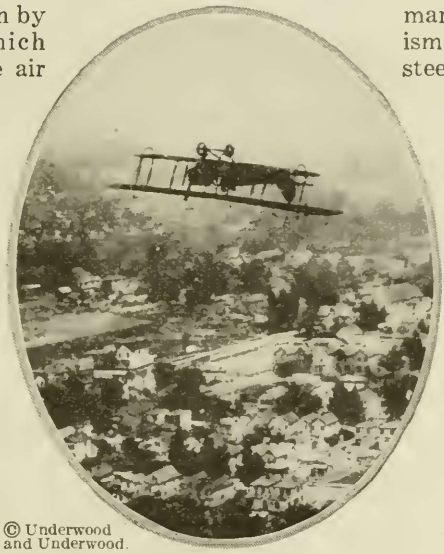
Like a Wasp on the Wing

Is the New Albatross Destroyer in which the Germans have embodied all that the war has taught about fast fighting airplanes

By Carl Dienstbach

THE war will be won by that power which launches into the air the greatest number of the fastest fighting airplanes. This seems to have been realized from the day when it dawned on the general staffs of Europe that artillery must be aimed by a man several thousand feet in the air, that the enemy must be prevented from similarly directing his own fire, and that as a result, fighting machines must be resorted to in order to gain supremacy in the air. As a result, the warring nations have been trying to outstrip one another in producing the fastest and most formidable fighters. British, French, Germans have all commanded the air at different times, and the times usually coincided with the appearance of faster and more improved machines.



Upside Down in Mid-Air

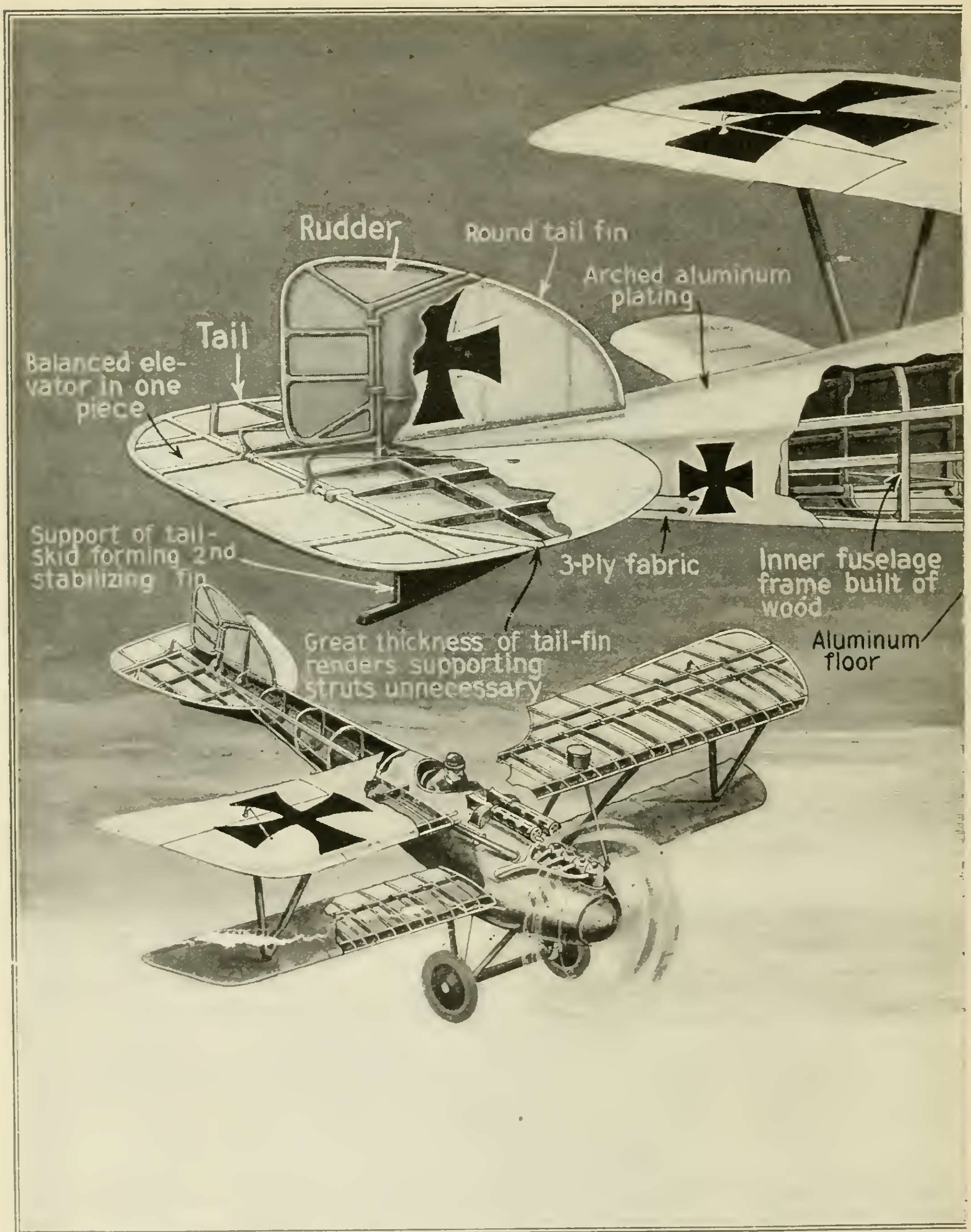
We used to marvel at the men who looped-the-loop in flying machines or slid down sideways or tail first, wondering what was the good of it all. The wildest acrobatic feats performed at flying-machine meetings before the war are now part and parcel of every fighter's tactical equipment. He must put himself in a favorable position and if necessary must loop-the-loop to do so.

Whenever the newest type of hostile machine is captured, it is examined with microscopic minuteness. The curve of its wings, the spacing of its struts, the shape of its fins and tail, the material of which it is made, the proportioning of its different parts—everything is measured, tested and noted. It is not only studied; it is copied. This is no time for riding pet hobbies. The best that the enemy has must be not only imitated, but bettered.

It seems to be conceded in the British and French despatches that the new German Albatross destroyer known as "type D-III" is for the time being the fastest and most formidable fighting airplane on the Western front. In this remarkable piece of mechanism we see embodied in steel, wood and linen, all the lessons so bloodily driven home by two years of fighting in the air. The new Albatross is an amalgamation of the best features to be found in the original small Albatross and the latest fast French Nieuport.

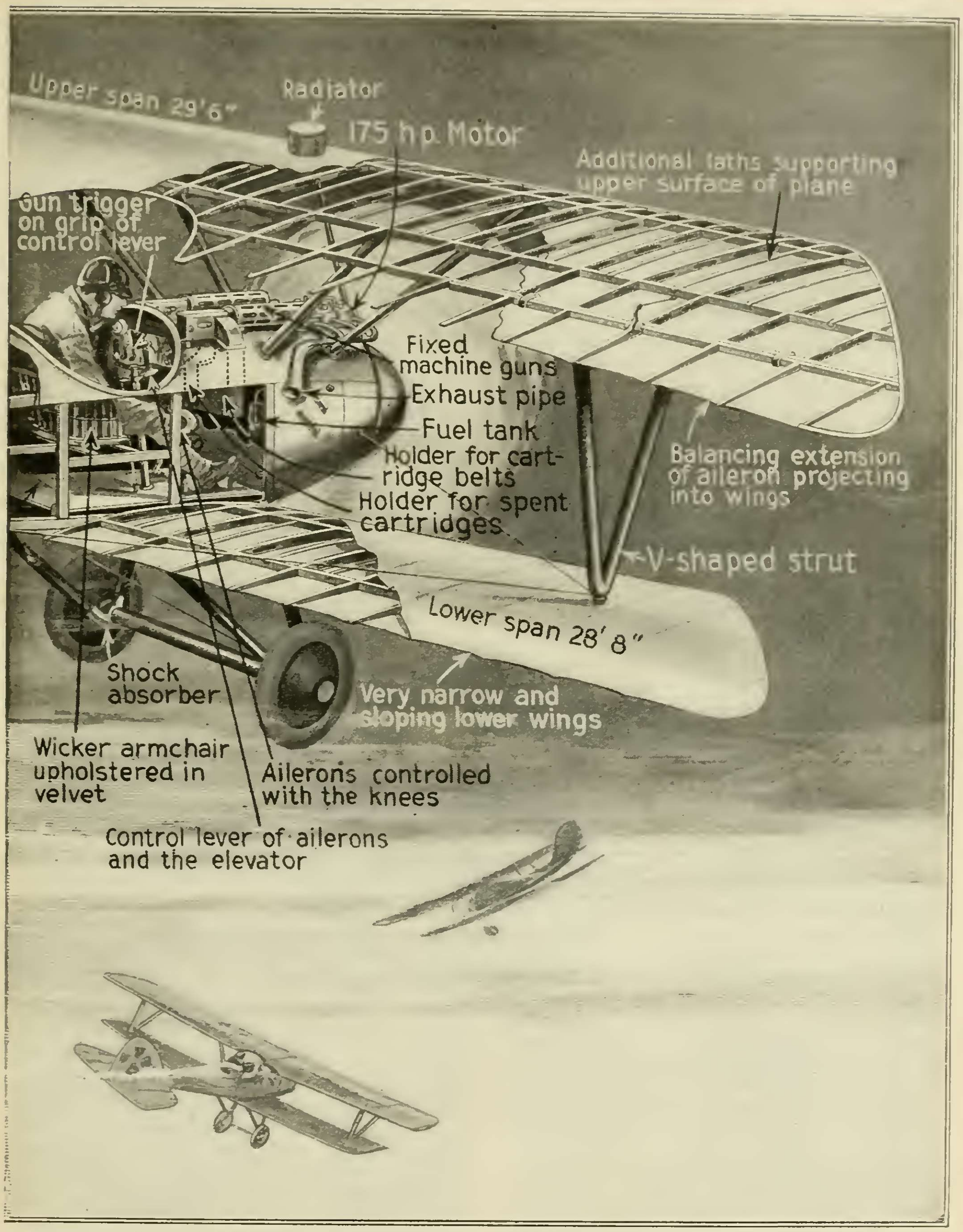
Above all things, a fighting machine must be fast. A speed of one hundred and thirty miles an hour is about the minimum now. In addition to speed, the machine must have the maneuvering power of a wasp; it must be able to dart up and down and in and out with the rapidity of an insect.

In the French Nieuport machine these two essential qualities of speed and maneuvering ability were more highly developed than in any other. The Nieuport is a biplane in which the lower wing is but half as wide as the upper. We look at the Albatross. Sure enough, its lower wing is one-half the width of the upper. In the fast Nieuport, the wings are "staggered"—that is, the lower wing lies not directly below the upper, but slightly to the rear, so that the front edge of the lower wing is just beneath the rear edge of the upper one. Why is this done? Because the struts that tie the two wings together can be shortened. Shortened struts, in turn, mean less wind resistance. Look at the detail drawing of the Albatross that accompanies this article. You see at once that the Albatross, too, has "staggered" wings and short struts.



In their new Alabatross destroyer, which is probably the fastest fighting machine on the machines and have added improvements of their own. A stationary engine of 175 horse-

Why is the lower wing narrower than the upper? There is a kind of interference between upper and lower wings. The air is "caught," as it were, between the superposed surfaces. If the lower wing is narrowed this interference is largely prevented. But there are structural reasons, too, for narrowing the width of the lower plane. Note in the drawing that the struts are triangular in form and that the



western front, the Germans have copied the best features of the French and British fighting power drives the Albatross through the air at the tremendous speed of over 130 miles an hour

rear member of a triangle lies directly behind the front member. Isn't it obvious that the triangular strut thus formed is strong and light and that it will offer less resistance to the wind than if a rectangle with diagonal wire bracing were adopted? Note, too, that the staggered wing construction with the narrow lower plane makes it possible to fasten each triangular strut directly to the lower main beam.

This adds to the strength of the entire biplane.

But the Germans have improved upon the Nieuport in this: They have spread the central struts which hold the upper wing to the fuselage or body, far apart. Hence the two wings are tied together by only two sets of struts—the triangular ones previously described and the central ones. Why was this done? Simply to avoid the use of wires. In the older machines, by which I mean machines that flew in the early weeks of the war, there were a far greater number of wires than would now be considered permissible. Wire bracing extended in all directions. Now, a piano wire which vibrates a distance of half an inch to either side of its normal position offers as much resistance as a rod one inch in diameter. A wire may seem thin, but when it vibrates it is the equivalent of a thick rod. It offers much resistance as a result. And so we find the airplane designers of the world trying to get rid of wires. The builders of the Albatross have gone far in this direction.

From the British, the Germans copied the rounded outline of the tail fins. The tail surfaces of a flying machine have much the same effect as the feathers of an arrow. They steady the machine. The perfect target arrow has rounded feathers. This explains the British tail formation of the German Albatross.

More than any other fighting machine thus far designed the Albatross is shorn of projections. Indeed, the craft approaches a bird in cleanness of line. The water tank, for instance, is no longer found near the engine; it is built into the upper wing. The radiators, through which the cooling water circulates, lie flat against the fuselage or body.

Steadying fins and rudders and ailerons (the hinged surfaces at the rear corners of the upper wing, serving to balance the machine from side to side) must be strong and stiff and yet free from external support. But their wind resistance must be low. The Germans met the situation by giving the fins and rudders a streamline form, which means a shape that parts the air most easily. The steadying effect of a fin depends in part on its area. Additional area was gained very cheaply by filling out the space between the fuselage or body and the tail-skid.

The fuselage or body in which the single fighter sits is noticeably large. But mark the lines. This smooth, correctly designed bulk, large as it is, parts the air with the lowest possible resistance. Note how the fuselage and the wings are tied together so as to get rid of struts and wires. The idea is not new, but it has been so ingeniously carried out that it deserves mention here.

The exhaust from the engine is carefully collected and conducted downward and rearward. Whiffs of exhaust gas should not be added to the tribulations the pilot already has to bear.

It takes a certain amount of muscular effort to swing a rudder quickly. Clearly, the fighter who can swing his rudder most quickly has the greatest maneuvering ability. The muscular effort involved, must not retard a man from making the right turn at the right moment. Hence we find that in the Albatross all the controlled surfaces are balanced, which means that triangular extensions are provided beyond their pivots. You will find this clearly brought out in the tail of the Albatross as it is shown in the accompanying drawing.

Since the entire machine must be swung around in order to aim a gun, it is obvious that as many as twelve guns could be mounted if there were place for them. Indeed, on the Nieuport as many as five have been carried—three on the upper wing and two firing through the propeller. No doubt a similar practice is followed by the Germans. In our drawing we have shown only two machine guns firing through the propeller.

How astonishing it is to find the inventions of fairy-tale writers brought to realization. For years we have been entertaining our children with one of the most beautiful fairy-tales of Hans Christian Anderson—a tale in which a wicked prince rashly essays to fight God himself with ships flying through the air and mounting guns that rain thousands of bullets in response to the mere pressing of a button. Look at the Albatross and you will see the magical buttons attached to the control-lever. Who knows but flying machine designers may find other improvements suggested in what we have been pleased to consider the poetic vaporings of romancers!