

July 19, 1932.

A. F. THOMPSON

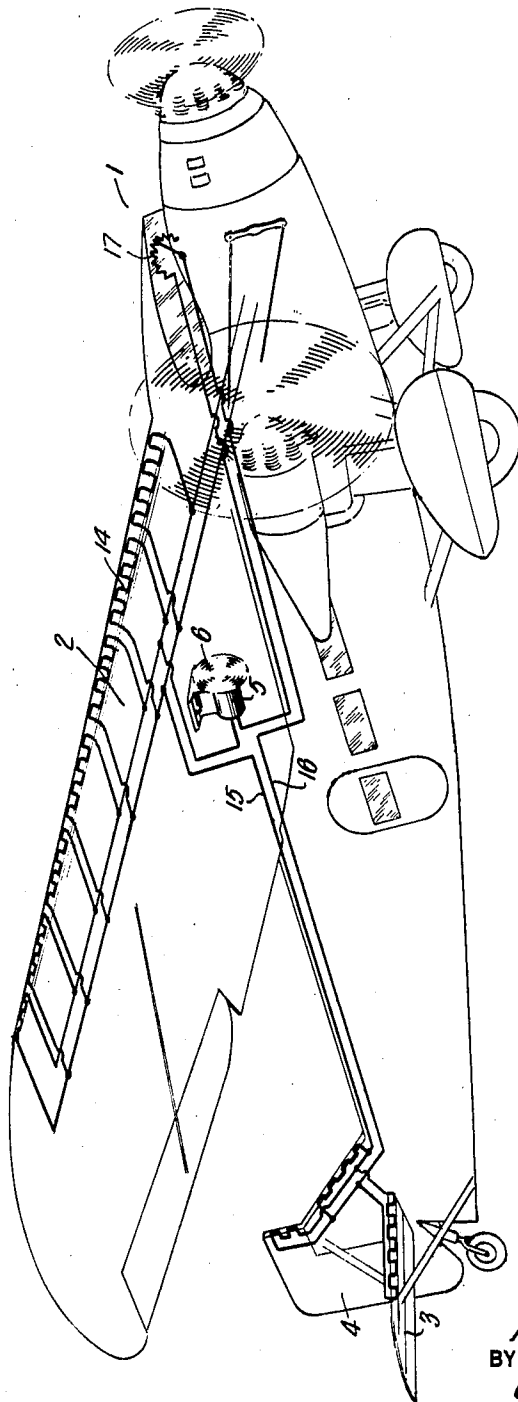
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HEATER FOR AIRPLANE WINGS

Filed Oct. 11, 1930

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Fig. 1.



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Fig. 2.

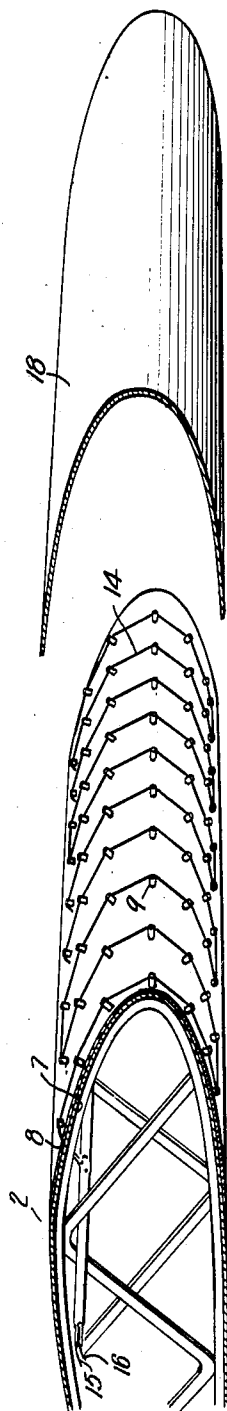


Fig. 3.

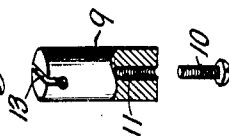
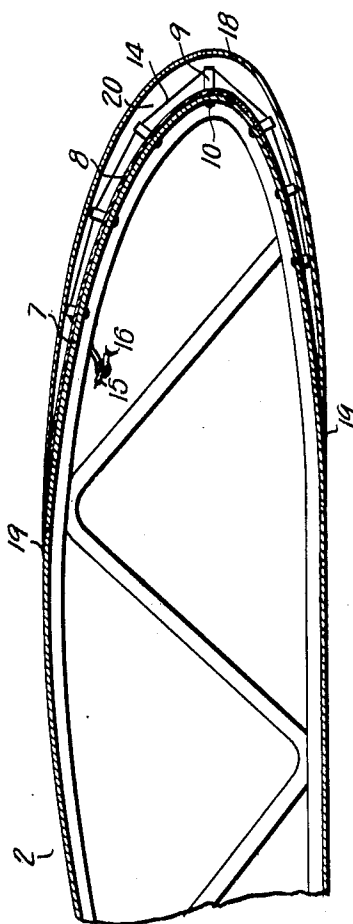


Fig. 4.



Fig. 5.



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HEATER FOR AIRPLANE WINGS

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My invention relates to heating devices and more particularly to apparatus of that character for heating wing and like surfaces on airplanes.

5 The hazards of flying, incident to ice accumulating on airplane wings and stabilizers at high altitudes or in cold weather is well known, the additional load of the ice on the plane often seriously interfering with safe
10 aeronautical transportation.

The principal object of my invention, therefore, is to provide apparatus for effectively heating an airplane, particularly the wings and stabilizers, to prevent accumulation of
15 ice and snow thereon.

A further object of the invention is to provide for heating such portions in individual sections so that inoperation of one of the sections will not interfere with the heating
20 conditions of adjacent sections.

In accomplishing these and other objects of my invention I have provided improved details of structure the preferred forms of which are illustrated in the accompanying
25 drawings, wherein:

Fig. 1 is a perspective view of an airplane equipped with heating apparatus embodying my invention and shown diagrammatically to more clearly illustrate the method of wiring
30 preferably employed.

Fig. 2 is a perspective view of a wing portion wired in accordance with my invention, a cover plate being shown in disassembled relation therewith.

35 Fig. 3 is a cross sectional view of a wing portion showing the cover plate in functional position.

Fig. 4 is a perspective view of a preferred form of insulator used.

40 Fig. 5 is a perspective view of a modified form of an insulator.

Referring more in detail to the drawings:

1 designates an airplane having the usual wings 2, stabilizers 3 and a rudder 4. In order to equip a plane of this character with means for heating the wing surfaces and other portions of the plane, particularly susceptible to the accumulation of ice, I have provided electrical heating means including a generator
50 ator 5 mounted at a convenient location on the

plane as, for example, beneath one of the wings as shown in Fig. 1.

The generator is preferably driven by a propeller 6 actuated by air pressure produced by the rapid travel of the plane through
55 the air, it being obvious however, that batteries or any suitable means for supplying current may be substituted for the generator.

In wiring the plane to lead the electrical current to various parts of the plane to which the heat is to be directly applied, such as the metal surface 7 of the wing structure, it is desirable to first cover those portions of the plane with a layer of asbestos 8 or similar
60 insulating material.

Insulators or spacers 9, preferably of a type as illustrated in Figs. 4 and 5, are then secured to the asbestos and metal covering by screws 10 extended therethrough and threadedly engaging sockets 11 in one end of
65 the insulators.

An opening 12, or a slot 13, adjacent the opposite ends of the insulators is adapted to receive a heating wire 14 tapped from lead wires 15 and 16 leading from the generator.
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The insulators are preferably arranged in longitudinal and transverse rows, as shown in Fig. 2, and individual wires are strung on a plurality of the insulators to produce individual series of heating sections for preventing damage to one section when an adjacent section may, for some reason, cease to operate.

The sections on the front edge of the stabilizers and rudders are arranged in like manner and connected to the lead wires in parallel to heat the front edges of the surfaces. The amount of current flowing through the wires and consequently the amount of heat radiating therefrom, is controlled by a rheostat
80 17 preferably mounted on the instrument panel of the cock pit.

After threading the wires over the insulating spacers, a cover plate 18 formed of light metal or the like is mounted over the sections and is secured to the metal covering of the plane portions by welding, as indicated at 19, or other suitable means such as screws.

A chamber 20 formed in this manner between the outer covering and the asbestos in-
85 100

sulation constitutes a dead air space and conserves the heat supplied in the chamber by the heated wires.

With a plane equipped with heating apparatus, as above described, it is obvious that the travel of the plane through the air will cause an air stream to be forced against the generator propeller, thereby rotating the propeller and driving the generator at a speed sufficient to generate current for heating the wires in the heating chambers.

The amount of current supplied to the wires may be easily controlled by the rheostat and the pilot can readily determine the extent to which the wires are heated by the coloring of the metal covering 18.

By providing the heating wires adjacent the front edge of the wings, stabilizers, rudders and other portions of the plane which are to be heated, it is apparent that the heat will be carried along the entire surfaces of such portions by the stream of air flowing over these parts, thereby preventing accumulation of ice on any part of the plane.

Due to the layer of asbestos insulation covering the surfaces to which heat is directly applied, danger of fire is obviated, and with the sectional wiring as particularly shown in Fig. 1, operation of one section is independent of an adjacent section, it being noted that two sections of the apparatus are always in series in order to provide for control of the wing, stabilizer and rudder sections by a single rheostat.

As a result of the dead air chamber between the layer of insulation and the outer covering, a minimum amount of current is necessary to supply sufficient heat to maintain the plane surfaces above freezing temperatures.

While Fig. 1 shows only one wing provided with heating wires, which is deemed to be sufficient for illustration purposes, the lead wires are continued to the opposite wing and heating wires are tapped therefrom in like manner to produce individual heating sections.

What I claim and desire to secure by Letters Patent is:

1. In combination with aircraft including a source of electrical energy, heating wires arranged on a selected surface of said craft, a layer of insulation between said surface and wires, feed wires leading from the source of energy to the heating wires, means interposed in the feed wires for controlling the amount of current flowing through said wires, and a covering for said insulation and heating wires substantially conforming in shape to said surface and spaced therefrom to form a dead air chamber.

2. In combination with aircraft including a source of electrical energy, feed wires leading from said source of energy, individual sections of heating wire connected to the feed

wires and arranged on a selected surface of the craft, a layer of insulation between the heating wires and said surface, means interposed in the feed wires for controlling the amount of current flowing through the wires, and a covering for said insulation and heating wires substantially conforming in shape to said surface and spaced therefrom to form a dead air chamber.

3. In combination with aircraft including a source of electrical energy, feed wires leading from said source of energy, individual sections of heating wires connected to the feed wires and arranged on separated members of the craft, the sections of each member being connected in parallel to the feed wires and a section of one member being connected in series with a section of another member, and means interposed in the feed wires for controlling the amount of current flowing through the wires.

4. In combination with aircraft including a source of electrical energy, feed wires leading from said source of energy, individual sections of heating wire connected to the feed wires and arranged on the forward edges of separated members of the craft, the sections of each member being connected in parallel to the feed wires, and a section of one member being connected in series with a section of another member, means interposed in the feed wires for controlling the amount of current flowing through the wires, and a layer of insulation between each member and its respective heating wires.

5. In combination with aircraft including a source of electrical energy, feed wires leading from said source of energy, individual sections of heating wire connected to the feed wires and arranged on the forward edges of separated members of the craft, the sections of each member being connected in parallel to the feed wires, and a section of one member being connected in series with a section of another member, means interposed in the feed wires for controlling the amount of current flowing through the wires, insulation between each member and its respective heating wires, and a covering for said insulation and heating wires and spaced therefrom to form a dead air chamber.

6. In combination with aircraft including a source of electrical energy, heating wires arranged on a curved forward surface of said craft and insulated therefrom, feed wires leading from the source of energy to said heating wires, and a cover for said heating wires conforming in shape to said curved surface and spaced therefrom, said cover having edges secured to the craft to form an inclosed chamber.

7. In combination with aircraft including a source of electrical energy, feed wires leading from said source of energy, insulators arranged in transverse and longitudinal rows

on leading edges of said craft, heating wires strung on said insulators and connected to the feed wires, means for controlling the amount of current flowing through the wires, and a covering for said insulation and heating wires and spaced therefrom to form a dead air chamber.

8. In combination with aircraft including a source of electrical energy, feed wires leading from said source of energy, insulators arranged in rows on a selected surface of said craft, heating wires strung on said insulators and connected to the feed wires, a layer of insulation between the heating wires and said surface, means for controlling the amount of current flowing through the wires, and a covering for said insulation and heating wires and spaced therefrom to form a dead air chamber.

20 In testimony whereof I affix my signature.
ARCHIE F. THOMPSON.

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