Aug. 14, 1928. 1,681,037

F. H. HALL

CELLULOID WINDOW

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Fig. 1.

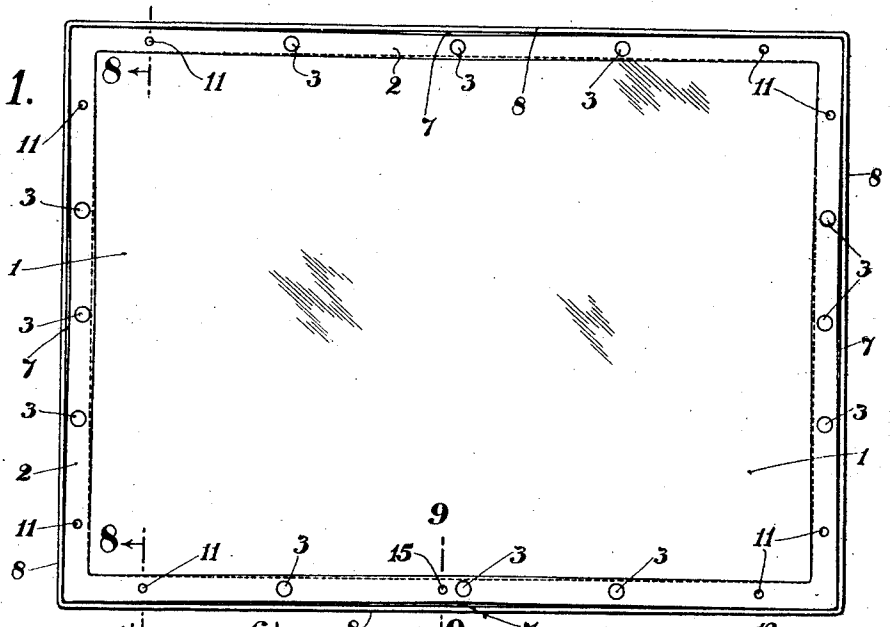
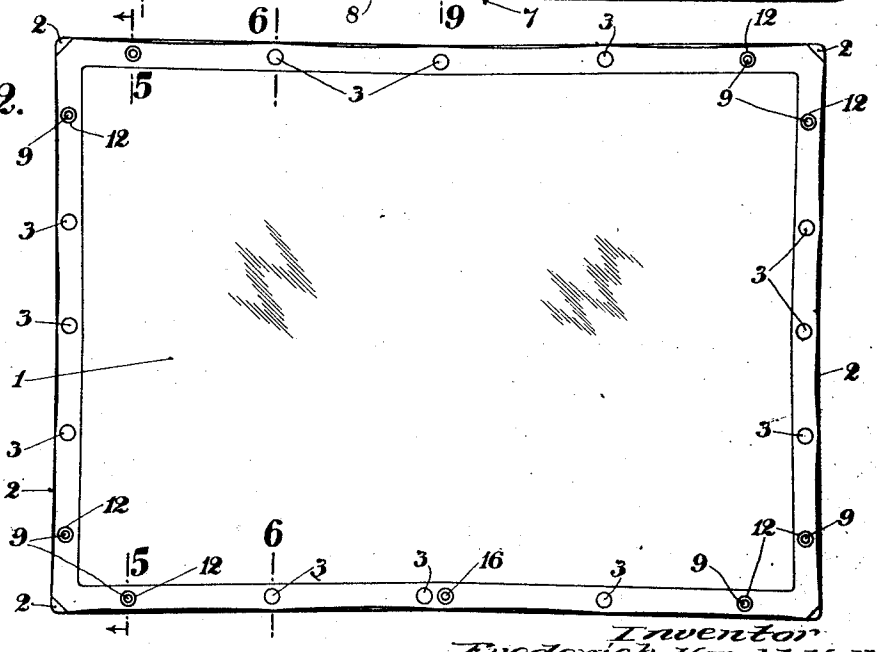


Fig. 2.



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Fig. 3.

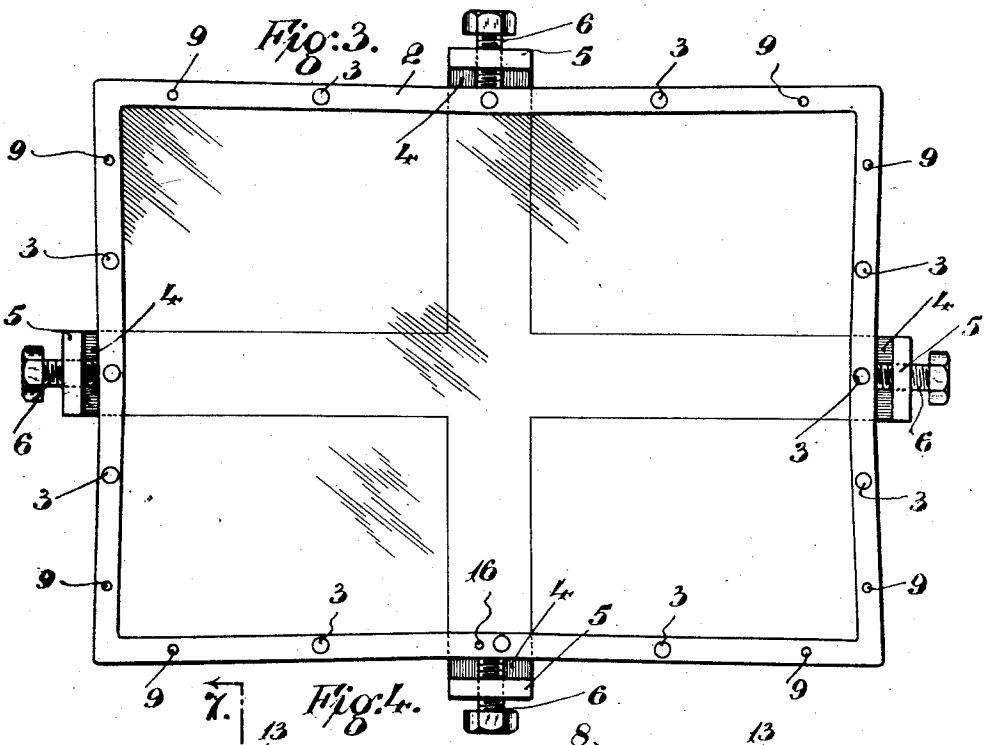
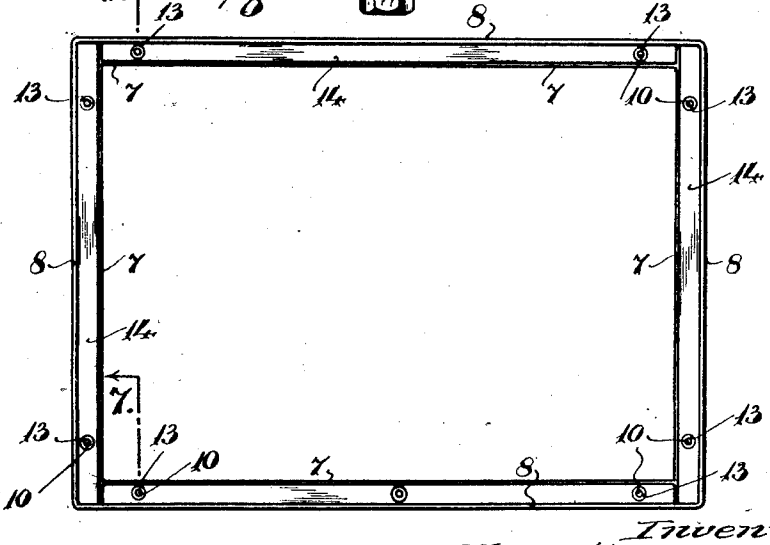


Fig. 4.



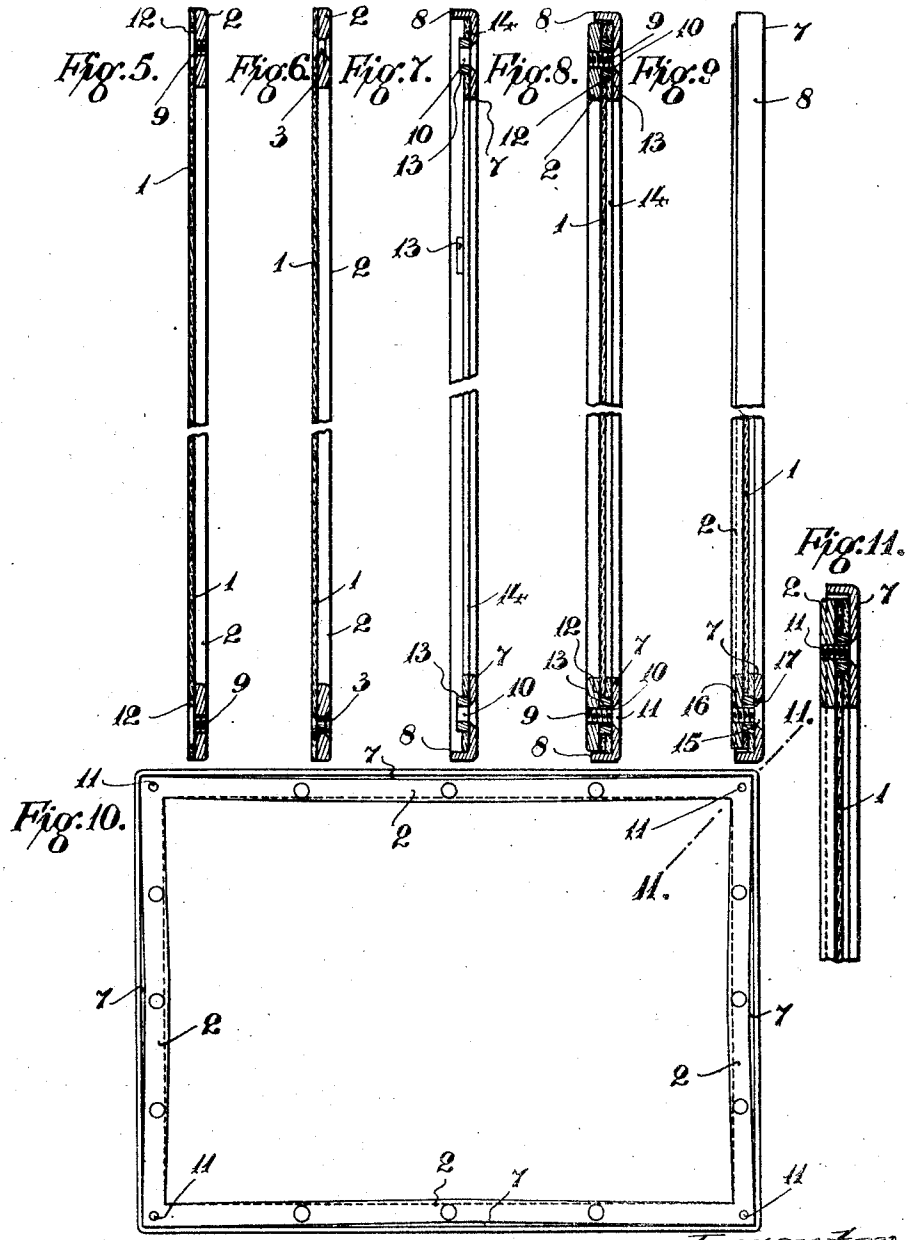
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Fig. 12.

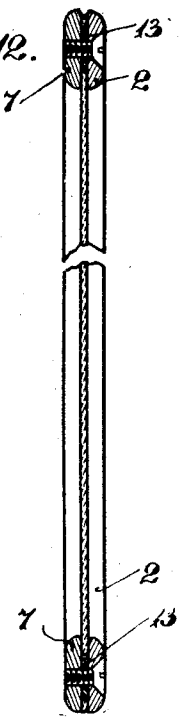
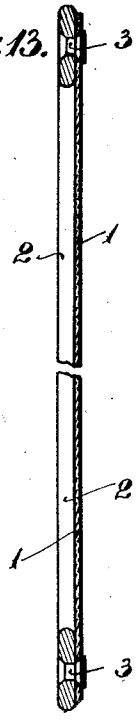


Fig. 13.



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UNITED STATES PATENT OFFICE.

FREDERICK HAROLD HALL, OF HOLFORD, NEAR BRIDGWATER, ENGLAND.

CELLULOID WINDOW.

Application filed February 3, 1925, Serial No. 6,570, and in Great Britain February 9, 1924.

This invention relates to celluloid or like windows for motor vehicles or for other purposes wherein the celluloid or the like is mounted within or carried by a metal or other frame or support.

In such windows no provision has hitherto been made to allow for the expansion or contraction of the celluloid under changing weather conditions with the result that buckling of the celluloid is apt to occur during hot weather. The object of the present invention is to provide an improved construction of window wherein means are provided for exerting a pull on the celluloid or the like, so that it is kept taut, whilst the expansion and contraction of the celluloid is allowed for. Buckling of the celluloid under varying weather conditions is thus prevented.

Figure 1 of the accompanying drawings is a side elevation of a celluloid window constructed in accordance with this invention, the celluloid panel being carried by a flexible frame attached near each corner to an outer rigid frame member.

Figure 2 is an elevational view of the flexible frame member showing the celluloid attached thereto, before the said frame member has been secured to the rigid frame.

Figure 3 shows the special clamping device which may be employed for springing the sides of the flexible frame inwards ready for the attachment of the celluloid thereto.

Figure 4 is an elevational view of the outer rigid frame member before the flexible frame carrying the celluloid panel has been secured thereto, the said rigid frame member being shown fitted with packing strips carrying distance sleeves for preventing binding of the celluloid between the two frames.

Figure 5 is a cross-section on the line 5—5, Figure 2, upon a larger scale.

Figure 6 is a cross-section, upon a larger scale, on the line 6—6, Figure 2.

Figure 7 is an enlarged cross-section on the line 7—7, Figure 4.

Figure 8 is an enlarged cross-section on the line 8—8, Figure 1, showing clearly the manner in which the two frames are prevented from binding upon the celluloid.

Figure 9 is a side view of the window, partly in section, on the line 9—9, Figure 1, upon a larger scale.

Figure 10 is an elevational view of a slightly modified arrangement in which the two frames are secured together by a single screw at each corner.

Figure 11 is a section on the line 11—11, Figure 10.

Figure 12 illustrates a further modification in which the celluloid is mounted between two frames of a D-section.

Figure 13 shows a further arrangement in which a single frame only is employed.

The same reference numerals indicate corresponding parts in each of the figures.

Referring to Figures 1 to 9 of the drawings, the celluloid panel 1 of the improved window is attached at each of its edges to the corresponding sides of a rectangular metal frame 2 by means of rivets 3, the latter being arranged at distances apart near the centre of each side, as shown, so as to leave the corners of the celluloid 1 free or unrestricted. The aforesaid sides of the frame 2 to which the celluloid is attached are resilient or of a spring construction, and, before the celluloid is secured to the frame 2, the said frame 2 is put into a clamping device comprising, as shown in Figure 3, four integral diverging arms 4 disposed at right-angles to one another, their extremities being formed with integral upstanding lugs 5 tapped with holes to receive screwbolts 6. When the frame 2 is fitted within the said clamping device the lugs 5 are arranged to come adjacent the outer edges of the sides of the frame in such a manner that the extremities of the bolts 6 may be brought to bear upon the middle portion of the said edges. The said bolts are then screwed up so as to cause the sides of the frame 2 to spring or to flex inwards towards the centre of the latter in the manner illustrated. After the said sides have been sprung inwards in the above manner the celluloid panel 1 is placed in position upon the frame 2 and its edges are securely riveted to the sides of the latter, the rivet holes having been previously made in the said sides. The frame 2 is then removed from the clamping device by slacking the bolts 6, when the sides of the said frame tend to spring back into their original positions and thereby draw the celluloid perfectly taut so that it is in a state of tension. Should the celluloid expand owing to an increase in temperature, this expansion is automatically taken up owing to the sides of the frame 2 expanding further outwards so that buckling of the celluloid is effectively prevented. On the

other hand, any contraction of the celluloid due to a decrease of temperature causes the sides of the frame to be drawn inwards. It will thus be seen that this method of attaching the celluloid ensures that the latter is maintained perfectly flat under varying temperature conditions, and buckling of the celluloid, which is liable to occur in celluloid windows as hitherto constructed, is prevented. After the celluloid panel 1 has been attached to the frame 2 the latter is fitted within a rigid or non-flexible outer frame 7 provided around its outer edge with an integral upstanding flange 8 adapted to surround the edges of the aforesaid inner frame 2 in the manner illustrated in Figure 1. The said inner frame is provided near each end of each of its sides with a tapped screw hole 9 adapted to register with a plain hole 10 in the outer frame 7. Screws 11 are then passed through the holes 10 of the frame 7 to engage corresponding holes 9 in the frame 2 so that the two frames are rigidly secured together. As previously mentioned, the celluloid panel 1 is attached to the frame 2 in such a manner that the corners thereof are free to expand or contract without being influenced by the said frame 2, and in order that this expansion and contraction of the corners of the celluloid shall not be interfered with by the attachment screws 11 which secure together the two frames, holes 12 are formed in the celluloid (see Figure 2) through which each attachment screw 11 is arranged to pass, these holes being considerably larger than the diameters of the said screws so that ample clearance is provided around the latter to permit of the free expansion or contraction of the corners. Further, to prevent the two frames 2 and 7 from binding upon the aforesaid corners of the celluloid the attachment screws 11 are arranged to pass through distance sleeves 13 disposed between the opposed faces of the two frames. These distance sleeves are preferably tightly fitted within holes in celluloid or other packing strips 14 so as to project beyond the one side of each of the latter, the strips being placed within the rigid frame 7, as shown in Figure 4, before the frame 2 with the celluloid has been placed therein, and serving to hold the distance sleeves 13 in their correct positions to receive the attachment screws 11. Since the flexible frame 2 is attached to the outer rigid frame 7 only near its corners, the unattached middle portion of its sides are left free to move relatively to the said rigid frame 7 and to adapt themselves to the contraction or expansion of the celluloid.

If desired, additional screws may be employed for securing together the two frames 2 and 7, such screws being disposed at or near the middle of the latter, but being so arranged that whilst assisting to secure the sides of the frames together they permit of a relative movement taking place between the corresponding sides of the two frames. In the particular example illustrated in Figures 1 to 9 of the drawings, one side member of each frame is provided at the centre with an additional securing screw 15. This screw is arranged to engage into a tapped hole 16 in the inner flexible frame 2 (see particularly Figure 9) but passes through a plain hole 17 in the corresponding side of the other frame 7, this hole 17 being of such a size as to give a clearance (exaggerated in the drawings) around the shank and head end of the screw 15 to permit of the necessary relative movement.

Figures 10 and 11 show a window of substantially the same construction as shown in the previous figures, the only difference being that the two frames are secured together at each corner by a single screw 11 only. Means are provided for preventing the contraction or expansion of the corners of the celluloid from being restricted by the attachment screws similar to the above described.

If desired both of the frames 2 and 7, between which the celluloid panel is mounted, may be of a D-section, as shown in Figure 12 of the drawings; or they may be of any other suitable cross-sectional shape. The packing strips employed in the previous examples may be omitted, as shown, although distance slevees 13 are fitted upon the attachment screws 11.

Figure 13 of the drawings shows a window in which a single resilient sided frame 2 only is employed, rivets 3 being used to secure the celluloid 1 to the latter.

The celluloid may be attached at each side to the flexible frame member by any suitable number of rivets, preferably arranged near the middle portion of the respective side so as to leave the corners of the celluloid free to expand or contract without being influenced by the frame; or other securing means may be employed.

Having fully described my invention, what I desire to claim and secure by Letters Patent is:—

1. A window comprising a flexible transparent panel, a frame having resilient side and end members, means for attaching the middle portions of the edges of the panel to the said side and end members, an outer rigid frame, and means for securing the resilient frame to the said rigid frame so as to allow of a relative movement between them.

2. A window comprising a flexible transparent panel, a frame having resilient side and end members, means for attaching the middle portions of the edges of the panel to the said side and end members, an outer rigid frame, and means for attaching the

corners of the resilient frame to the corners of the rigid frame, so as to permit of a relative movement between the two frames.

3. A window comprising a flexible panel, a frame having resilient side and end members, means for attaching the middle portions of the edges of the panel to the said side and end members, an outer rigid frame, means for attaching the corners of the resilient frame to the corners of the rigid frame, and distance members to prevent the frames from binding upon the panel.

4. A window comprising a flexible panel, a resilient frame, means for attaching the edges of the panel to the resilient frame, a rigid frame, means for attaching the corner portions of the resilient frame to the corner portions of the rigid frame, and means for permitting of the free expansion and contraction of the corners of the panel.

5. A window comprising a flexible panel, a frame having resilient side and end members, means for attaching the middle portions of the edges of the panel to the said side and end members, an outer rigid frame, means for attaching the corners of the resilient frame to the corners of the rigid frame, and means for permitting of the free expansion or contraction of the corners of the panel.

In testimony whereof I have hereunto set my hand.

FREDERICK HAROLD HALL.