Feb. 26, 1929. 1,703,612

A. S. CAROUSSO

AIRCRAFT HEATER

Filed July 7, 1927 3 Sheets-Sheet 1

Fig. 1.

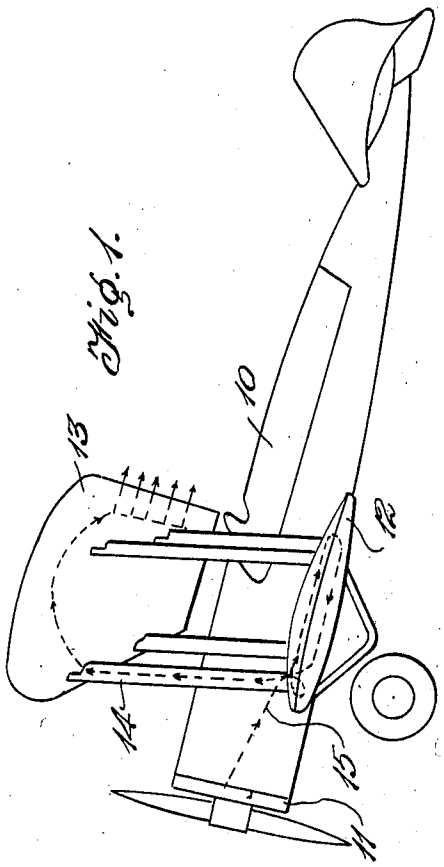


Fig. 6.

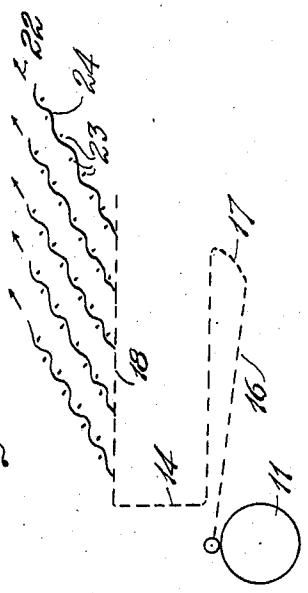
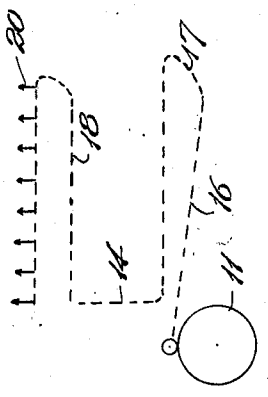


Fig. 5.



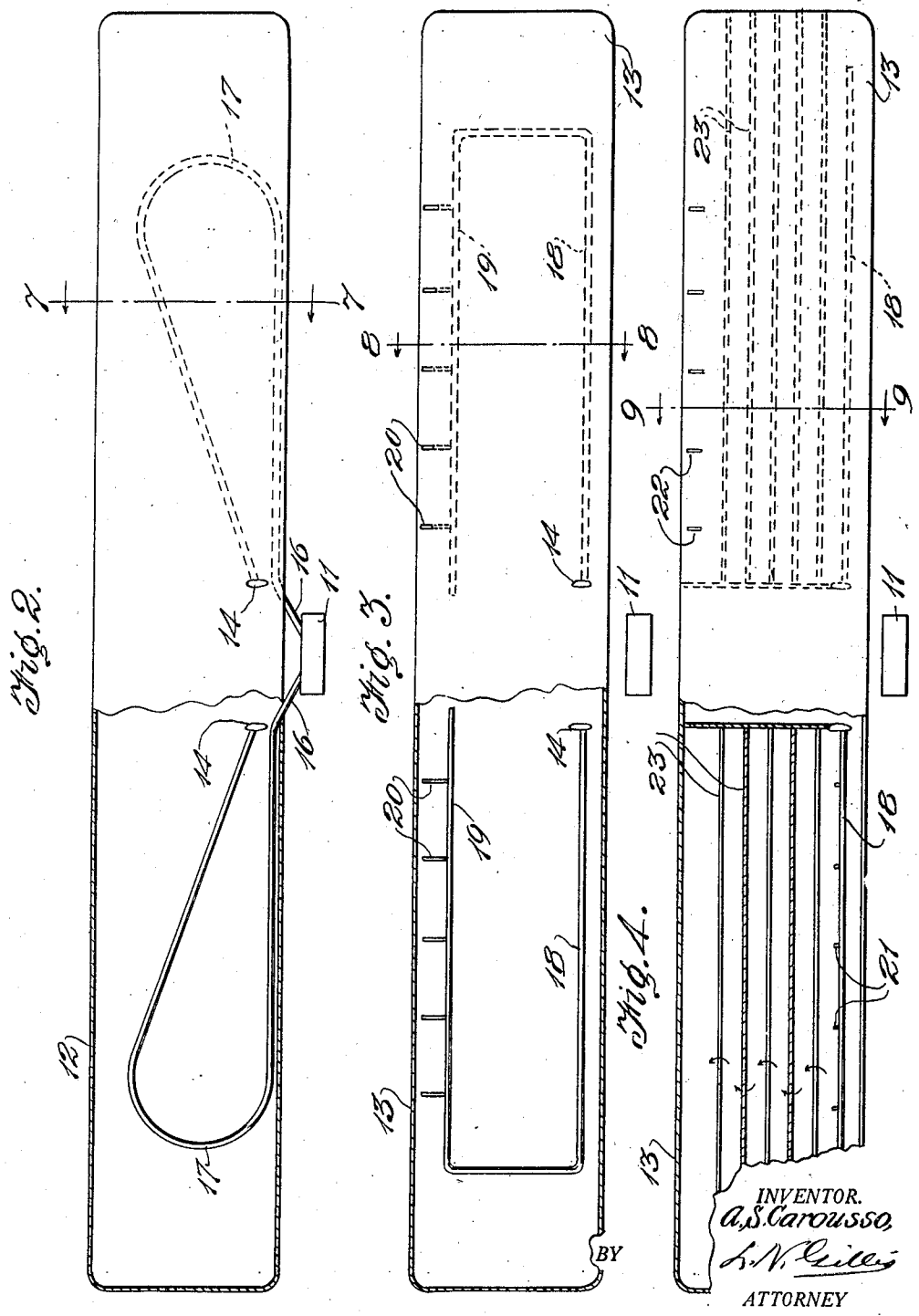
INVENTOR.
A.S. Carousso,
BY L. N. Gilles
ATTORNEY

Feb. 26, 1929. 1,703,612

A. S. CAROUSSO

AIRCRAFT HEATER

Filed July 7, 1927 3 Sheets-Sheet 2



Feb. 26, 1929. 1,703,612

A. S. CAROUSSO

AIRCRAFT HEATER

Filed July 7, 1927 3 Sheets-Sheet 3

Fig. 11.

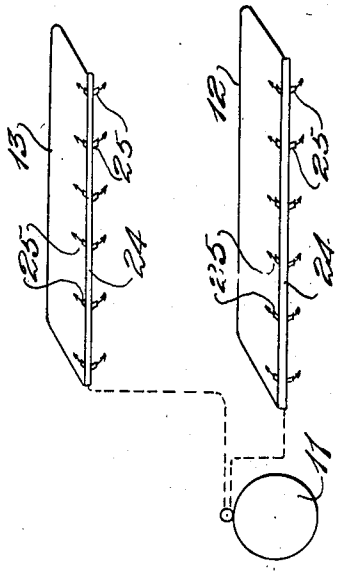


Fig. 8.

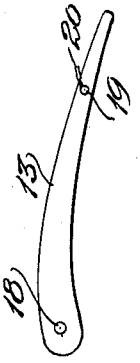


Fig. 9.

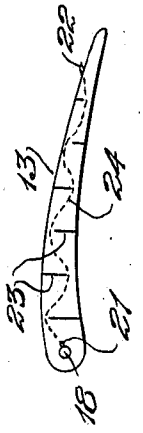


Fig. 10.

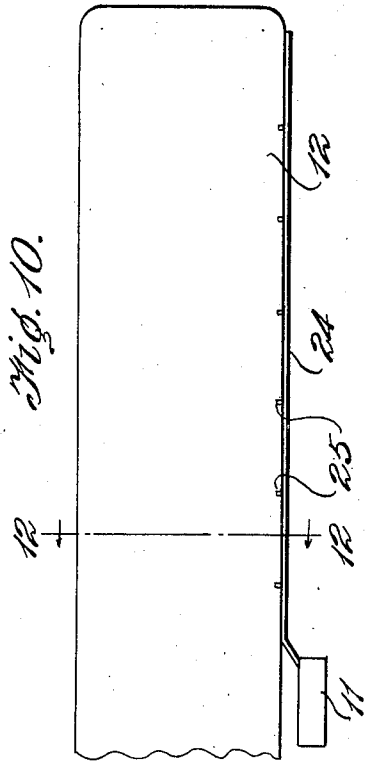
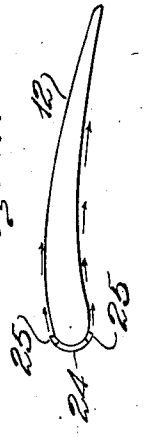


Fig. 7.



Fig. 12.



INVENTOR.

A. S. Carousso,

BY L. N. Gillis

ATTORNEY

Patented Feb. 26, 1929. 1,703,612

UNITED STATES PATENT OFFICE.

ARISTIDES S. CAROUSSO, OF FLUSHING, NEW YORK.

AIRCRAFT HEATER.

Application filed July 7, 1927. Serial No. 204,098.

This invention relates to airships.

It is well known that in the navigation of airships in cold weather or at high altitudes it frequently happens that the form of the ship is distorted by the accumulation of frozen moisture on the outer coverings of the ship, this being in the form of ice, sleet or snow. This accumulation of moisture necessarily adds to the load to be sustained by the ship whether the ship is of the lighter than air type such as a dirigible balloon or whether it is of the heavier than air type such as an aeroplane. The continued accumulation of weight in this manner tends to force the ship down. Furthermore, in the case of aeroplanes not only is the accumulation injurious because of the added weight but a much more serious effect is produced. In aeroplanes this accumulation is apt to occur on the leading edges and adjacent the leading edges of the wings thus destroying the proper curvature or aerofoil section and in consequence frequently so interfering with the lifting power of the wings as to make the shaft incapable of remaining in the air, a weight of ice insufficient to overcome the flying qualities of the machine when accumulated in this manner effectually destroying the lift.

The principal object of the persent invention is to provide a novel and improved construction of airship wherein the heat of the engine exhaust is utilized to maintain the outer covering of the ship, especially the wings in aeroplanes, in a heated condition so that ice, sleet and snow will melt as fast as they form or fall on the ship and thus not only prevent the addition of weight but also prevent the distortion of the lift surfaces or other form of the ship.

A second important object of the invention is to so dispose of the exhaust from the engine that it will not only effectually warm the wings of an aeroplane but these wings will themselves act as a muffler for eliminating the noise of the exhaust.

With the above and other objects in view as will be hereinafter apparent, the invention consists in general of certain novel details of construction and combinations of parts hereinafter fully described, illustrated in the accompanying drawings and specifically claimed.

In the accompanying drawings like characters of reference indicate like parts in the several views, and

Figure 1 is a diagrammatic side elevation of an aeroplane showing a typical travel of the exhaust from the engine through the wings with this invention in use.

Figure 2 is a plan view partly broken away showing a lower pair of wings with the means for conducting exhaust from the engine therethrough.

Figure 3 is a view similar to Figure 2 but showing a pair of upper wings in one form of the invention.

Figure 4 is a view similar to Figure 3 but showing a modified form of the invention.

Figure 5 is a diagrammatic view showing the travel of the exhaust when the wings shown in Figures 2 and 3 are used.

Figure 6 is a diagrammatic view showing the travel of the exhaust when the wings shown in Figures 2 and 4 are used.

Figure 7 is a diagrammatic section on the line 7—7 of Figure 2.

Figure 8 is a diagrammatic section on the line 8—8 of Figure 3.

Figure 9 is a diagrammatic section on the line 9—9 of Figure 4.

Figure 10 is a view of a modified arrangement wherein the exhaust gases are allowed to flow on the outside of the wings.

Figure 11 is a diagrammatic view similar to Figures 5 and 6 showing the distribution of the exhaust gases in the form shown in Fig. ure 10.

Figure 12 is a diagrammatic section on the line 12—12 of Figure 10.

For the purpose of illustrating the invention the general arrangement has been shown in Figure 1 wherein an aeroplane 10 is provided with an engine 11, lower wings 12 and upper wings 13. At the front these lower and upper wings, which are hollow, are connected by hollow struts 14 so that communication is had between the interiors of the lower and upper wings. The dotted lines 15 in this figure indicates the path of the hot gases from the exhaust through these wings and it will be seen that the exhaust first takes a circuitous path through the lower wings, then passes up through the struts 14 and flows through the upper wings from front to rear, escaping at the rear or trailing edge portion.

In the form shown in Figure 2 the lower

wings are illustrated and it will be seen that from the engine 11 a pair of exhaust pipes 16 lead to the forward or leading edge of the lower wings and in each wing the pipe is conducted outwardly along the leading edge and returned by a large loop 17 to the lower end of the respective strut 14. Passing up to the upper wings 13 the exhaust is led outwardly on each wing as at 18 and in the form shown in Figure 3 the pipe extends rearwardly and then inwardly as at 19 adjacent the trailing edge, outlet pipes 20 branching off and projecting upwardly at a slight angle through the top of the wing adjacent said trailing edge.

In the form shown in Figure 4 the pipe section 18 is provided with outlet nozzles 21 and the wing covering itself is provided near the trailing edge with exhaust nozzles 22, baffles 23 being aligned in staggered relation, as best seen in Figure 9, between the nozzles 21 and 22 so that the exhaust gases follow the path shown by the dotted line 24 in Figure 9. In both Figure 3 and Figure 4 the effect of the exhaust nozzles 20 and 22 respectively is to increase the rarefied or vacuum area which exists over the top of a properly constructed aeroplane wing and thus this arrangement not only heats the wings but also tends to assist in the actual lift.

In the form shown in Figure 10 each wing is treated alike and in this form the lower wing 12 is shown along the leading edge of which extends a pipe 24 of arcuate cross section as can be seen by reference to Figure 12, this pipe thus hugs the leading edge of the wing closely and from the top and bottom edges of the pipe extend exhaust nozzles 25 so that the hot air escaping from these nozzles flows along the wing in the direction shown by the arrows in Figure 12. The upper wings 13, as will be seen by reference to Figure 11, are treated in the same manner.

It will now be obvious that under these conditions the wings will be kept warm so that any tendency to accumulate ice, sleet or snow will be eliminated and the wings will thus retain their true form and weight will not be added thereto to tend to depress the plane or distort the proper aerofoil section. Moreover, as the exhaust is allowed to escape through this circuitous passage it is baffled so that the escape is quite.

There has thus been provided a simple and efficient device of the kind described and for the purpose specified.

It is obvious that minor changes may be made in the form and construction of the invention without departing from the material spirit thereof. It is not, therefore, desired to confine the invention to the exact form herein shown and described, but it is desired to include all such as properly come within the scope claimed.

Having thus described the invention, what is claimed as new, is:

1. In a biplane having an engine and upper and lower pairs of hollow wings, hollow struts connecting said wings and affording communication between the spaces in the lower wings and the spaces in the upper wings, pipes leading from the engine exhaust and extending into the lower wings at the leading edges thereof, said pipes being extended in a circuitous path through said wings to the hollow struts, pipe sections extending from the upper ends of said struts along the interior of said upper wings and provided with escape ports, said upper wings having exhaust ports in their rear parts, and baffles in said upper wings between the escape and exhaust ports.

2. In a biplane having an engine and upper and lower wings of hollow conformation, hollow struts connecting said wings and affording communication between the spaces within said wings, pipes leading from the engine exhaust and extending into the lower wing, pipes positioned within the upper wing and connecting with the hollow struts, exhaust nozzles in said last mentioned pipes, the said pipes in both lower and upper wings being bent to substantially encircle the interiors of the hollow wings, whereby the exhaust gases pass into the lower pipes and thence through the hollow struts into the upper pipes and through the exhaust nozzles, substantially as described.

In testimony whereof I affix my signature

ARISTIDES S. CAROUSSO