

SMOG HOG

*Howard Bonner's successful
aerobatic multi-controlled radio
model for 3.5 c.c. to 6 c.c. motors
described by Robert E. Bowen*

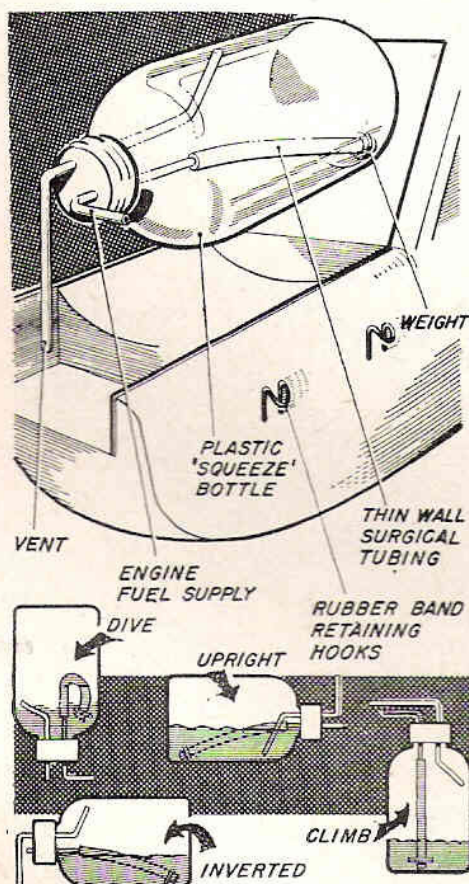
*Left: Maestro Bonner, complete with
broad grin and Smog Hog, snapped at
Dallas, scene of the 1956 Nationals*

FROM SUNNY CALIFORNIA, land of perpetual flying weather, we have the latest news and views of American radio control activity. Let us start with a brief description, including basic building instructions of Howard Bonner's "Smog Hog". Designed for ease of construction and good flight characteristics, it utilizes Grant's theories of lateral area, has a light wing loading and first made its appearance in the Spring of 1956. Since then the model has built up a terrific reputation, winning five first places and one second place including the 1956 American National Championship and the Californian State Meet. In this latter event it was the first R/C model to score over 200 points which it has been

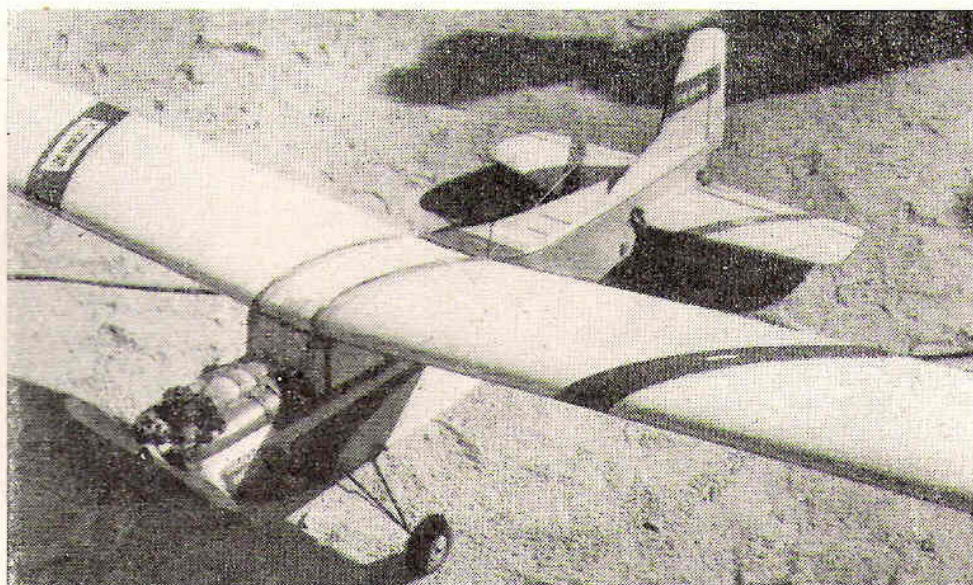
topping consistently ever since. All of this would not have been possible without a first rate pilot and dependable radio equipment. Howard Bonner believes in plenty of practice and during the 1956 season used C.G. Electronics 5 channel equipment with Bonner servo motors for rudder and elevator controls and presumably a Bonner Motor Control Unit for engine control. We have shown this type of installation on our drawing as it will also be quite suitable for E. D. Reed equipment with motorised servos, but also show amendments for those people who would like to start off with rudder only.

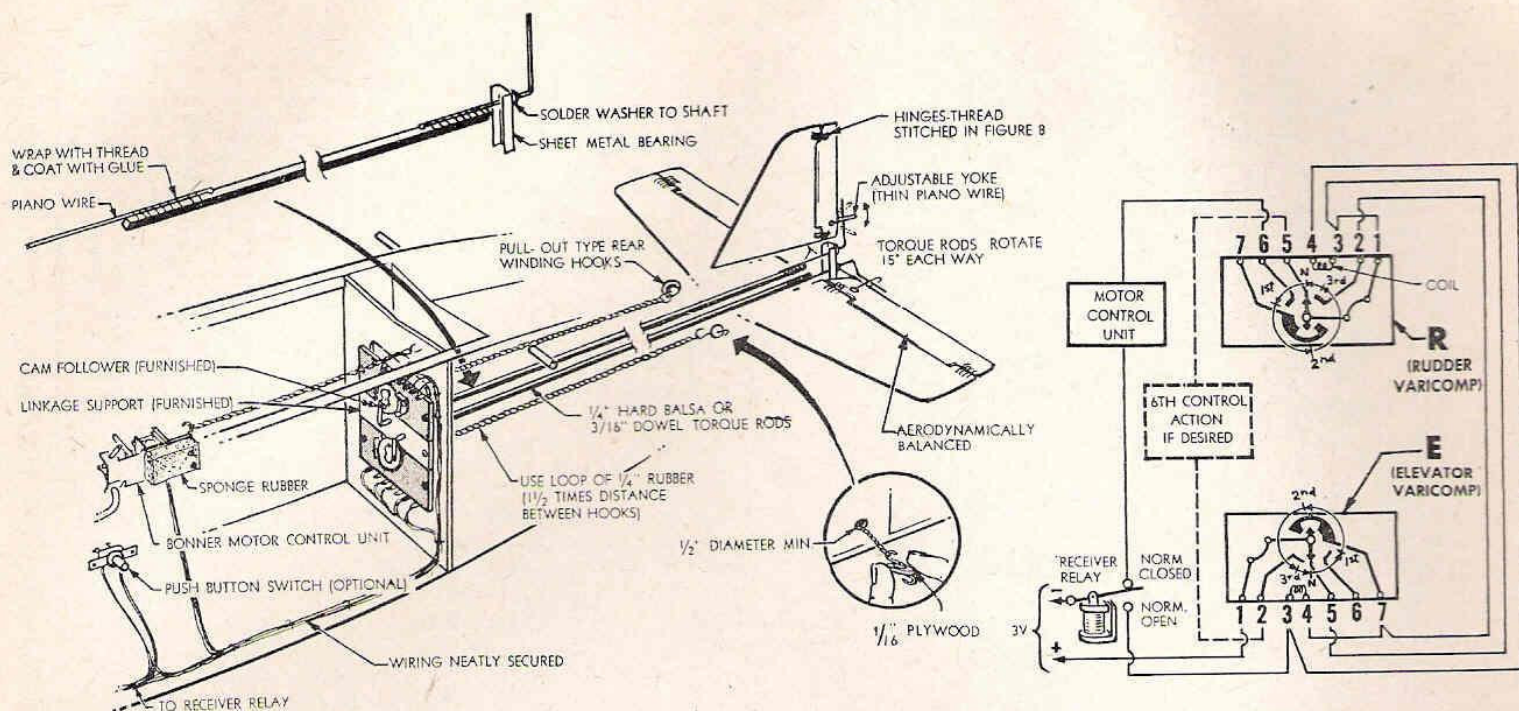
Systems such as Bonner's own "VariComp" illustrated opposite can also be used successfully, it is, however, essential to balance the control surfaces aerodynamically so that there is not too much load on the escapements. Our American friends do this by means of a "speeding auto", presumably of the open type!

Bob Bowen tells us that "Smog Hog" ground handling is just like a full size kite, with Howard Bonner taxiing it out to the line, applying the tailwheel brake to bring the model to a halt before opening up to full throttle for take-off. In the air it performs snap rolls, spins, inverted flight, loops inside and out, Cuban 8's and feather-like



*Close-up of model
below shows fuel
tank installation
described dia-
grammatically on
left. Span is 74½
inches, wing area
6 sq. ft., and all up
weight 5½ lb.*



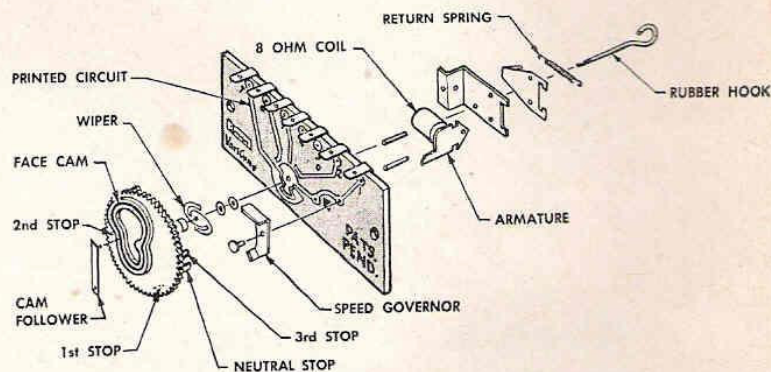


touch-and-go's. A version using a single channel Deltron receiver and Bonner "VariComps" cascaded, won a recent "Larks" Club contest, one of the great features of the design being its hand-off recovery characteristics. If you get confused or do the wrong thing in the middle of a manoeuvre, merely return all controls to neutral and the model will recover itself.

The latest ideas for easy maintenance are incorporated, such as the two-wheel knock-off landing gear and the expendable engine mounting plate that permits quick engine changes, or will break in a crash without damaging the engine or fuselage. The fuel tank scheme is strictly practical using a clear 4 ounce plastic bottle held by bands, as shown in our sketch, which permits easy filling and a visual fuel supply.

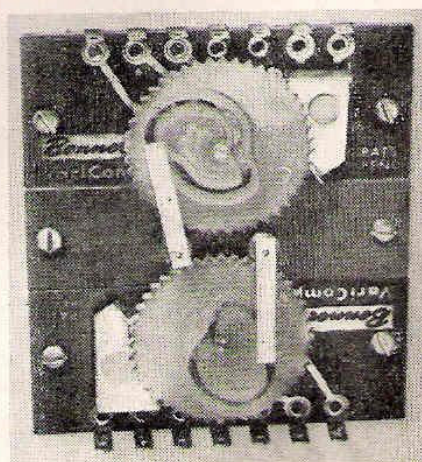
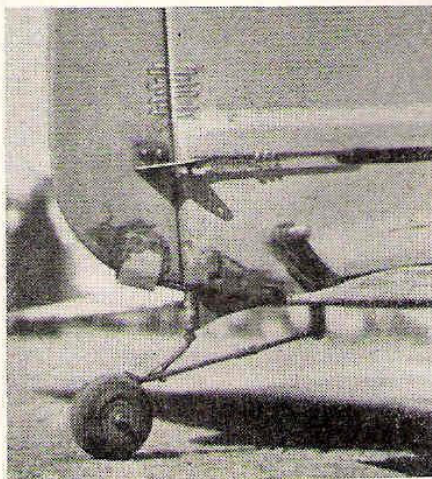
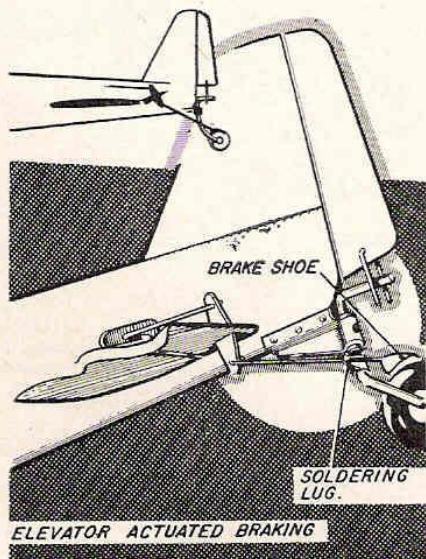
General construction is quite straightforward, the fuselage being the conventional strong box type with sheel balsa sides, top and bottom. Parallel sides aid considerably in squaring up the fuselage during the initial stages of assembly and great care should be taken when aligning the noseblocks and F.1 to result in a 0 degree thrustline.

Remember to instal and line up the various control rods before planking the top and bottom of fuselage



Installation of two Bonner VariComps to provide rudder and elevator control from a single channel outfit is shown above. This also permits engine control and a further control if required. Keying system is: "Right", hold; "Left", press hold; "Up", press press hold; "Down", press press press hold. For motor control the button is tapped quickly. No signal gives "Neutral" of course. Recommended scheme is to start with rudder only with one Vari Comp and progress to two or more cascaded as experience grows. Exploded drawing above, shows general construction, printed circuits are used and the face cam wheel is of nylon with the stops on the side nearest the panel. We rigged up samples sent as per photo below. This clearly shows cam followers which are soldered to torque rods that provide link to controls

Sketch on left shows alternative system for elevator crank operated tailwheel brake whilst centre photo details close-up of assembly on Bonner's own model



Of interest to readers will be other "Larks" members. Top is, Ray Downs with Mrs. Downs assisting and smart R/C Bipe. Centre, is Dale Root's "Ascender", which has semi-symmetrical wing and a fast flying speed. Uses Babcock 3-channel tone filter radio and a Torp 35. Bottom: Dean Kenny, President of the "Larks" starts up at the 1956 Nationals where he placed 4th in R/C Multi.

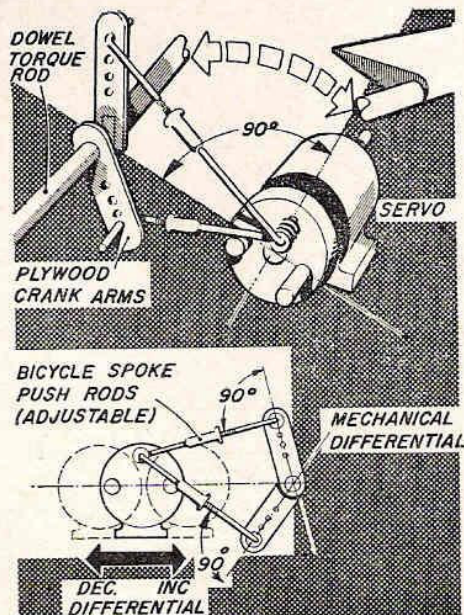
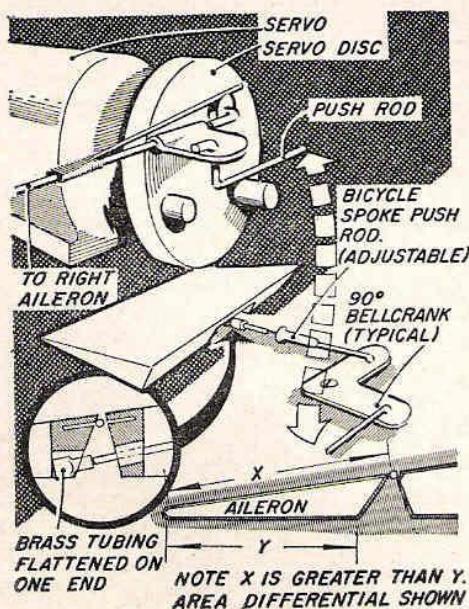
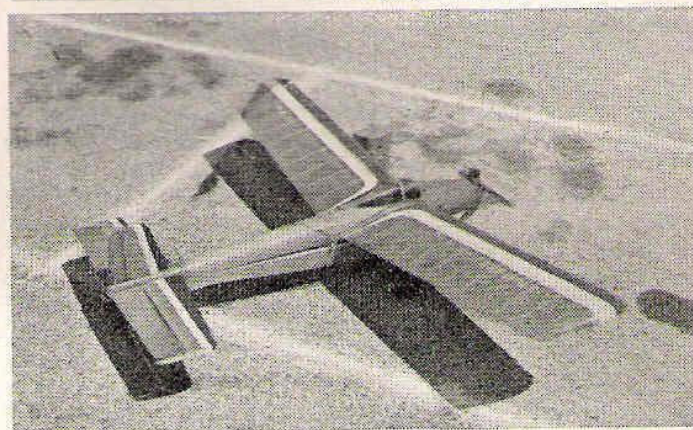
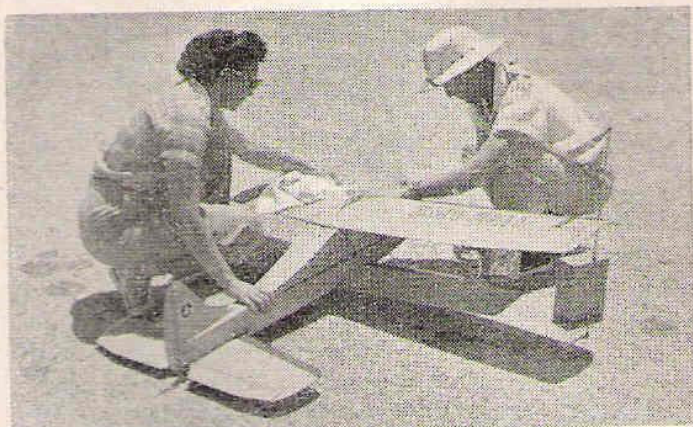
aft of F3 which will necessitate temporarily fitting the servo motors. Fuselage is nylon covered for strength and both the battery and receiver compartments are well packed with sponge rubber in the usual way. The motor control escapement on Howard Bonner's original is mounted on the right side of the fuselage just behind the receiver box operating the throttle by means of a 16 s.w.g. push rod.

Wing construction is conventional although the absence of plywood dihedral braces may shock a few of the old hands. This is a case of "absence makes the wing grow stronger", for the lack of braces prevents shear stresses converging where the plywood finishes. Centre section strength is achieved by scarf splicing the spars. The top and bottom pieces of the front and rear spars should be spliced in opposite directions. If desired a conventional trailing edge can replace the one shown on the drawing, in which case it will be necessary to notch the spars and modify the rib section. You may, however, get the pucker that so often occurs with this type of joint which the somewhat unusual joint shown, tends to prevent. Shorter wing given as alternative on plan increases the flying speed but otherwise does not alter the flight characteristics.

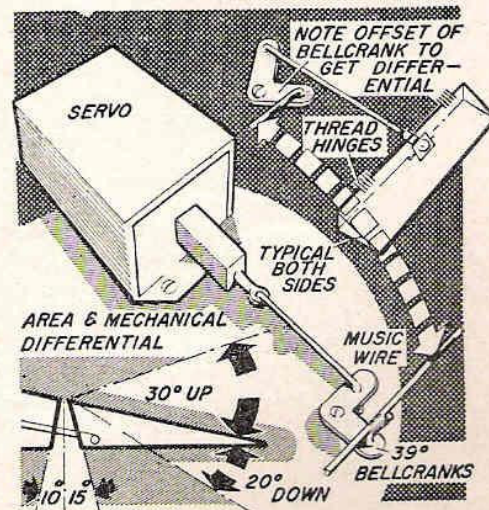
Fin, rudder, tailplane and elevators should offer no difficulty to the average builder, the latter items are linked by 16 s.w.g. piano wire which has a brass control horn soldered to it and the hinges are fabricated from fairly stout twine for both elevators and the rudder.

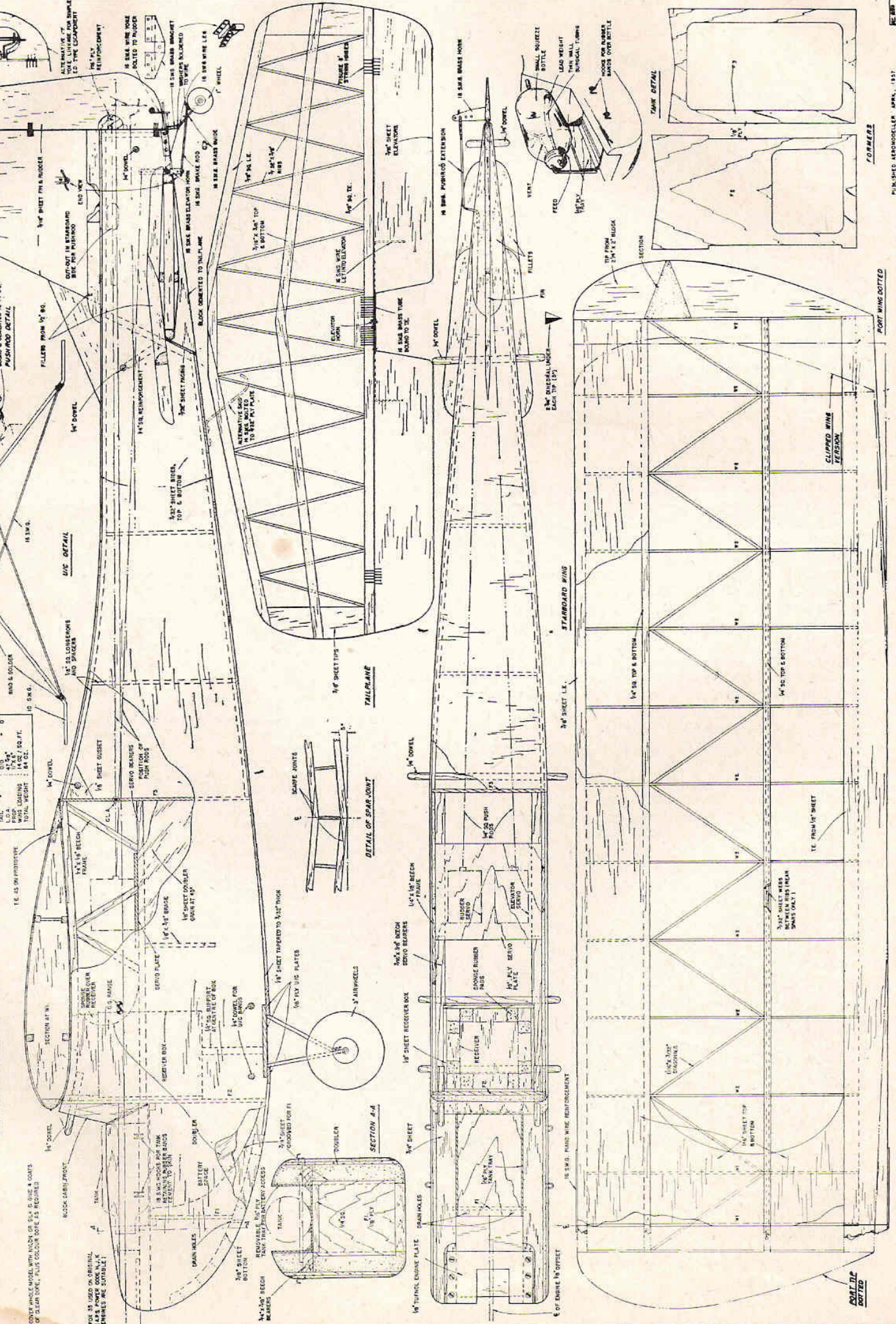
The model should balance within the C.G. range shown on the drawing and with the tailplane rigged at zero degrees the centre of the wing leading edge should be 7/16th inches above the centre of the trailing edge. This can be checked by setting the model up on a level surface with flying surfaces in position.

Bonner does not recommend hand gliding with a model of this size. His scheme for test flying is to use engine control to give moderate power for R.O.G. take-off after thoroughly checking all controls with engine running.



Three alternative differential elevator systems published in the "Larks" Newsletter should provide British multi enthusiasts with ideas





ASTRO-HOG

By Fred Dunn

FRED DUNN is a member of the LARKS club and the *Los Angeles Radio Kontrollers* are probably the most advanced radio control flyers in the modelling world today. With multi-channel equipment of the Orbit class which permits two simultaneous channels; first class motor servos such as the Bonner (also a member of the Larks); and special R/C engines such as the Veco 35RC and the Torpedo 35RC it was inevitable that fully-aerobatic multi-control models were going to emanate from this enthusiasts' club on the West Coast of the United States.

Fred tells us that the design was evolved the hard way, his first attempts at a low wing, based on the P.T.19 and P.51 making eight attempts, eight landings, all of them fatal! Interested club members watching the flights bowed their heads and walked away convinced that low wing layouts had no future. Discouraged but not defeated Fred decided that this first design was too scientific and that the next project would be more functional. He therefore followed some themes of the renowned "Smog Hog", keeping to the N.A.C.A. 2415 airfoil and including ailerons which had been omitted from the original project. The result was that "Astro Hog" made its debut in August, 1957, at a club meeting where Fred handed the controls to the "ol' master himself", Howard Bonner. Flights were so impressive, after six more Larks members had handled the controls, that Astro Hogs were, within a few weeks, the order of the day. In the hands of experts such as Howard Bonner, Ray Downs, Dean Kenny, Bob Dunham, etc., the design has quickly become world famous and is being flown internationally, as for example the version by Cliff Culverwell shown on the opposite page which won the South African Nationals. Bob Dunham, designer of the Orbit equipment, has already won five major R/C contests in the States and there will, no doubt, be many more Astro Hog successes to come.

Heading shows Bob Dunham, the 1957 U.S. National Champion, with Astro Hog fitted with Torpedo 35RC. Below is Fred Dunn's original machine complete with Rising Sun paint scheme in black and white



With multi equipment at a premium in this country at the present time many people are going to ask if the model can be flown rudder-only. The answer is "No" in its standard form, but with the dihedral increased to at least 10 degrees per half span the designer believes that good results would be achieved.

Astro Hog is principally intended for multi flying where turns are carried out with ailerons only, and British enthusiasts are fortunate in having an advanced and proven design in which to install their multi channel equipment.

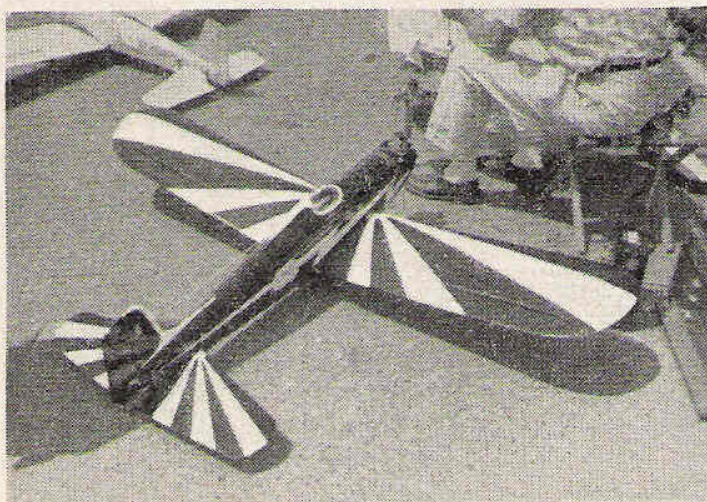
To give some idea of its performance we quote from Fred Dunn's original article in *Model Airplane News*.

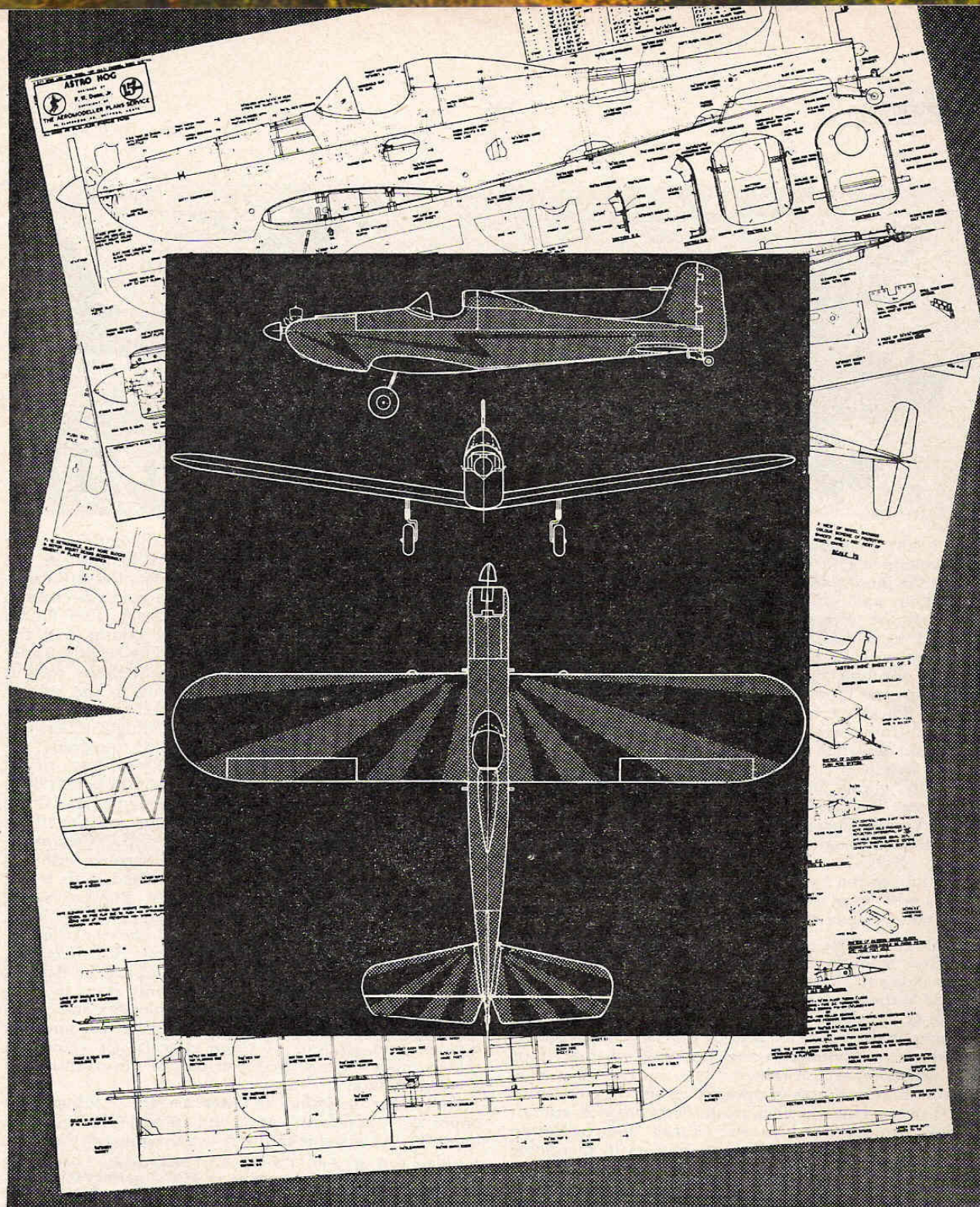
"Outside loops are a cinch. Full-down-elevator held will produce a well-rounded manoeuvre. The loop can be tightened by shifting the C/G aft about $\frac{1}{4}$ in., but don't overdo it or some of the other stunts may begin to offer trouble. Inside loops are much tighter if command is held, but can be opened up by pulsing."

"For inverted flight, just roll to inverted position and tap on a few short blasts of down-elevator to maintain nose attitude, hit another down and hold for a second, then roll out with those trusty ailerons."

"True spins can be a work of art with the Astro. Just as in a real ship, apply some up-elevator to produce a stall, then ciam on up-elevator and full rudder and hold (good old simultaneous control). The Astro will enter the spin quite rapidly and gyrates at a constant rate. Spin recovery is fast and she drops out with no hesitation after the controls are neutralised. A few taps on the elcvator will bring the nose up to level position; now, hit full aileron and watch her do one nice victory roll on the way back up. This is real flying!"

We feel sure that these comments will swell the ranks of multi enthusiasts and mention that in spite of its size Astro Hog costs only £3 in the way of materials for the entire airframe, plus dope and wheels, etc. Which means that the total model cost excluding engine would not be more than £5.





Full size three-sheet drawings are available from A.P.S. price 15/- post free complete with detailed building instructions

Quote Reference R/C699

