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PREVENTION OF ICE ACCRETION

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3 Claims. (Cl. 117—72)

This invention relates to the prevention of ice accretion, and more particularly to the de-icing of or prevention of ice accretion on aircraft.

The primary object of this invention is to enable surfaces such as the various exposed surfaces of aircraft to be treated with an ice accretion deterrent in such manner that it can adhere firmly to the surface and will remain there and be effective for frequent and repeated use or for prolonged periods.

According to the invention, the surface to be treated has first applied to it an undercoating and then a finishing coating, the undercoating being in the nature of an adherent, whilst the finishing coating essentially contains the ice accretion deterrent, the composition of the two coatings being such that they will blend or combine to form a layer firmly united to the surface and containing the ice accretion deterrent.

For the undercoating, I use a suitable adherent, preferably a solution of glycerol phthalate in any suitable solvent, preferably acetone. The glycerol phthalate should be in solid form as the liquid form may not be completely polymerized and the further polymerization of the material prevents the production of an undercoating of uniform properties. The undercoating may be applied in any suitable manner but is quickly and easily applied with a brush. It adheres firmly to the surface to form a hard lacquer-like surface.

For the finishing coating, I use a solution of glycol stearate in ethylene glycol which has been worked up into a cream as hereinafter described. 4 lbs. of glycol stearate and 1 gallon of ethylene glycol will yield 1 gallon of the cream.

The addition of uranium salts to the cream is advantageous, as they tend to promote water shedding by the cream.

The ethylene glycol is placed in a suitable vessel and heated to about 70° C. The glycol stearate is then added and allowed to dissolve in the ethylene glycol. The temperature is then allowed to drop or is lowered to about 45° C. when the solution is stirred for a quarter of an hour. Stirring is then stopped for a quarter of an hour and intermittent stirring continued at intervals of a quarter of an hour until the solution is cold. The solution thickens up into a cream as it cools. I have found that it is an advantage if the solution cools as quickly as possible and I may accordingly carry out the preparation of the cream in a water-jacketed vessel, for example a water-jacketed copper, cold water being circulated through the jacket after solution of the glycol stearate is complete. A suitable stirring device may also be provided in association with the water-jacketed vessel. The intermittent stirring of the solution as it cools prevents frothing and ensures that the final cream is free from air bubbles.

Assuming that the invention is to be applied to the prevention of ice accretion on aircraft, the undercoating of glycerol phthalate-acetone solution is first applied to the parts of the aircraft which it is considered necessary to treat and sets almost immediately into a hard varnish-like layer by virtue of the rapid volatilisation of the acetone. The cream-like finishing coating of glycol stearate-ethylene glycol solution is then applied in any suitable manner as with a brush, and it is found that the two coatings blend or combine to form a single coating which has the property of preventing ice accretion on the treated parts of the aircraft at temperatures as low as −64° C. I think that a logical explanation of the phenomena which enable this very desirable result to be obtained is that the ethylene glycol in the cream plasticises the undercoating thereby enabling it to act as an adhesive and at the same time acts as a freezing point depressant with the result that the melting point of any ice which tends to form on the treated parts of the aircraft is lowered so that the parts of the ice in contact with the treated surfaces will melt and the accumulated ice slide bodily off the aircraft.

I have found that it is possible to expose surfaces treated in accordance with this invention to icing conditions for a number of times without the necessity of renewing the finishing coating while the undercoating need be renewed at even less frequent intervals.

What I claim and desire to secure by Letters Patent of the United States is:

1. A method of preventing ice accretion on the exposed surfaces of aircraft comprising the steps of applying to said surfaces, an undercoating consisting of a solution of solid, completely polymerized glycerol phthalate and thereafter applying on said undercoating a finishing coating consisting of a solution of glycol stearate in ethylene glycol.

2. A method of preventing ice accretion on aircraft comprising the steps of applying to the exposed surfaces of the aircraft an undercoating consisting of a solution of solid glycerol phthalate in acetone and thereafter applying a finishing coating consisting of a solution of glycol stearate in ethylene glycol.

3. A method of preventing ice accretion on the exposed surfaces of aircraft, comprising the steps of applying to said surfaces an undercoating consisting of a solution of completely polymerized glycerol phthalate in acetone, allowing said undercoating to set into a hard varnish-like layer and then applying a finishing coating consisting of a solution of glycol stearate in ethylene glycol whereby the two coatings combine to form a single coating capable of preventing ice accretion.

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