



FLUTTER WING

by ROLAND T. MAYER

Here is an interesting experimental design that seems to have great possibilities in the stunt field

PERHAPS the name *Roto-panel* most accurately describes the plane featured in this article, or at least the method of generating lift used with this plane, but from its very conception it has been called a *Flutter Wing* for some reason or other, and at this stage of the game everyone who has ever seen it fly will undoubtedly remember it as such.

As far as is known the ship has no prototype in either full scale or model aircraft at present, but after putting the *Flutter Wing* through its paces, we are sure that before long planes of this type will be popular performers in any stunt event.

The plane presented here is the final result of a year and a half of experimental work with rotary panel types, beginning with hand-launched and towline gliders and working finally into control line gas models. Our main purpose in beginning this project was to develop a wing for stunt models which could produce a relatively constant amount of lift throughout various maneuvers, thus preventing the lag and general sluggishness usually present in most stunts performed by U-control models. Wing slots have been employed by many builders to increase the anti-stall characteristics of their ships with varying degrees of success, but even these models on the average seem to lack smoothness. Judging from performance we believe the rotating panel goes a step beyond the best that slots have to offer.

Perhaps the theory behind the rotating panel can be most easily explained by the use of an analogy. Let us compare the panel to a falling leaf which as it falls rotates about an axis parallel to the ground and running the length of the leaf. The rotation is such that the leading edge moves upward while the trailing edge moves downward. Now by enclosing this symmetrically shaped panel between a leading and trailing edge, so shaped as to channel the air flow in a manner which would cause the panel to rotate at a higher speed and in an opposite direction to the leaf previously mentioned, a lift was produced which proved sufficient to maintain a plane in flight. In addition, this lift was found to remain relatively constant throughout various maneuvers. This may be explained by the fact that regardless of the angle of attack of the wing, the attitude of the rotating panel with respect to the air stream remained virtually unchanged.

The advantages of the rotating panel wing over the conventional type may be summed up as follows: because of the added drag of the panel, its initial lift-drag ratio is lower than that of a regular wing and a plane employing it will necessarily be slower, but the lift delivered remains relatively constant throughout all changes in the angle of attack. Although the conventional wing has a high lift drag ratio at its best angle of attack, this ratio fluctuates rapidly from its maximum to a value of zero as the angle increases. At the zero point no lift is produced, but the drag is very high. Naturally, in stunt flying this very unfavorable zero point is reached quite frequently and with the complete loss of lift comes the corresponding instability and loss of smoothness in performance. We feel, therefore, that any wing capable of delivering a fairly constant amount of lift throughout a wide range of changes in the angle of attack, as does the *Flutter Wing*, should prove itself hard to beat in stunt competition.

To any experienced builder it will be obvious that the plane presented in this article was not designed for stunting. We were more interested in having a good sturdy carrier for the wing during the initial tests. The prime requisites were strength, ease of construction, and to satisfy our model builders pride, fairly clean lines. When finished, the ship filled the bill nicely.

The initial flight tests were rather hectic but they did give a good indication of things to come. Due to a short elevator horn, the ship was overly sensitive on the first flights. In fact, we had all we could do to keep it on a level flight path; certainly most other ships would never have survived such a violent beginning. Several times because of the oversensitive controls the ship was thrown into violent stalls but it was in these stalls that the *Flutter Wing* showed promise. Instead of falling off and wrapping up in its own lines, as happens in most cases of this type, our ship merely hovered like a helicopter

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