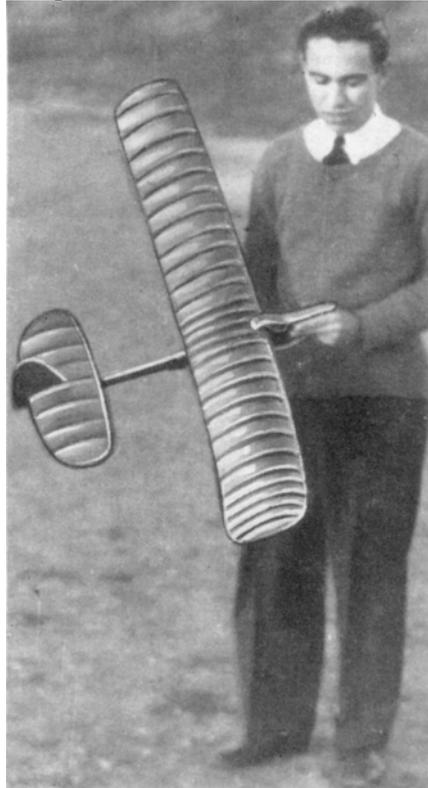


# FLY THE "MISSING" LINK

A simply constructed class E towline soaring model that makes high performance possible for the beginner

by, **GEORGE BROWN**



**The author with his model before the record flight**

THIS record soarer is the seemingly forgotten link between gas and rubber powered flight. In gas model flying a motor run is an assumed twenty seconds but the model may glide for many minutes. The same holds true for rubber powered models. Thus, disregarding the mode of power, model builders experience the same thrills when their models are soaring high overhead.

The "Link" is a model that compares in wing area to a small gas model, and since it is motorless, rubber builders can also fly it.

Only recently have these large soarers gained some of their justly deserved popularity. The thrill of seeing a tow launch glider soar slowly and lazily overhead, majestically rising along thermal paths, gives anyone the urge to build and

fly his own model. As to competitions, model soaring glider Elmira meets "packs them in," so, why not start the ball rolling in your own club.

A word as to the design of the Link. As mentioned on the plan, the glider possesses a short moment arm and a rather low aspect ratio wing for a soaring glider. In experimenting with this design, the author has found that this glider could be made to circle tightly without spinning. The merits of this type glide in riding air currents is acknowledged by all. It is suggested that you first read through all the construction details before beginning the actual construction of this simple but high performance glider.

WING-Although the wing has five sections, it is constructed as three: the center section and the

two outer panels. The outer panels are later cracked to form the tip sections. Twenty-five ribs of 1/8" soft sheet stock are required. Shape the leading, trailing and center spars from hard balsa. Since the wing is of simple mono-spar construction, only the outer panels need be described.

First cement all but the tip ribs at their leading, trailing and center spar positions. Next taper the required amount from the spar as shown on the plans, for the tip taper. Then cement the bamboo tip to the leading and trailing edge spars. When dry, force it upwards and cement to the spar. This will give it an upward dihedral angle. The tip rib is cut to size from 1/8" sheet, as are all others. Next shape it to conform to the tip taper and cement in place. This completes the construction of one outer panel. Simply duplicate the procedure for the other.

After having cut the required spar slant for the dihedral angle, pin and cement the three panels together. The dihedral angle should be one inch at the position shown on the plan. After the cement has dried, crack the spars of the outer panels at the required position, to form the fourth and fifth sections of the wing. These are then pinned and cemented together with the required four inches of dihedral.

All joints are strengthened by 1/16" sheet gussets and extra coatings of cement. The center section is strengthened with 1/8" x 1/4" hard balsa strip bracer. Notch the center ribs and cement in place. Next an aluminum sheet guard is cemented around the trailing edge where the wing meets the fuselage. This completes the construction of the wing framework.

Sand the complete framework with a fine sandpaper. Next cover the wing with a light bamboo paper. Each section must be covered individually, top and bottom, in order to obtain a good covering job. Make sure the paper sticks to the undercamber of each rib. After covering, water spray the paper and leave to dry. When dry, give the complete wing three coats of a clear dope. A light sanding will eliminate any rough paper spots.

**FUSELAGE** - Select a hard balsa block for the fuselage as this part of the glider will have to "take it" most. Next cut out the top and side views without rounding off the edges. Only after the fillet

and wing rest blocks have been cemented in place do you start shaping the block with its required sections. Leave the fuselage flat where the tail surface is cemented. Cut the cockpit rest block from medium balsa, rounding off the front and cementing it in place. Extra coatings of cement will keep it from breaking off during rough landings. The wing should fit snugly in place between the cockpit and wing rest blocks. Also make sure that the fillet block fits the wing undercamber.

Next cut out a section of the fuselage and hollow housing for the lead balance. The amount of lead depends upon the weight of other parts of the model. Simply add enough to bring the complete model up to the required weight; it should balance at approximately where the lead is situated. Keep the weight securely cemented in place so as not to shift the C.G. in flight. Now cement back in place the section which was cut out of the fuselage. Finer balance adjustments can be made by the use of clay on the nose or tail of the model.

Cut the cockpit cover pattern from thick celluloid and cement in place. For the tow cord, bend two hooks from .040 wire and cement securely in place. The complete fuselage is then sanded until a smooth wood surface is obtained. Then give it about six coats of a clear dope and sand lightly between each. Try using a little more effort on the last coat, sanding lightly and evenly. You should obtain a smooth glossy surface. A few coatings of cement on the nose will keep it from wearing. Do not color dope the fuselage until the tail surface has been cemented in place.

**STABILIZERS-RUDDERS**-For the stabilizer, cut the required ribs from soft sheet balsa and cement to the spars. Next cement the bamboo tip in place. A thin top rudder section is employed with 1/8" square ribs. Shape the 1/8" soft sheet bottom rib to fit the top section of the stabilizer airfoil. Cover the rudder and stabilizer with a light bamboo paper. Next water spray them and leave to dry. Two coats of a clear dope should be used for tightening the paper.

The bottom rudders are shaped from 1/8" sheet stock. They are then cemented at their stabilizer positions. make sure they are cemented to the ribs and not only to the paper. Give them three coats of dope, sanding lightly between

each. If you like, give them two coats of a colored dope.

**ASSEMBLING-FINISHING** - Cement the stabilizer to the fuselage, making sure that it is lined up with the wing. It is set at a zero degree incidence angle. A few extra coats of cement will keep it securely in place. Next cement the rudder to the stabilizer and fuselage. A cement fillet formed at the points of contact of the rudder, stabilizer and fuselage will eliminate any vibration.

The color doping of the glider is all that remains to its completion. As to the color scheme, that is left to the taste of the builder. Give the fuselage two coats of a colored dope, sanding lightly between each. Three coats of a good polishing wax will give a smooth, glossy surface. Colored papered wing and tail surface trimmed with a colored dope will give a fine appearance.

**FLYING**-First slip the wing in place, holding it on with rubber bands: it should nestle firmly in place. The Link should balance where the weight is situated. All surfaces should have a zero degree of incidence angle. Test glide the model from a shoulder high position. If it should glide with the tail slightly high, add a small amount of clay to the tail. The model should be made to glide in a flat but tight turn. This results in a ballooning type glide, taking advantage of the slightest atmospheric aid. In many a flight the Link has

soared overhead for minutes at a time at an altitude of only one hundred feet!

You've probable wondered about the tow hooks located on the side of the fuselage. They are placed there so the tight flight turn of the glider is offset while being towed. In other words a tight left turn would be neutralized since the model would be pulled to the right; when released the glider would resume its flight turn. The best way to tow a glider to obtain maximum altitude is to tow a few feet at a time. If the glider does not tow straight, but shows a tendency of circling to either side, slacken the tow cord which straightens it out. Simply repeat this procedure until the glider reaches its maximum altitude for tow cord length.

After obtaining some skill with this type launch, heights of 80 to 90 feet can be reached. For windy weather use the front hook. The rear hook is used for calm weather flying. In towing your model, just remember that to prevent crashes it is better to tow slowly and surely rather than fast. A good point about this type model is the small amount of flying accessories needed. The only equipment is a tow cord and the usual contest kit. Some sort of vehicle with which to pursue the Link will also come in handy. Don't forget to do your part in boosting American model aviation.

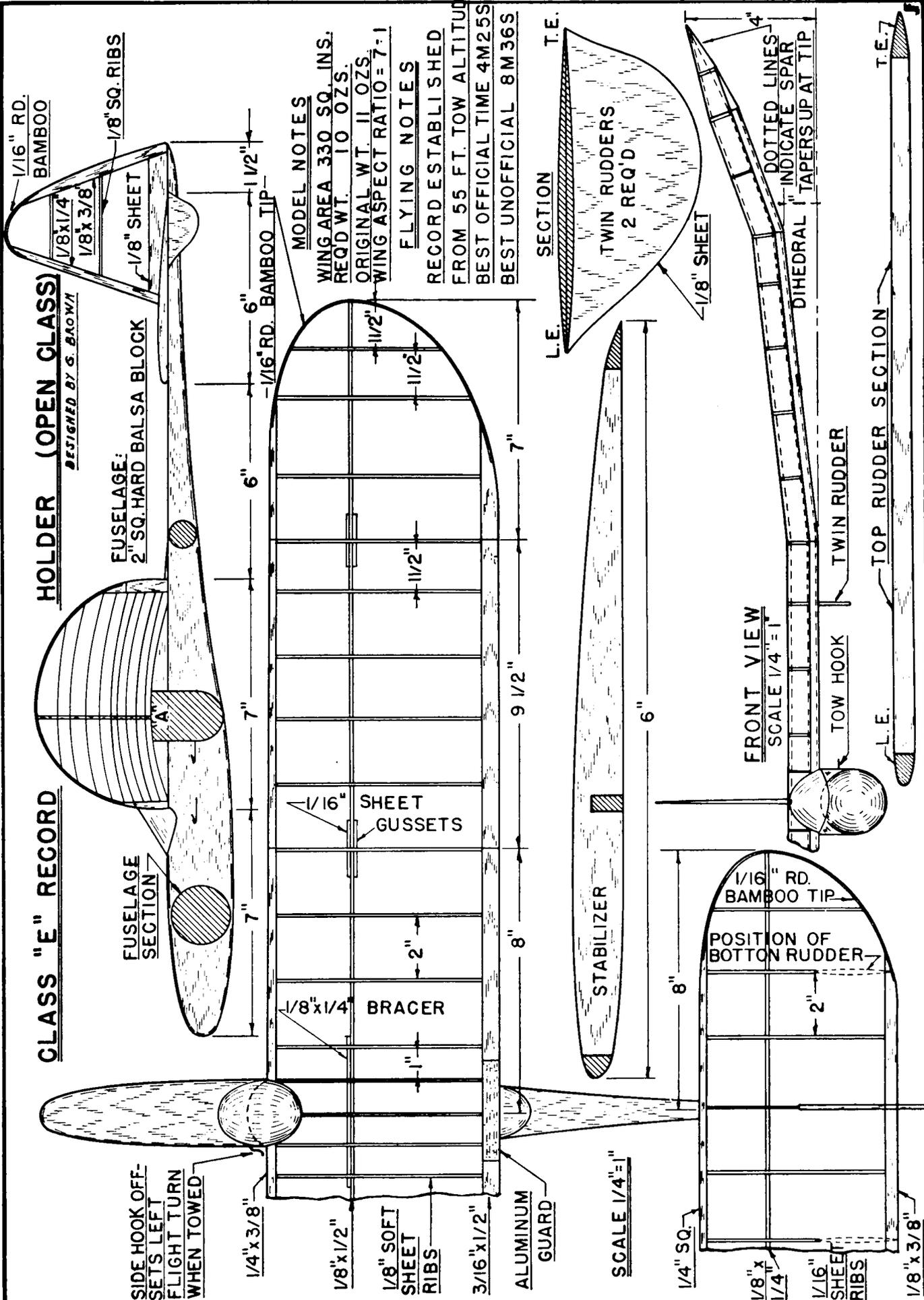
## **VICTORY**

***Scanned from September 1942  
Model Airplane News***

**CLASS "E" RECORD**

**HOLDER (OPEN CLASS)**

DESIGNED BY G. BAOWM



SIDE HOOK OFF-SETS LEFT FLIGHT TURN WHEN TOWED

FUSELAGE SECTION

FUSELAGE: 2" SQ. HARD Balsa BLOCK

1/8" SQ. RIBS

1/8" SHEET

1/8 x 1/4

1/8 x 3/8

1/16" RD. BAMBOO

1/4" x 3/8"

1/8" x 1/2"

1/8" SOFT SHEET RIBS

3/16" x 1/2"

ALUMINUM GUARD

SCALE 1/4" = 1"

1/4" SQ.

1/8" x 1/4"

1/16" SHEET RIBS

1/8" x 3/8"

1/8" x 1/4"

BRACER

1/16"

SHEET GUSSETS

2"

8"

9 1/2"

7"

1 1/2"

1 1/2"

6"

6"

1 1/2"

1/16" RD. BAMBOO TIP

MODEL NOTES

WING AREA 330 SQ. INS.  
REQ'D WT. 10 OZS.  
ORIGINAL WT. 11 OZS.  
WING ASPECT RATIO = 7.1

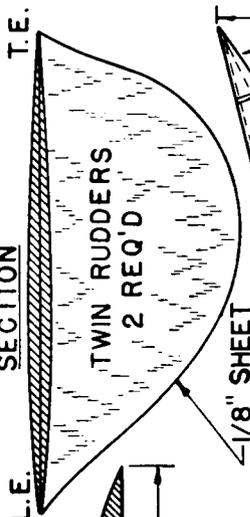
FLYING NOTES

RECORD ESTABLISHED FROM 55 FT. TOW ALTITUDE  
BEST OFFICIAL TIME 4M25S  
BEST UNOFFICIAL 8M36S

STABILIZER

6"

L.E. SECTION



T.E.

FRONT VIEW SCALE 1/4" = 1"

TOW HOOK

TWIN RUDDER

L.E.

TOP RUDDER SECTION

T.E.

1/8" SHEET

DOTTED LINES INDICATE SPAR DIHEDRAL 1" TAPERS UP AT TIP

4"

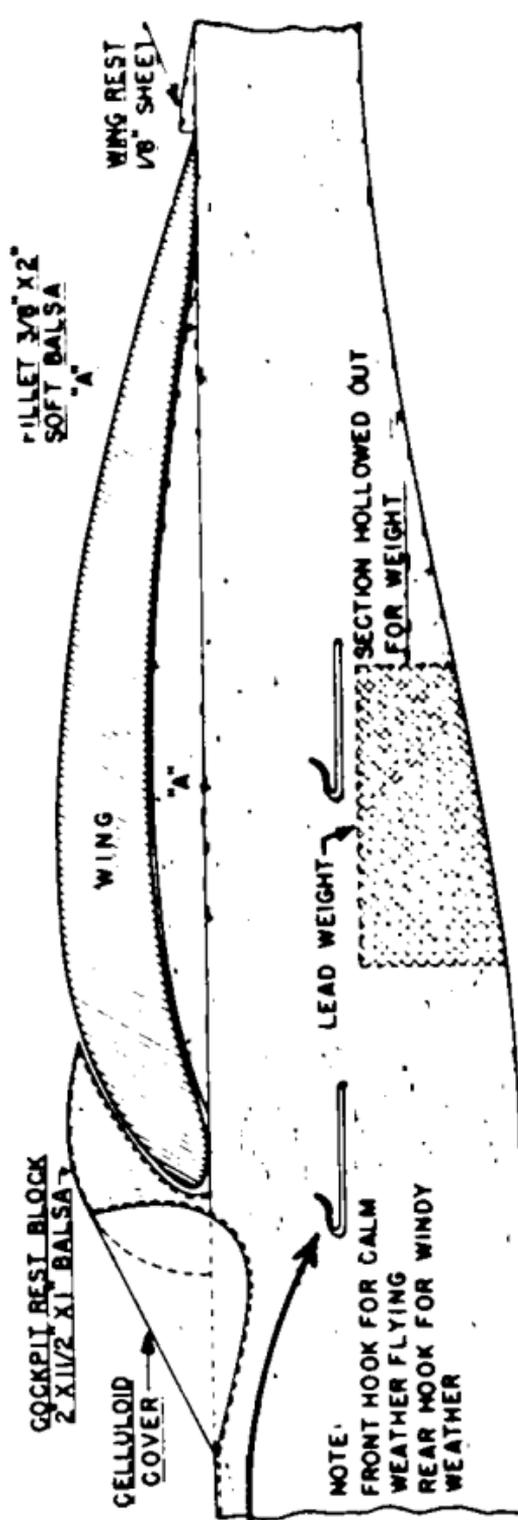
8"

1/16" RD. BAMBOO TIP

POSITION OF BOTTOM RUDDER

2"

1/8" x 3/8"



.040 WIRE HOOK

