Aug. 26, 1930. V. J. BURNELLI 1,774,472

COOLING MEANS FOR AIRPLANE ENGINES

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Fig. 1.

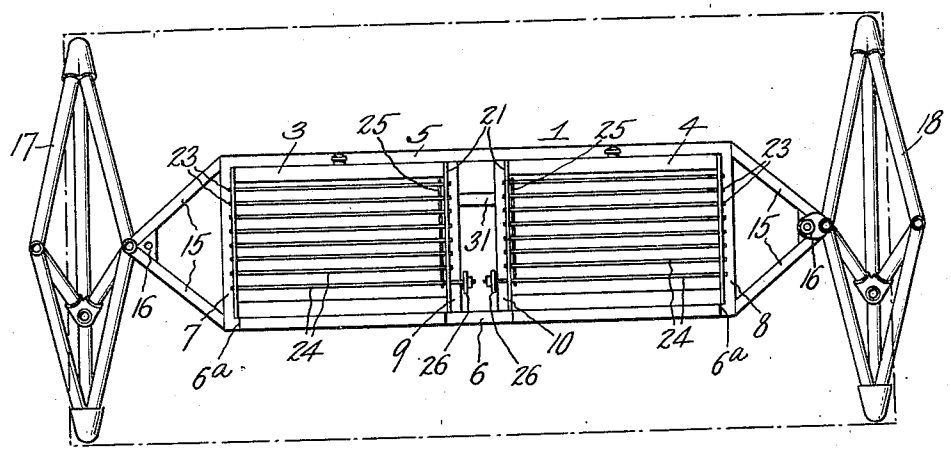
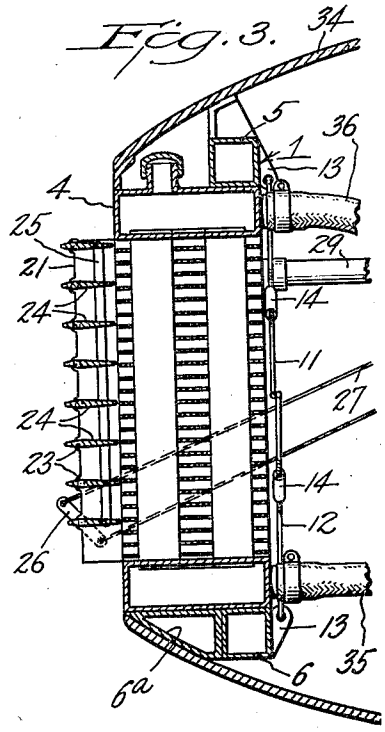


Fig. 3.



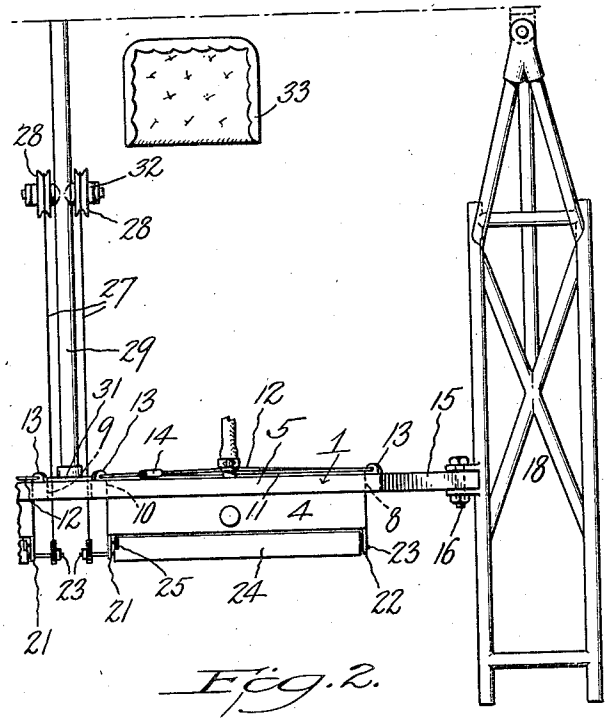


Fig. 2.

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Fig. 4.

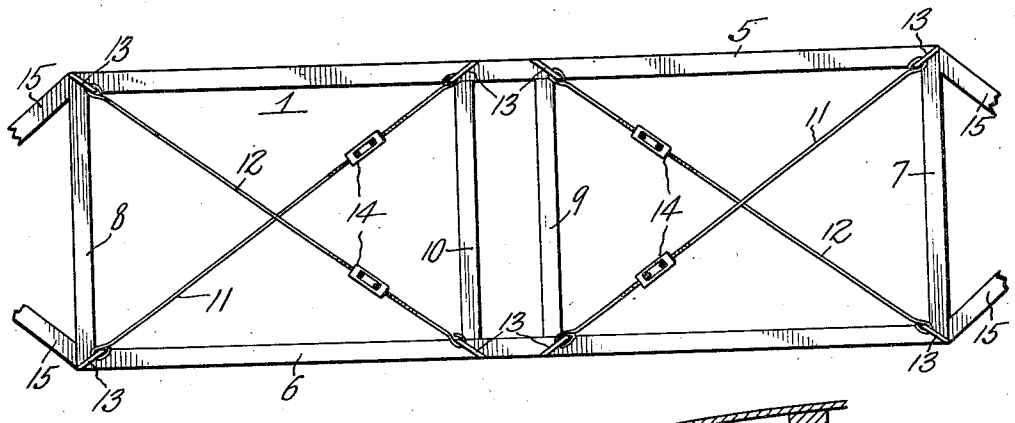
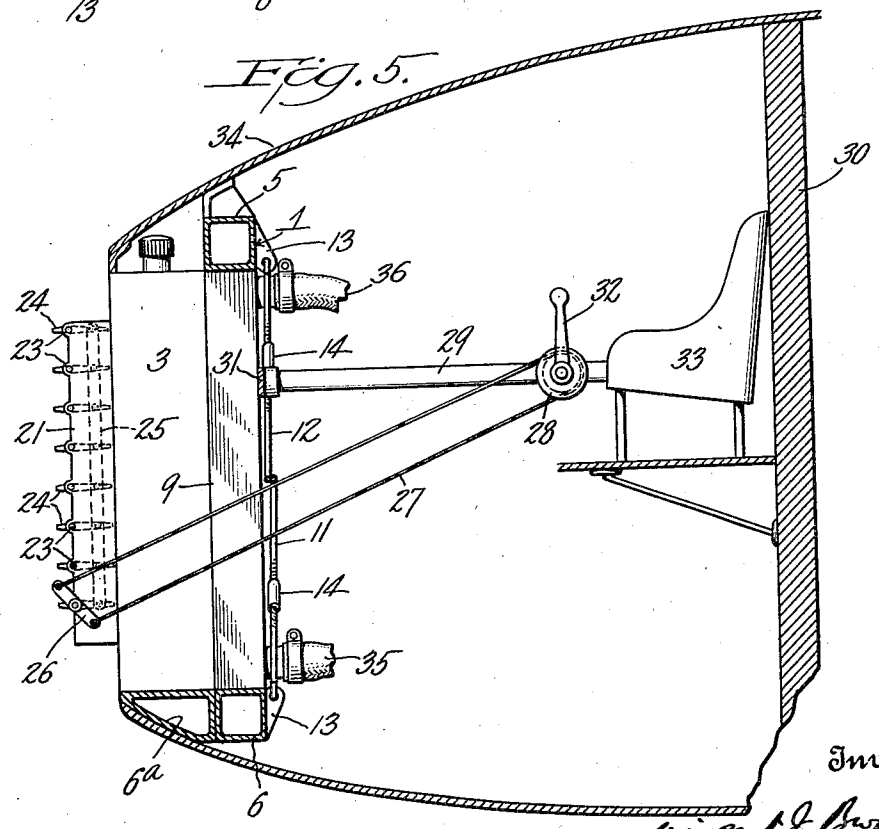


Fig. 5.



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UNITED STATES PATENT OFFICE

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COOLING MEANS FOR AIRPLANE ENGINES

Application filed February 4, 1929. Serial No. 337,199.

This invention relates to airplanes and my improvements have particular reference to airplanes of large size, such for example as those of the Burnelli type, wherein the fuselage, of airfoil contour, has sufficient width to contain two engines within its leading edge.

The engines are supported on mounts therefor of a character described in my application Patent No. 1,723,763 dated Aug. 6, 1929 and my present invention refers to novel means for supporting the engine radiators between the engine mounts in addition to means whereby the flow of air through the radiators may be controlled, to vary the degree of the cooling effect applied to the circulatory water in a water cooled engine. Or, when air cooled engines are employed, to regulate the volume of air that is caused to pass contactingly over the cylinders.

Other features and advantages of my invention will hereinafter appear.

In the drawings:—

Figure 1 is a front elevation of a pair of radiators surported at the leading edge of a fuselage.

Fig. 2 is a plan view, showing an engine mount at one side within a fuselage.

Fig. 3 is a side sectional elevation of a radiator equipped with adjustable shutters for controlling the flow of air admitted thereto, said radiator being shown as contained within the fuselage nose.

Fig. 4 is a rear view of the supporting frame for a pair of radiators, and

Fig. 5 is a side view partly in section, showing a radiator, the air flow regulating means therefor, and the control therefor in its relation to the pilot's seat.

In Fig. 1 the outline of a fuselage is indicated by the dot and dash line and the numeral 1 indicates a rectangular, tubular frame which contains and carries the two radiators, 3, 4 in which the circulating water for the engines (not shown) is to be subjected to the cooling influence of air flowing through said radiators.

The frame 1 consists of upper horizontal member 5, lower horizontal member 6, and vertical members 7, 8 and intermediate vertical members, 9, 10. The members 5 and 6 are respectively the upper and lower containing means for both radiators, while the pairs of vertical members 7, 9 and 8, 10 respectively contain the radiators at the sides. The individual containing frames for the radiators are braced by truss cables 11, 12 that extend diagonally from opposite corners of the frames, where they engage with lugs 13, said cables being provided with turnbuckles 14 for taking up the slack therein.

The radiator carrying frames have truss members 15 extended from the side members 7, 8 respectively, and connected, as at 16, with the engine mounts 17, 18.

The radiators 3, 4, respectively contained within the individual containing frames, are each provided with a pair of vertical plates 21, 22, secured to and projecting from the front thereof, these plates affording bearings for a series of pivots 23, disposed horizontally, in equi-spaced relation. Each pivot carries a shutter 24, said shutters all being pivotally connected to a vertically disposed bar 25, whereby the shutters are all adapted to swing unitedly between their horizontal positions (shown in Fig. 5) in which positions the interspaces are fully open for the flow of air through the radiator, and their closed positions at which they exclude the passage of air. An end shutter is shown as having a cross arm 26 attached thereto, opposite ends of said arm engaging the ends of a cable 27 that extends back to a sheave 28, pivoted to a support 29, here shown as extended between the partition 30 and a cross piece 31 that connects the frame members 9, 10, said sheave having a handle 32, for its rotation, located within reach from the pilot's seat 33. As will be apparent the rotation of sheave 28 in one direction will cause the shutters 24 to be moved toward their vertical or closed position, while rotation of the sheave in the opposite direction will cause the shutters to be moved toward their horizontal or fully open position. In this manner the quantity of air that is permitted to flow through the radiator is controlled. Each radiator is pro-

vided with similar, independent shutters and control means therefor, the respective control means being mounted at opposite sides of support 29, which latter is disposed intermediate the two seats for the pilots (one such seat only being illustrated) it being understood that for a large airplane it is desirable that two pilots should be seated at the controls.

The nose or forward portion of the fuselage is indicated by the reference numeral 34 as enclosing the pilot's compartment, in advance of partition 30, part of the engine mounts and engines (the latter not shown) and the radiators, excepting of course the radiator fronts. The engine mounts are shown extended beyond the radiators, and they are to be contained in separate cowlings, not herein illustrated as forming no part of the present invention.

The radiators are each provided with a supply tube, indicated at 35, and a return tube 36.

The frame member 6 has connected thereto a forward extension 6^a as further support for the radiators.

It will be appreciated that with an air passage-way located in the fuselage nose, behind the propeller or propellers, the blast pressure created by the propeller is relieved to the extent of such portion of the pressure as traverses the passage-way and passes off through suitable rearward outlets.

Variations within the spirit and scope of my invention are equally comprehended by the foregoing disclosure.

I claim:—

1. The combination with an airplane having a fuselage of extended width, engine mounts carried by said fuselage at opposite sides thereof, a rectangular frame, two radiators disposed side by side at the front of said fuselage, and supported by said frame, trussing between opposite sides of said frame, and truss members connecting said frame with said engine mounts.

2. The combination with an airplane having a fuselage of extended width, and seats for two pilots therein, of engine mounts carried by said fuselage at opposite sides thereof, two radiators disposed side by side at the front of said fuselage, series of shutters respectively at the fronts of said radiators, to regulate the flow of air therethrough, respective control means for said shutters, and means operable from both said seats to actuate said control means.

Executed this 30th day of January, 1929.

VINCENT J. BURNELLI.