screen glazing units;

Fig. 4 is a fragmentary view, shown in section, further illustrating the corner construction and;

Fig. 5 is a view illustrating the retainer means utilized to hold the screen in a taut condition between the opposed frame members of the glazing units.

With reference to the drawings, wherein like reference numerals have been utilized to identify identical parts in each of the several views, there is shown in said figures a combined window and screen glazing unit illustrated generally by reference numeral **10**. The glazing unit comprises two parallel sheets of glass **11** and **12** and a piece of shade screen **13** which are mounted in parallel relation with respect to each other by suitable framing devices indicated generally by reference numeral **14**.

The framing devices **14** together form a substantially rectangular frame of suitable size and each comprises an extruded member **15** which is preferably made of aluminum. The extruded aluminum frame members **15** are each formed with a recess or channel **16** therein which is defined by a pair of facing projections **17** and **18**. The projecting portions **17** and **18** are respectively provided with shoulders **19** and **20** and the projecting portions **17** and **18** are disposed a sufficient distance apart to accommodate the screen **13**.

The frame members **15** are also each formed with opposed flat surfaces **21** and **22** which lie in planes substantially parallel to the panes of glass **11** and **12** and with outwardly projecting abutment shoulders **23** and **24**. The panes of glass **11** and **12**, when assembled with the framing members **15**, are respectively disposed against the flat surfaces **21** and **22** and with their marginal edges respectively seated against shoulders **23** and **24**.

It is contemplated, if desired, that a suitable sealing mastic may be disposed between the glass panes and the surfaces on the framing members **15** and, in order to retain the glass panes **11** and **12** in assembly with the framing members **15**, suitable U-shaped enclosing members **25**, which may be formed of any desired suitable material, are provided which have side portions **26** and **27** respectively adapted to hold the panes of glass **11** and **12** rigidly against the framing members **15**.

The framing members **15**, at each corner of the glazing unit **10**, are mitered so as to provide neat corners for the assembly and are joined together by suitable L-shaped members **28** which fit snugly within the channels or openings **16** in the adjacent framing members **15** in order to hold the framing members in assembly with each other.

The mounting means of the present invention is particularly adapted to retain the top and bottom edges of the screen **13** under the desired tension between and in assembly with the top and bottom framing members **15**. The screen **13** may be of any desired type capable of cutting out a certain portion of the light which otherwise would be transmitted through the glazing unit, and, in the present case, the screen is shown as screening material of the type shown in the patent to Ewing 2,194,222. This type of screen comprises longitudinally extending parallel ribbon-like filler or louver wires **29** which are held together by horizontally spaced longitudinally extending pairs of warp wires **30**. Each pair of warp wires are twisted together between each adjacent pair of louvers wires **29** and this provides a certain amount of longitudinal resilience to the screen while, at the same time, maintaining the desired angular relationship between the major surfaces of the ribbon-like filler or louver wires **29** and the plane of the screen when the screen is placed under tension between the framing members **15**, respectively disposed at the top and bottom of the glazing unit **10**.

The edges of the screen **13** are each disposed within

the channel 16 of the respective framing members 15; however, only the top and bottom edges or end portions of the screen 13 are positively retained within the channels 16.

The means for positively retaining the top and bottom end portions of the screen 13 within the channels 16 of the top and bottom framing members 15 will now be described. This means comprises a sinuous lacer-like retainer element or member 31. The sinuous lacer-like retainer element 31 is preferably made of some desirable metallic wire formed into a sinuous shape in any desired manner, such as, by running the wire through a pair of gears to provide elongated portions 32 alternately spaced between uniformly spaced crest portions 33. The space between each adjacent pair of crests 33 is substantially equal to the space between each adjacent set of warp wires 30 and it is contemplated that the lacer-like retainer member 31 may be assembled with the top and bottom end portions of the screen 13 by merely pushing the retainer element 31 between an adjacent pair of louver wires 29 near the top and bottom ends of the screen 13 in a manner such that each pair of warp wires 30 is received within one of the crests 33. It will be noted that the depth of each of the crests 33 is of the order of two to three times the width of each louver or filler wire 29 so that when the lacer-like retainer 31 is assembled with the end portion of the screen 13, as shown in Fig. 2, the substantially straight portions 32 which join the crests 33 are disposed on one side of the screen 13 while the peaks of the crests are disposed substantially the same distance from and on the opposite side of the screen. The straight portions 32 and crests 33 then respectively engage the shoulders 19 and 20 on the projections 17 and 18 and thus positively prevent the withdrawal of the screen 13 from the channel 16 in an upward direction, as viewed in Fig. 2.

It will be understood that the upper end portion of the screen 13 will be assembled with the top frame member 15 in precisely the same manner as the lower end portion of the screen 13 is assembled with the lower frame member 15.

In actual practice the top and bottom framing members 15 may be aligned substantially parallel to each other with the channels 16 thereof facing each other and the piece of screen 13, with the lacer-like retainer members 31 already properly disposed between adjacent pairs of louver wires at the top and bottom end portions of the screen 13, may be inserted into the channels 16 through the ends of the channels 16. The side frame members 15 may then be assembled, these being secured to the top and bottom end frame members by the L-shaped corner brackets 28. Thereafter, the panes of glass 11 and 12 are suitably positioned and the sealing member 15 is mounted around the entire frame in order to hold the entire assembly together.

It will be understood that the screen 13 may be positioned within the top and bottom frame members 15 and thereafter these frame members can be spread apart slightly to provide the desired tension for the screen 13. It will also be understood that the ends of the louver or filler wires 29 will be disposed between the projections 17 and 18 of the side frame members 15, it being unnecessary to provide any positive retention for the side edges of the screen within the channels of the side frame members 15.

It will be further understood that the corner members 28 are adapted to fit snugly within the channels 16; however, the corner members 28 need not extend but only a slight distance into the channles 16 and it is therefore necessary to cut away only a short portion of the ends of the louver wires at each corner in order to provide for the insertion of the corner members 28 without interference with the ends and side portions of the screen 13 also disposed within the channels 16.

It is contemplated that numerous changes and modifications may be made in the present invention without departing from the spirit or scope thereof.

What is claimed is:

1. In a combined window and screen assembly, the combination including a piece of screen composed of a plurality of symmetrically spaced horizontally extending parallel ribbon-like elements disposed with their major surfaces at a predetermined angle to the normal plane of the screen and having a plurality of horizontally spaced, longitudinally extending supporting elements extending between said parallel ribbon-like members, a plurality of interconnected frame members disposed around the edges of said screen, each of said frame members being formed with a longitudinally extending channel opening in the direction of the mid-portion of said screen, said frame members each including means defining inwardly extending opposed projections along said channel, for receiving the respective adjacent edges of the screen therebetween, lacer-like retainer means respectively provided for opposed end portions of said screen having protuberant portions disposed between adjacent pairs of said parallel ribbon-like elements at the respective end portions of said screen, said lacer-like retainer means being respectively disposed within the channels in the frame members adjacent said opposed end portions of said screen and in holding engagement with said opposed projections for holding said screen under tension between said frame members, said frame members each further including means defining outwardly directed shoulders on opposite sides thereof respectively facing in the general direction of the mid-portion of said screen, and a pair of panes of glass respectively disposed with their edges in abutment with said shoulders on said frame members for thereby providing a unitary assembly of said screen and panes of glass.

2. A multiple glass sheet glazing unit comprising two spaced parallel sheets of glass, substantially rigid frame members disposed around the marginal portions of said glass sheets with each of said frame members having outwardly directed abutment shoulders disposed substantially normal to the planes of said glass sheets and having the marginal edges of said glass sheets seated thereagainst, said frame members each including means for retaining said glass sheets in spaced relation from each other, each frame member further including means defining a longitudinally extending recess opening in the direction of the mid-portion of said unit and having inwardly extending opposed facing projections along the edges of said recess, a piece of screen composed of a plurality of symmetrically longitudinally spaced parallel ribbon-like elements disposed with their major surfaces at a predetermined angle to the normal plane of the screen and including a plurality of horizontally, spaced longitudinally extending supporting elements extending between said parallel ribbon-like elements and having its terminal edges respectively disposed within said frame recesses, means comprising lacer-like retainers respectively disposed at opposed ends of said piece of screen between an adjacent pair of said parallel ribbon-like elements at the said respective end portions of said screen and within the respective recesses in the frame members adjacent said opposed end portions of said screen, said lacer-like retainers respectively extending beneath said opposed facing projections and in holding engagement therewith for retaining the screen under tension between said sheets of glass, and interconnected sealing members of a substantially U-shape cross-section disposed around said frame members and glass sheets for retaining the latter in engagement with the frame members.

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