Jan. 13, 1942. G. VAN DAAM 2,269,566

MEANS FOR HEATING WINDOWS OR TRANSPARENT PANES FOR AIRCRAFT, MOTOR CARS, OR THE LIKE

Filed June 10, 1939

Fig. 1.

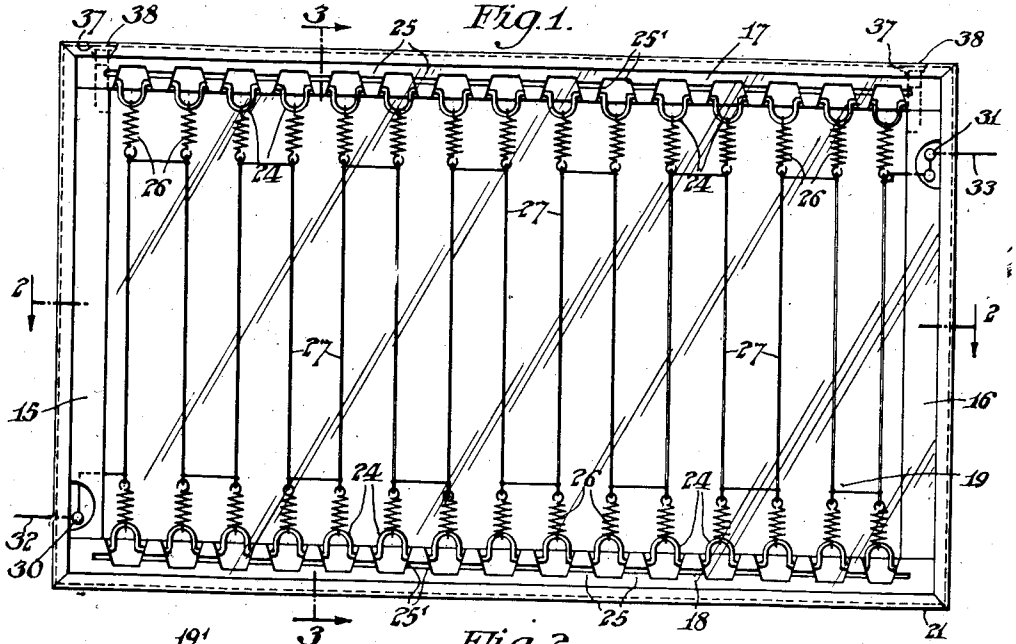


Fig. 2.

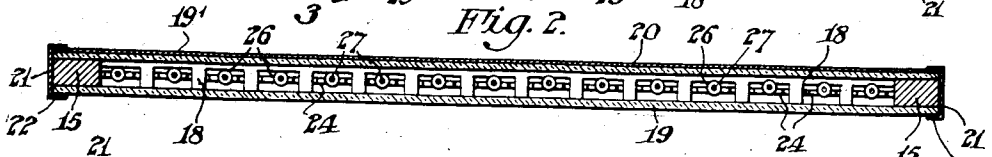


Fig. 4.

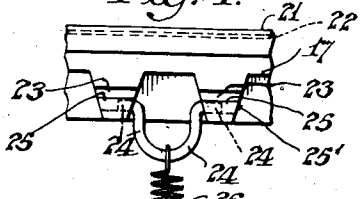


Fig. 5.

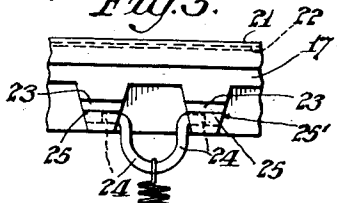


Fig. 3.

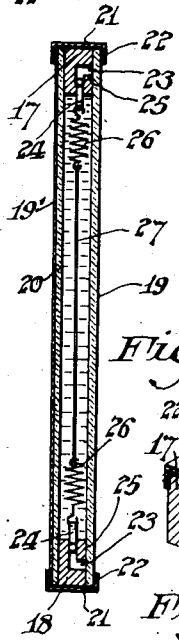


Fig. 6.

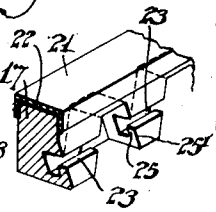
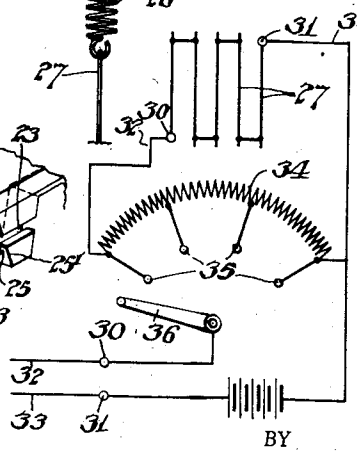


Fig. 7.



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MEANS FOR HEATING WINDOWS OR TRANSPARENT PANES FOR AIRCRAFT, MOTOR CARS, OR THE LIKE

Gerrit Van Daam, Buffalo, N. Y.

Application June 10, 1939, Serial No. 278,446

3 Claims. (Cl. 219—19)

My invention relates to improvement in means for heating windows or transparent panes for aircraft, motor cars, or the like.

The object is to provide means for heating said window or panes so that the same will not become clouded or frosted during inclement atmospheric conditions.

My invention comprises means whereby standard plate glass panes are protected from sharp changes in temperature which would tend to crack or fracture the glass. This is accomplished by securing preferably to the outer face of the glass a layer or coating of transparent thermoplastic material, or the like.

My invention also comprises improved means for suspending, under spring or elastic tension, an electric resistance strand, ribbon or wire, evenly between two sheets of transparent material, whereby the strand extensions are maintained midway between said sheets and in properly spaced relationship.

My invention also comprises removable strand supporting brackets disengageably connected to the frame members, and connecting springs between said brackets and strand. This arrangement is useful, not only for suspending and maintaining the strand in proper position under varying temperature and atmospheric conditions, but also to provide a substantial space between the strand and the supporting frame members, in order that the heat delivered by the resistance may be generated, well within the margins of the pane and removed or spaced from the surrounding supporting frame. The heat will thus be confined more effectively to the desired area.

My invention also comprises means whereby a suitable fluid may be introduced into the hermetically sealed chamber, formed between the panes for the purpose herein specified.

The said strand is provided with means whereby the current, passing through the suspended resistance, may be arbitrarily controlled so that the temperature of said resistance may be gradually increased or decreased as required.

Referring to the drawing which illustrates merely by way of example suitable means for effecting the invention:

Fig. 1 is a view in elevation.

Fig. 2 is a fragmentary elevation showing a modification.

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

Fig. 4 is a section on the line 4—4 of Fig. 1.

Fig. 5 is a detail in elevation showing the strand suspending means.

Fig. 6 is a similar view of a modification.

Fig. 7 is a diagram of a rheostat control.

Similar numerals refer to similar parts throughout the several views.

In accordance with the example illustrated in the drawings a rectangular spacing frame is provided consisting of the members 15, 16, 17 and 18, preferably of non-conducting material. These members are connected together in any suitable way. The sheets or panes 19 and 20 of transparent material have outside dimensions corresponding with the outside dimensions of the separating frame. These sheets or panes are placed, one on each side of the frame and are held in position by the flanged frame 21 of metal or other suitable material. A hermetic and water-proof seal is maintained between the flanges of said frame 21, and the panes by any suitable packing, such as indicated at 22.

The upper and lower horizontal elements 17 and 18 are provided with slots 23 in which the ends of U-shaped formations or brackets 24 are secured. These slots 23 are provided with shoulders or projections 25 to maintain the bracket ends or trunnions 24' in proper position. The parts of the separating frame members between the vertical arms of projections 25, are tapered as shown at 25' to provide flaring air spaces between said vertical arms and the adjacent parts of the frame. These brackets 24 are in loop, or U-formation and are adapted to receive the ends of springs 26, to the other ends of which is secured each extension of the resistance strand 27.

In Fig. 5 a modification is shown in which yokes 28 are provided, secured to the lower end of each spring 26, while the resistance 27 is secured, in proper spaced relationship, to the outer ends of said yokes.

The upper and lower horizontal members 17 and 18 are substantially the same in construction, and the strand 27 is threaded forward and backward in the usual way, except that the supporting connections with the strand are through springs, or spring controlled yokes, so that a constant yielding tension is exerted upon each extension of the strand 17.

The important purpose of the springs 26 is to maintain the strand extensions in normal position, and permit the necessary expansion or contraction, due to thermal or other causes, and thus prevent the strand extensions from touching each other and thereby cause a short circuit, and also to prevent said extensions from touching the surface of the panes.

Where it is desired to use standard plate glass as the transparent panes, I provide a special pro-

tection for the same. This protection consists of a sheet or layer 19' (see Figs. 2 and 3), of non-frangible, transparent material, such, for example, as is known to the trade as Plexiglass, or a thermo-plastic material made of acrylic resins.

This material is practically non-frangible and a poor heat conductor. When applied to the outer face of the glass, it protects the same from sudden and sharp temperature changes which are liable to crack or fracture the glass during the flight in sub-cold temperatures.

The usual circuit connections are provided, such as binding posts 30 and 31 with the wire leads 32 and 33. In Fig. 7 is shown diagrammatically a suitable rheostat control for the circuit, so that the heating current may be applied gradually, and may be increased or reduced as required by varying temperature conditions of the atmosphere. In this figure, the resistance 34 is provided with stepped contacts 35, for cooperation with the controlling switch 36.

In Fig. 1 is shown a port 37 closed by a stopper 38, which may be used for introducing, into the space between the panes, when desirable, a suitable liquid such as mineral oil or other non-conducting (electrical), non-expanding and non-inflammable liquid.

This fluid or liquid is used advantageously for several purposes; for example, it serves to support the panes against excessive external pressure. It also serves to provide a better and more even distribution of the heat to the panes.

What I claim is:

1. In a device of the character described, the combination of a spacing frame, two transparent panes having margins co-extensive with the outer margins of said frame, means securing said panes hermetically to the opposite faces of said frame thereby forming a chamber between said panes and within said frame, and a resistance strand having zigzag extensions within the area bounded by said frame, said chamber containing a liquid for supporting the panes against excessive external pressure.

2. In a device of the character described, the combination of a spacing frame, two transparent panes having margins co-extensive with the outer margins of said frame, means securing said panes hermetically to the opposite faces of said frame thereby forming a chamber between said panes and within said frame, and a resistance strand having zigzag extensions within the area bounded by said frame, said chamber containing a non-conducting, non-expanding and non-inflammable liquid for supporting the panes against excessive external pressure.

3. In a device of the character described, the combination of a spacing frame, two transparent panes having margins co-extensive with the outer margins of said frame, means securing said panes hermetically to the opposite faces of said frame thereby forming a chamber between said panes and within said frame, and a resistance strand suspended within the area bounded by said frame, said chamber containing mineral oil.

GERRIT VAN DAAM.