Feb. 17, 1931. J. C. YETTER 1,793,039

WINDOW

Filed March 14, 1928

Fig. 2.

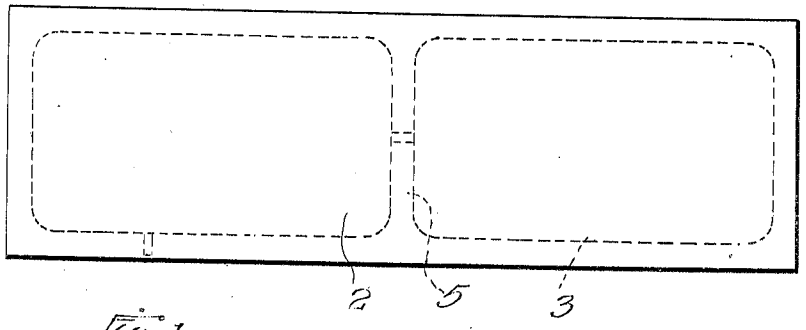


Fig. 1.

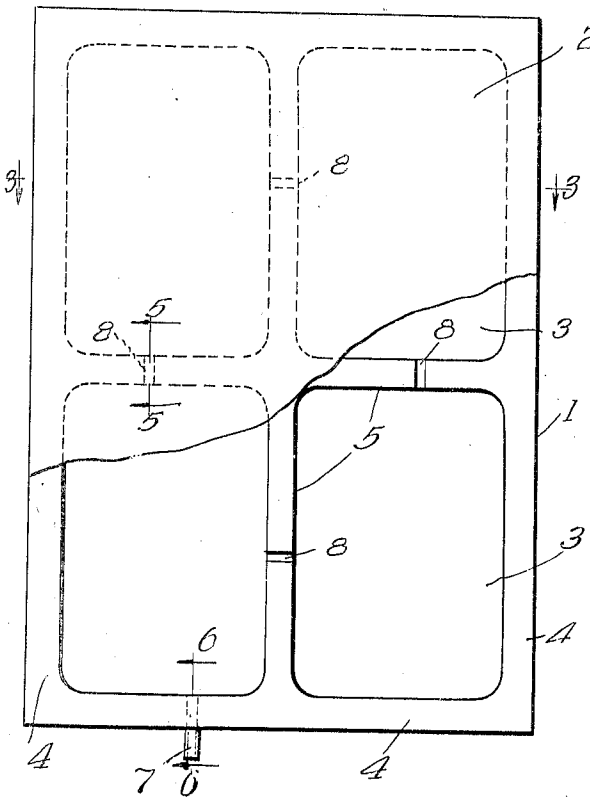


Fig. 4.

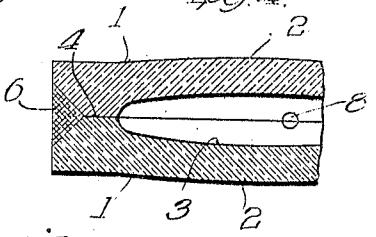


Fig. 5

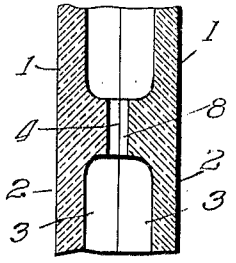


Fig. 6

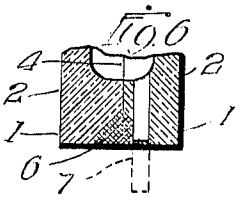
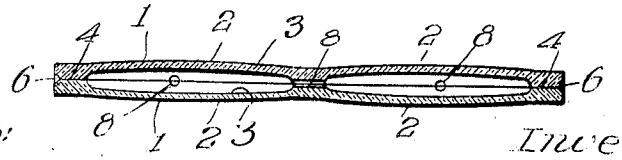


Fig. 3.



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1,793,039

UNITED STATES PATENT OFFICE

JOHN C. YETTER, OF CHICAGO, ILLINOIS

WINDOW

Application filed March 14, 1928. Serial No. 261,603.

My invention relates to improvements in windows or rather in transparent sheets for use as windows.

The object of my invention is to provide a transparent sheet or structure adapted to be used as a window and so constructed or made that the transmission of heat therethrough shall be very much less than through ordinary window glass. In other words it is my object to provide a transparent structure suitable for windows in a building or for windshields on automobiles which shall be capable of being exposed to a temperature very much below freezing at its outer surface, while its inner surface can readily be maintained at sufficiently high temperature to prevent the formation of frost thereon.

My invention consists in a transparent structure through which clear vision can be attained and comprising two sheets of transparent material such as glass, joined at their edges and having their major portions separated by a thin space from which the air has been exhausted.

In other words, my invention resides in a substantially flat transparent structure having a vacuum space between its inner and outer walls.

In cases where the window has considerable area the structure may contain strengthening partitions.

A valuable feature of my invention resides in the means which I employ for providing against the collapsing pressure of the air and the expansion and contraction of the walls of the structure, viz, the slight outward bowing or curving of the walls of the structure.

My invention will be more readily understood by reference to the accompanying drawing forming part of this specification and in which—

Fig. 1 is a plan view of a transparent structure embodying my invention in a form suitable for a window, part of one side being broken away;

Fig. 2 is a similar view of such a structure of a shape to form a windshield for an automobile;

Fig. 3 is a transverse section on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary section on the line 3—3 of Fig. 1;

Fig. 5 is a fragmentary section on the line 5—5 of Fig. 1, and

Fig. 6 is a detail section on the line 6—6 of Fig. 1.

As shown in the drawings, I preferably make up my novel window or windshield by first making two sheets or plates 1. Each of these plates has a substantially flat outer surface 2 which can be highly finished by polishing similarly to the surface of plate glass and the opposite side is provided with relatively large shallow depressions 3 bordered by narrow flat ledges 4. If the window is large or long, I also provide sufficient transverse ribs or ledges 5 to properly support the external atmospheric pressure when the air is exhausted from within the structure. Having made the sheets 1, I next place two of them together so that the depressions 3 and ledges 4 and 5 of the two coincide and then the two sheets are sealed together at their edges. This is probably best accomplished by fusing the edges of the two sheets together where they meet as shown at 6, Figs. 3 and 4.

As described, so far, the structure is transparent and cellular, that is, it has opposed walls separated by relatively thin spaces which extend over the major portion of the area of the plates. While such air spaces would have some utility in preventing the transmission of heat through from one side to the other, I prefer to exhaust the air from the spaces in the body of the structure and for this purpose I provide a suction tube or opening 7 at the edge at one point through which the air can be drawn from the interior to provide a vacuum within the structure and then the tube 7 can be sealed by fusing in a well known manner.

For the purpose of ensuring that air will be withdrawn from all of the spaces within the structure through the one outlet 7, I provide connecting passages 8 between the several spaces by making notches in the contacting edges of the transverse partitions 5.

As the structure is hollow and the walls thin, I preferably make the opposite side walls 2 slightly crowned or rounded as indicated in the drawings.

Preferably, the crowning is just sufficient so that when the plates are finished and the vacuum is complete the atmospheric pressure will press the side walls 2 inwardly so that they are substantially flat and parallel.

Of course it will be understood that the crowning shown in the drawings is very greatly exaggerated as otherwise it could not be seen.

As many modifications of my invention will readily suggest themselves to one skilled in the art, I do not limit or confine my invention to the specific structure or combinations of parts herein shown and described.

I claim:

1. The method of making a substantially flat transparent structure for use as a window or the like, which consists in providing two relatively thin plates, arranging said plates in juxtaposition and with a closed relatively thin space between them, and exhausting the air from between said plates, the plates being initially bowed up or crowned sufficiently to cause them to be brought to a substantially flat condition when the air is exhausted from between them.

2. A transparent structure for use as a window and comprising two slightly bowed sheets, marginal ledges on the sheets, intermediate ribs on the sheets, the marginal ledges of the two sheets sealed together by fusing, the intermediate ribs registering with each other, the intermediate ribs provided with notches for connecting the spaces between same, and means at one point of the edge of the structure to exhaust the air from between the sheets and cause them to be pressed in until the intermediate ribs on the two sheets contact.

3. A transparent structure for use as a window and comprising two relatively thin sheets of glass arranged face to face, ledges at the edges of the sheets for spacing them apart, the sheets having internal strains tending to spread them apart, and a sub-atmospheric pressure between the sheets for holding them pressed toward each other.

4. A transparent structure for use as a window and comprising two relatively thin sheets of glass arranged face to face, ledges at the edges of the sheets for spacing them apart, the sheets having internal strains tending to bow them out, a sub-atmospheric pressure between the plates, and intermediate ribs on the plates arranged to prevent the sheets from being forced toward each other beyond parallelism by reason of such sub-atmospheric pressure.

5. A transparent structure for use as a window and comprising two relatively thin sheets of glass arranged face to face, ledges at the edges of the sheets for spacing them apart, the sheets having internal strains tending to bow them out, a sub-atmospheric pressure between the plates, intermediate ribs on the plates arranged to prevent the sheets from being forced toward each other beyond parallelism by reason of such sub-atmospheric pressure, and the ribs provided with openings for connecting the spaces between them together.

In witness that I claim the foregoing as my invention, I affix my signature this 7th day of March, A. D. 1928.

JOHN C. YETTER.