No. 676,296. Patented June 11, 1901.

R. E. ALLISON.

DEVICE FOR PREVENTING THE FORMATION OF FROST ON WINDOW PANES.

(Application filed Mar. 19, 1901.)

(No Model.) 2 Sheets—Sheet 1.

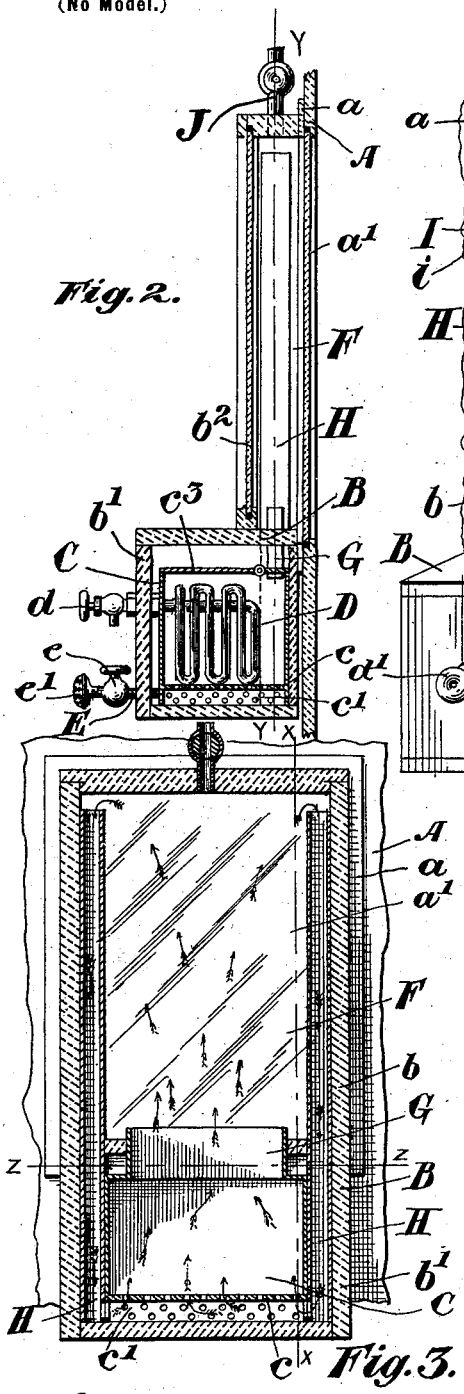

Fig. 2.

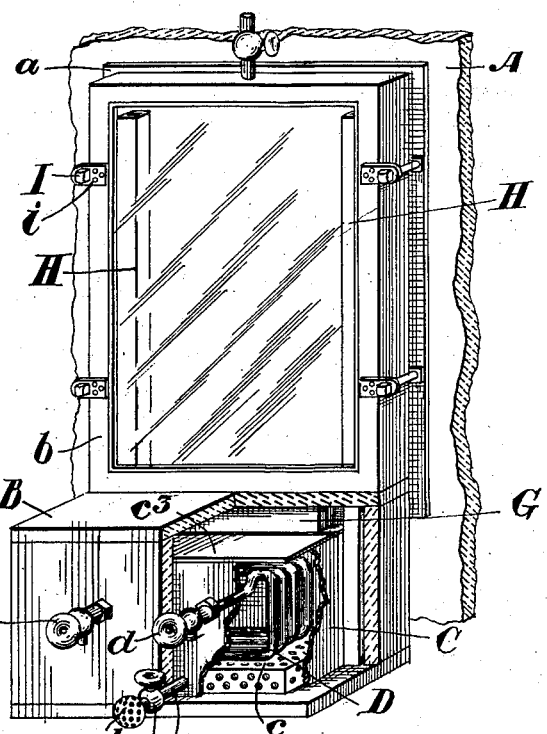

Fig. 1.

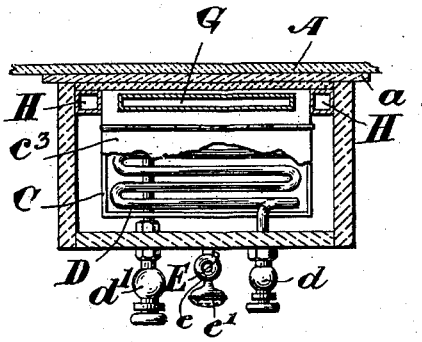

Fig. 4.

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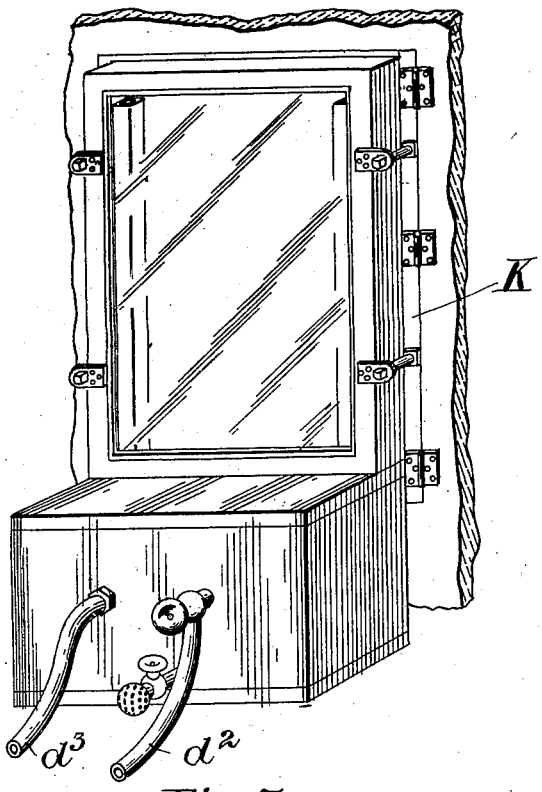

Fig. 5.

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UNITED STATES PATENT OFFICE.

ROBERT EMIL ALLISON, OF STE. JUSTINE, CANADA.

DEVICE FOR PREVENTING THE FORMATION OF FROST ON WINDOW-PANES.

SPECIFICATION forming part of Letters Patent No. 676,296, dated June 11, 1901.

Application filed March 19, 1901. Serial No. 51,861. (No model.)

To all whom it may concern:

Be it known that I, ROBERT EMIL ALLISON, station agent, a subject of the King of Great Britain, residing in the village of Ste. Justine, in the county of Vaudreuil, in the Province of Quebec, Canada, have invented new and useful Improvements in Devices for Preventing the Formation of Frost on Window-Panes, of which the following is a specification.

My invention relates to improvements in devices for preventing the formation of frost on window-panes; and the object of my invention is to produce an apparatus which may be readily attached to any window or be substituted for that window and shall prevent frost from forming on the window-pane, and thereby insure the glass keeping perfectly transparent; and it consists, essentially, of a box or case in which is a heating apparatus having an upper portion in which is secured a pane of glass and suitable passages from and to the heating apparatus for keeping up a circulation of warm air between said pane of glass and the pane of glass of the window proper, the various parts being constructed and arranged in detail as hereinafter more particularly described.

Figure 1 is a perspective view of my apparatus with the corner cut away. Fig. 2 is a sectional side elevation of my apparatus on the line $x\,x$, Fig. 3. Fig. 3 is a sectional front elevation on the line $y\,y$, Fig. 2. Fig. 4 is a sectional plan on the line Z Z, Fig. 2. Fig. 5 is a perspective view of an alternative form of my device.

In the drawings like letters of reference indicate corresponding parts in each figure.

A is the wall, in which is a window comprising the frame a and pane of glass a'.

B is the outside casing of my apparatus, comprising an upwardly-extending frame b and the box b'. A pane of glass b^2 is secured by the ordinary means in the frame b. Inside the box b' is located an inner box or casing C, preferably made of tin or other sheet metal. This inner box C is provided with a perforated false bottom c, and above this false bottom are supported the heating-pipes or other heating apparatus D. The ends of the heating-pipes extend through the front walls of the inner and outer boxes C and b', and they are provided with suitable inlet and outlet valves $d\ d'$.

E is a tube which forms a communication between the outside of the device and the space c', below the false bottom c of the box C, and is provided with a valve e of suitable form and a rose e' at its outer extremity. The top of the box C is provided with a hinged cover c^3. Communication is effected between the upper portions of the box C and the space F, between the panes of glass a' and b^2, by means of the passage or conduit G, this passage being, preferably, long and narrow, as shown in Fig. 4, but may be funnel-shaped or any other suitable form.

H H are tubes placed between the panes of glass $a'\,b^2$ and opening at their upper extremities into the upper portion of the space F and at their lower extremities into the space c'.

My apparatus may be secured to a window-frame by any suitable means; but the preferable means which I employ is a number of bolts I, passing through lugs i, secured to the outer casing B and screwed onto the frame of the window.

Any style of heating apparatus may be used, as is most convenient. In electric cars electric heaters could be used. In shops and houses hot-water heaters could be used. My device, however, is specially intended for use in locomotive-cabs, and in this case steam may be readily used from the boiler of the locomotive, and the operation of the apparatus is as follows: The apparatus having been attached to the window by means of the bolts I and the inlet-valve d having been joined to a steam-tube coming from the boiler, the inlet and outlet valves $d\ d'$ are opened, and steam passes through the tubes D, thus heating them. The outlet-valve d' is then almost closed, so that only a sufficient amount of steam to keep the pipes hot is allowed to circulate through same, or if the pipes have become very hot the steam may be cut off altogether. It will now be seen that the air in the inner box C which is in contact with the tubes D will be heated, and consequently will rise through the passage G into the space F between the panes of glass $a'\,b^2$ and come directly in contact with the glass. The hot air continuing to pour up through the passage G

forces the air ahead of it up to the top of the space F and into the return-tubes H H, down which it passes and reënters the space c' and from there passing through the perforated false bottom c again becomes heated through contact with the tubes D and reascends. Thus a complete circulation is kept up and a current of warm air is always in contact with the window-glass.

It will now be seen that I have provided an apparatus by which windows may be kept perfectly transparent even in extremely cold weather, and engineers in locomotive-cabs may plainly see the track in front of them and prevent accidents which have frequently occurred through their inability to do so. My device will also be found of use to enable merchants to display their merchandise in their shop-windows in winter without having them hidden by the formation of frost on the glass.

Although my device is described as applied to a window in which is already a pane of glass, it may also be used where there is no glass in the window by having two panes of glass set in the frame b, one on each side of the passage G, and the whole apparatus may be secured to the frame a of the window.

If it be necessary to open the window, the device may be attached to the movable frame K, as shown in Fig. 5, and by using flexible steam-tubes d^2 d^3 of suitable length the window may be opened without the necessity of disconnecting the apparatus therefrom.

In order to economize heat and steam, packing of any suitable kind may be used to fill up all cracks and joints, and the space between the inner box C and the outer casing b' may be filled up with heat-insulating material, such as asbestos or felt; but these being ordinary devices I do not claim them as my invention.

In the top of the frame b is an outlet-valve J, and if it is desired to admit cool air into the space F between the two panes of glass this valve J and the valve e may be opened, thus allowing a free circulation of air through the said space when required.

What I claim as my invention is—

1. In a device for keeping frost from forming on window-panes, the combination with the window glass and frame, of an auxiliary pane of glass set in a suitable frame, means for attaching said frame to the window-frame, an air-heating apparatus, a suitable casing for said air-heating apparatus secured below said auxiliary pane, and warm-air inlet and outlet openings at top and bottom respectively of the space between said panes of glass, as and for the purpose specified.

2. In a device for keeping frost from forming on window-panes in combination a frame, a pane of glass secured to said frame, a box attached to the lower portion of said frame, a heating apparatus in said box, a passage or conduit leading from the upper part of said box through the lower part of said frame, and upright tubes opening at their lower ends below said heating apparatus, and at their upper ends near the top of said frame, as and for the purpose specified.

3. In a device of the class described in combination a frame, a pane of glass secured in said frame, a box attached to the lower part of said frame, a heating apparatus in said box, a passage or conduit leading from the upper part of said box through the lower part of said frame, upright tubes opening at their lower ends below said heating apparatus, and at their upper ends near the top of said frame, air inlet and outlet openings, in the front of said box, and the top of said frame respectively as and for the purpose specified.

4. In a device of the class described in combination a frame, a pane of glass secured in said frame, an outer box or casing secured to the lower portion of said frame, an inner box within said outer box provided with a perforated false bottom, a heating apparatus in said inner box, a passage leading from the top of said inner box through the lower portion of said frame, upright tubes opening at their lower ends into the space below the false bottom of the said inner box, and at their upper ends near the top of said frame as and for the purpose specified.

5. In a device of the class described in combination a casing or box, a perforated false bottom to said box, a coil of tubes contained in said box their inlet and outlet ends passing through the front wall of said box, and suitable valves on inlet and outlet ends of said tubes as and for the purpose specified.

6. In a device of the class described, the combination with a window-frame, of two panes of glass attached to a frame, means for attaching said frame to the window-frame, an air-heating apparatus, a suitable casing for said air-heating apparatus, secured to the lower part of said frame, and warm-air inlet and outlet openings at top and bottom respectively of the space between said panes of glass, as and for the purpose specified.

Signed at the city of Ottawa this 20th day of February, 1901.

ROBERT EMIL ALLISON.

Witnesses:
E. P. FETHERSTONHAUGH,
F. C. ASKWITH.