June 21, 1932. F. L. JANSON 1,864,438

AEROPLANE

Filed Feb. 4, 1931

Fig. 1.

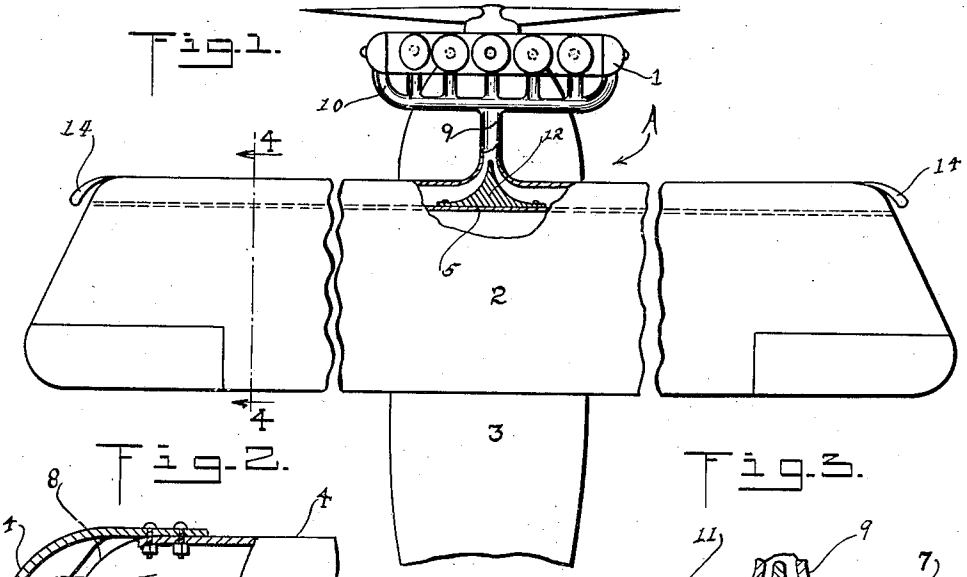


Fig. 2.

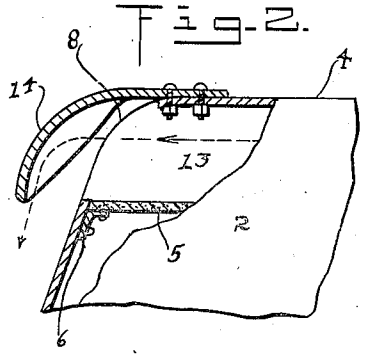


Fig. 3.

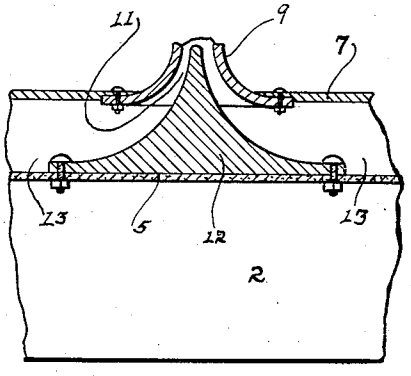


Fig. 4.

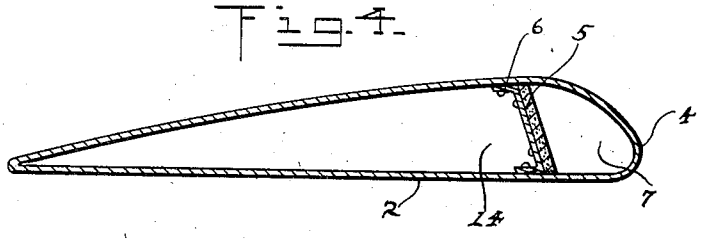
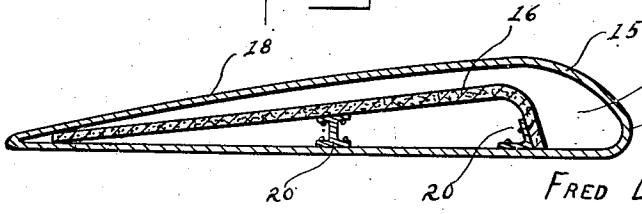


Fig. 5.



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Patented June 21, 1932 1,864,438

UNITED STATES PATENT OFFICE

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AEROPLANE

Application filed February 4, 1931. Serial No. 513,409.

This invention relates to aeroplanes in general, but more particularly to a means for preventing the accumulation of ice upon the wing tips of air crafts of the heavier-than-air type.

It is a well known fact that an aeroplane flying through the elements in a freezing or below freezing temperature is subjected to extreme danger by reason of snow, sleet, or ice accumulating upon the wing structure. This not only increases the weight of the craft, but tends to interfere with the control thereof which is vital to the safety of the craft and those carried thereby. It is therefore the principal object of this invention to subject surfaces of the wing structure on which ice, snow and sleet are most likely to accumulate to the action of heat of a temperature above the freezing point while the craft is in flight, and which heat is derived from the exhaust gases of the internal combustion engine or engines by which the craft is propelled.

Another object of the invention resides in causing the heated exhaust gases of the air craft engine to pass through the wings simultaneously in opposite directions from a point substantially centrally between the ends of the wing to cause a proportionate amount of heated gases to pass to the atmosphere through the tip ends of the wing. By this arrangement both sides of the wings are kept at substantially the same degree of temperature, and an even exhaust pressure is maintained at the tip ends to assure stability of the craft at all times.

Another object is to provide a simple means for directing the heat generated by an aeroplane engine into a plurality of tabs along the leading edge of the aeroplane wing.

A further object is the provision of an aeroplane wing heating system which may be installed on metallic wing structures now in use without requiring radical changes in the construction thereof.

A still further object of the invention resides in an aeroplane wing heating system which also acts as a muffler for the exhaust gases from the propelling internal combustion engine.

With these and other objects in view, the invention resides in the certain novel construction, combination and arrangement of parts, the essential features of which are hereinafter fully described, are particularly pointed out in the appended claims, and are illustrated in the accompanying drawing, in which:

Figure 1 is a fragmentary top plan view of an aeroplane with a portion of the wing structure broken away.

Figure 2 is a fragmentary plan view of one of the tip ends of the wing with parts broken away in section.

Figure 3 is a fragmentary top plan view of a portion of the wing with parts broken away in section to illustrate the manner in which the exhaust heated gases are directed in opposite directions as they enter the wing heating chamber.

Figure 4 is an enlarged vertical transverse sectional view on the line 4—4 of Figure 1.

Figure 5 is a vertical transverse sectional view illustrating a modified form of my invention.

Referring to the drawing by reference characters, and particularly to Figure 1 of the drawing, the reference numeral 1 designates the internal combustion engine of an aeroplane A of the heavier-than-air type. The air craft also includes the usual wing 2 which extends transversely of the fuselage 3.

The wing structure 2 may be of the present hollow metallic construction, and mounted within the same and extending substantially parallel to the leading edge 4 of the wing is a partition 5 which is preferably of a heat resisting or insulating material such as asbestos or the like. This partition is secured in position by brackets or like elements 6 which are bolted or riveted to the top and bottom walls of the wing 2. The partition 5 in conjunction with the walls of the leading edge 4 of the wing cooperate to provide a heat compartment or passageway 7 which opens through the outer ends of the wing through openings 8.

A pipe 9 has one end connected to the manifold 10 of the internal combustion engine 1, while the opposite end of the said pipe is flared outwardly as at 11 and is fixedly se-

cured to the leading edge of the wing at a point approximately centrally thereof, and which pipe 9 opens into the passageway or heat compartment 7.

For the purpose of directing the flow of the heated exhaust gases toward opposite ends of the wing structure, I provide a substantially V-shaped deflecting member 12, the pointed end of which extends into the flared portion 11 of the pipe 9 to divide the outlet end of the pipe 11 into two separate passages, and to likewise divide the heat chamber 7 into two separate conduits or passages 13—13. By this arrangement, it will be seen that a proportionate amount of the heated gases from the engine are caused to pass to the respective conduits 13—13 to heat the walls of the leading edge 4 of the wing structure. After passing out through opposite ends of the wing, the exhaust gases are deflected rearwardly by reason of deflector members or shields 14 which are carried by opposite ends of the wing. These shield members 14 are of convex configuration exteriorly and concaved interiorly, and are disposed in spaced relation to the opening 8, but in substantial alinement with the said openings 8 for the purpose of deflecting the exhaust gases rearwardly as shown in dotted lines in Figure 2 of the drawing. This shield or protector member prevents air currents in the region of the wing tip from swirling into the outlet of the exhaust passages which would otherwise produce an undesirable back pressure therein. The shield members also serve to produce a vacuum adjacent the openings 8 to induce the passage of the exhaust gases from the manifold of the engine toward the discharge end 8 of the passages 13.

From the foregoing description, it will be understood that the heated exhaust gases from the internal combustion engine of the air craft are passed through the conduit 13 simultaneously and which gases move in opposite directions toward the tip ends of the wings. The heat from these gases acts on the walls of the leading edge of the wings and prevent the possible assumulation of ice, snow, or sleet thereon.

In Figure 5 of the drawing I have illustrated a slightly modified form of my invention in which the numeral 15 designates a wing structure of the same type as that shown in the preferred form. In this form I provide a longitudinally extending partition 16 of asbestos or other insulating material which is held in spaced relation with respect to the leading edge 17 of the wing, and the top wall 18 of the said wing. By spacing the partition with respect to the leading edge in the top wall, I provide a heat chamber 19 within the wing, and which is adapted to receive the exhaust gases from an internal combustion engine in the same manner as explained in the preferred form. For the purpose of securing the partition 16 in position, I employ brace brackets or elements 20 which are suitably positioned to securely hold and position the partition in spaced relation with respect to the parts above referred to. In this form, not only the leading edge of the wing is subjected to the action of heat, but also the top of the wing structure is heated to prevent the accumulation of undesirable deposits thereon.

In addition to the functions of the heat conduits embodied in the wings, the same act as mufflers for deading the explosion of the aeroplane motor.

It will be readily apparent from the above description that this invention is capable of being readily applied to aeroplane wings and body structures which have already been constructed, as well as simply and economically incorporating the same in an aeroplane wing in the process of manufacture. The arrangement proposed is simple and inexpensive, as well as of great utility, permitting the utilization of the exhaust from the aeroplane motor in the heating of an aeroplane wing to prevent accumulation of ice or sleet thereon. By employing the deflecting member at the entrance end to the heat conduit, the exhaust gases are guided without loss into the two branches of the heating chamber, and without back pressure being set up on the exhaust pipe. Furthermore the outlet openings at the tip ends of the wing are protected by the shield members which permit the establishment of a suction force at the discharge openings and prevent a back pressure caused by wind current in the neighborhood of the wing tips.

While I have shown and described what I deem to be the most desirable embodiment of my invention, it will be understood that various changes in construction, may be resorted to if desired, and I do not limit myself to the precise structural details herein set forth, nor to anything less than the whole of my invention, limited only by the appended claims.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent is:—

1. In combination with an air craft having a propelling internal combustion engine, a wing having a passage extending lengthwise thereof and opening through its end, means for conveying heating exhaust gases from said engine to said passageway to heat the walls thereof during the passage of the heated gases therethrough, and protecting shield members carried by opposite ends of said wings and extending outward beyond the open ends of the passageway but disposed in alinement therewith.

2. In combination with an aeroplane having an internal combustion engine, and a

hollow wing, a partition within said hollow wing extending the length thereof to form a passage along the leading edge of the wing, said passage opening through opposite ends of said wing, and means for conveying heated exhaust gases from said engine to said passage at a point intermediate its ends, and deflector members extending beyond opposite ends of said wings in the path of the gases exhausted through opposite ends of said passage.

3. In combination with an aeroplane, having a propelling engine and a metallic wing having a passage therein extending substantially the length thereof and opening to the atmosphere, means to conduct exhaust gases from the engine into the passage, the passage being defined by the top and the leading edge portions of the wing and a partition member of heat insulating material in the wing spaced from said leading edge, and a shield member carried by said wing and overlying the open ends of said passage.

In testimony whereof, I have hereto affixed my signature.

FREDERICK L. JANSON.