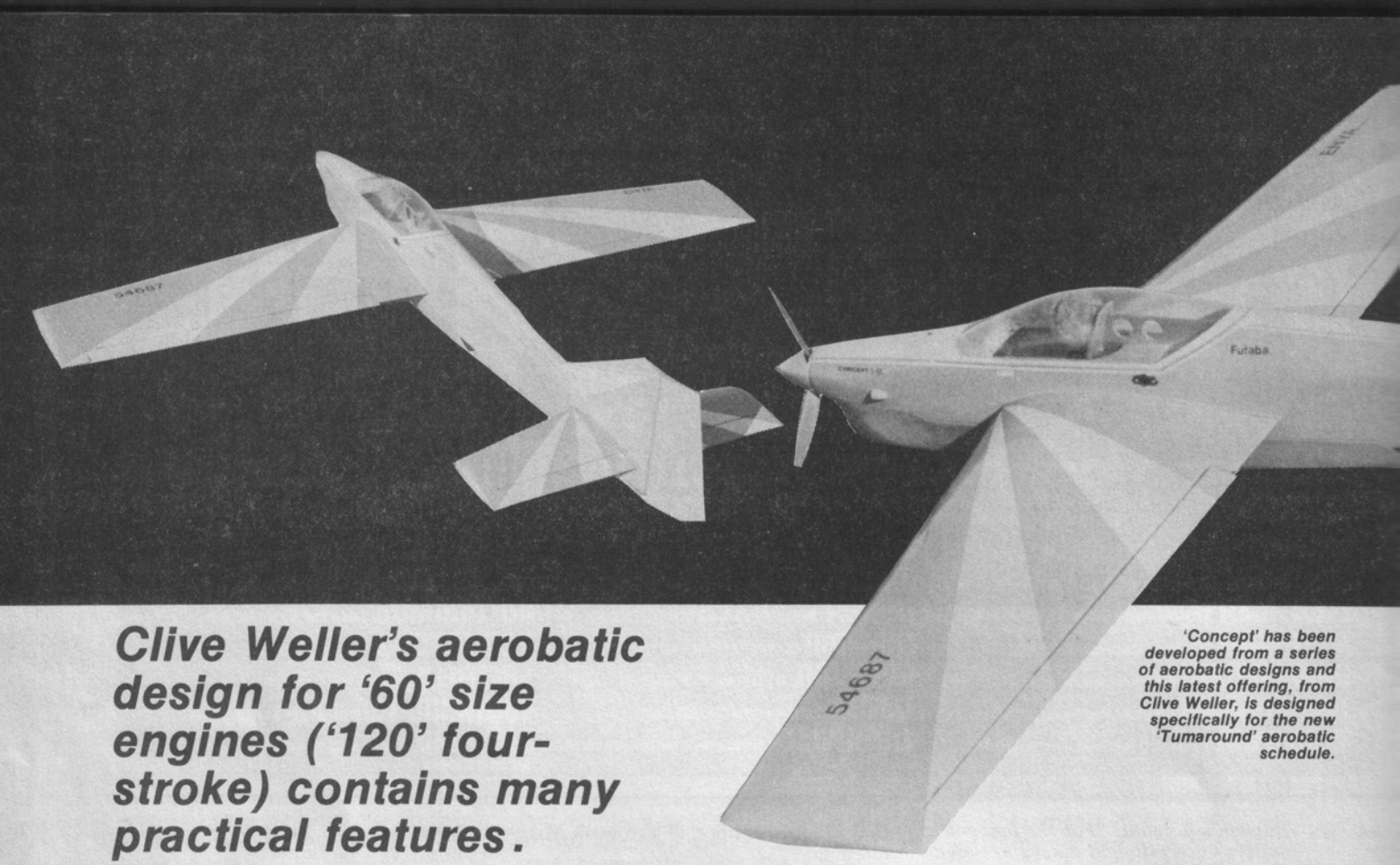


'Concept' has been developed from a series of aerobatic designs and this latest offering, from Clive Weller, is designed specifically for the new 'Tumaround' aerobatic schedule.

Clive Weller's aerobatic design for '60' size engines ('120' four-stroke) contains many practical features.

Concept 5-84

-for the new FAI 'Turnaround' schedule

When the Turnaround Schedule was introduced for use in 1984 most regular competitors were undecided as to what type of model would be best suited. During the journeys to events in 1983 fellow competitor John Thompson and I had many discussions about the design of aeroplane. Having decided on the dimensions required I sat down and drew "Concept". As the aeroplane was going to be on the large side I elected to use plug on wings to make transportation easier. The engine and tuned pipe are cowled, to help keep noise down, but the cowl is in one piece and maintenance is easy.

The cockpit area is removable for access to the fuel tank and radio equipment. To reduce engine intake noise I used a rear carb engine which is also rear exhaust, but the cowl will also take a front intake motor. I have tried a '120' 4 stroke, which will go inside the cowl if a hole is made in the bottom of the cowl for the top of the head to protrude.

Let's get on with the construction, other points will come up as we go along, I will not give a stick part A to part B detail as if you are building this design you will already have built and flown a number of aircraft.

The number one rule is to keep the weight as low as possible, light wood and glue kept to a minimum.

Tailplane

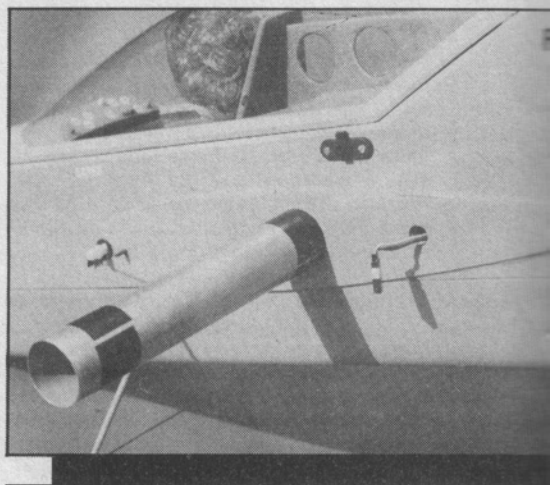
The tailplane is of conventional construction, the ribs are made by the "sandwich" method and each half is made flat on the building board, packing under the rear spar. The elevator is built as part of the assembly and, once the two halves are joined, they are cut out and faced as shown on the plan, this helps to reduce weight. The joining of of the tail halves is carried out with the top surfaces flat.

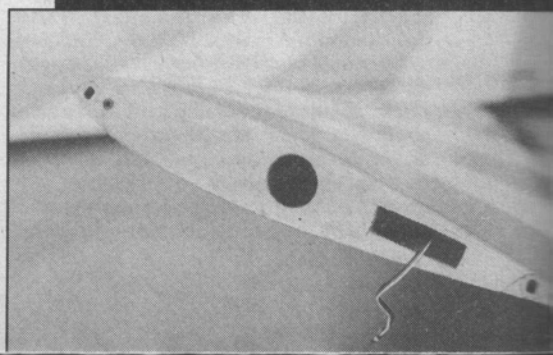
Fin and Rudder

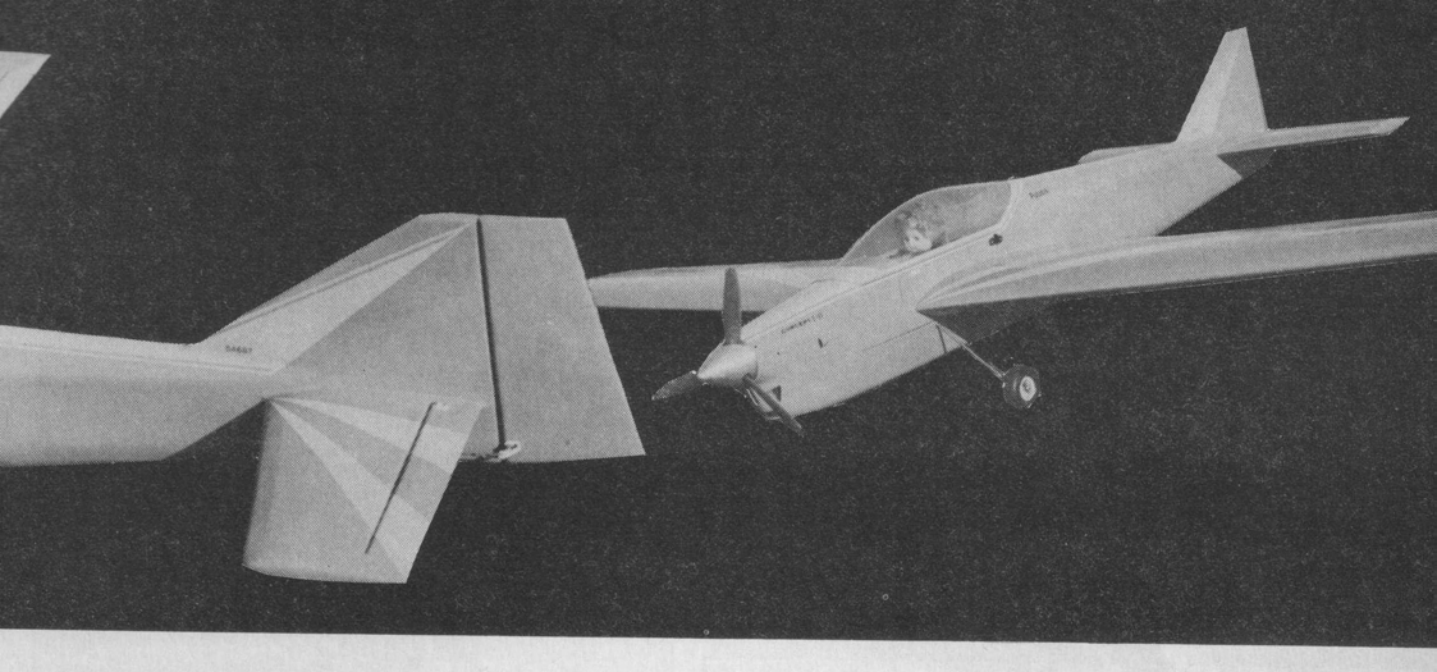
Assembly of the fin and rudder are straight forward, keep both straight and true and as light as possible.

Wings

As I said in the introduction, the wings are removable and are mounted on an aluminium tube which fits







through the fuselage, they are retained by either a "key hole" type glider wing retainer, with an elastic band, or Camlock retainers shown in the photographs. Metal pins prevent the wings from rotating on the tube.

The wing ribs can be made by the "sandwich" method, a vertical line is marked on the inboard end rib which passes through the centre of the tube mounting hole and is at right angles to the ribs centre line. This line is transferred across the top and bottom of the ribs through which a large wing tube will pass and a vertical centre line is drawn down these ribs. (Sounds involved but can be done in the time it takes you to read). You now have the horizontal centre line of the tube mounting ribs.

Measure down from the top of each of these ribs to obtain the tube centre point on the vertical line, (the top of the wing is flat) draw the tube hole on these ribs. Cut the holes for the plastic or resin paper tube which will slide over the aluminium fuselage tube.

Cut the ply and balsa sub ribs using the wing ribs as templates.

Assemble the wing upside down on the building board with the wing tubes in position and glued in, *do not add* inboard face rib yet. Sheet the bottom of the wing and then cut servo access plate. Sheet top of wing, the ailerons are cut out and faced — as with the elevators — do remember the hinge blocks. Add tip blocks and sand.

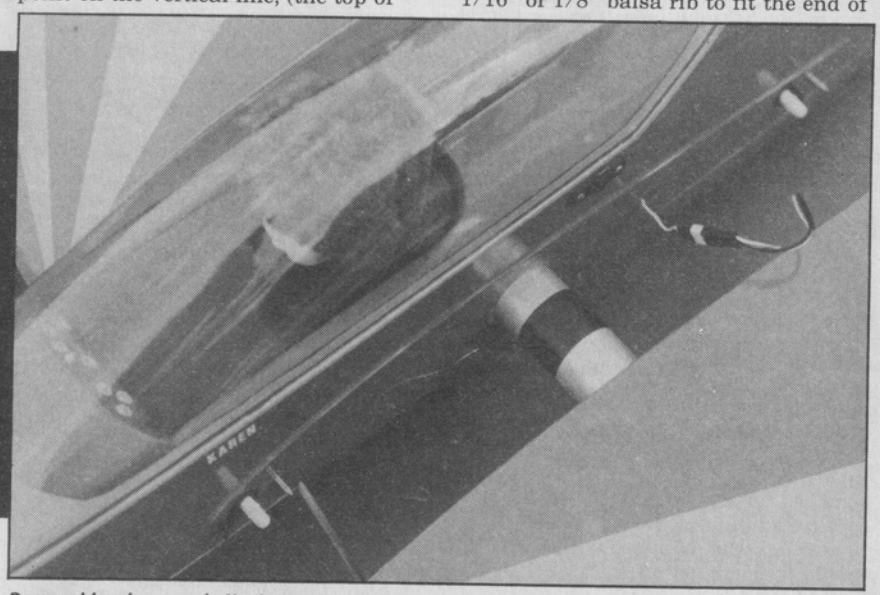
Fitting the Wing to the Fuselage

Once the fuselage is finished mount the aluminum tube across the fuselage and slide on the wings, it should fit snug against the fuselage, if not cut a 1/16″ or 1/8″ balsa rib to fit the end of the wing, this is sanded to obtain a good fit using a block. Glue this and the ply face rib in position on the wing end (with a piece of thin plastic film to prevent contact gluing it to the fuselage).

With the wings at 0° to the fuselage centre line, mark through from the *inside of the fuselage* to the forward and rear wing locating pins position, the servo lead and wing retaining holes.

Drill and fit plastic tubes (Sullivan push rod outer) into the facing rib and block behind at the positions of the wing locating pins.

The wing and tail could be made of foam if this is more convenient, but they must be as light as possible and ply wing tube sub ribs must be fitted at least 6" long at the inboard end, as on the built up wing.



Removable wing panel attachment is well illustrated in these photographs. Camlocks can be used as an alternative for wing retaining. Note the short pianowire wing positioners projecting from the fuselage plywood facing rib. Aluminium tube wing joiners are available from the designer - see Classified advertisements.

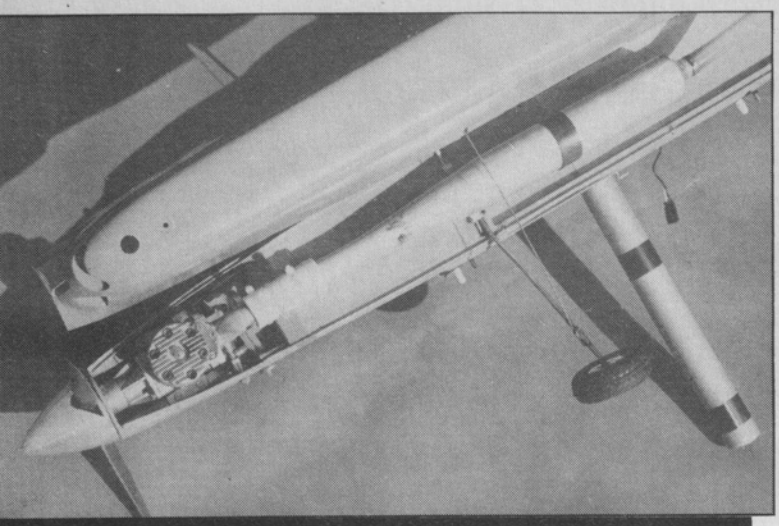
Fuselage

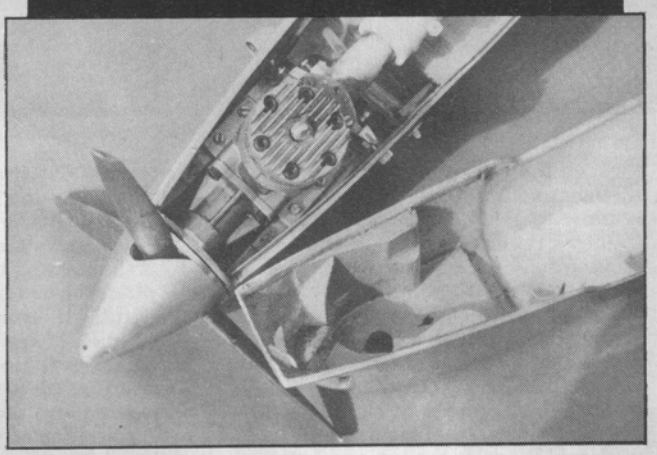
The fuselage follows a fairly conventional construction with 3/16in. sides with ply doublers and formers with 3/16in. planked over the rear section and block around the nose, to help damp vibration. In this aeroplane I discarded the usual cast engine mount and went for a hard wood engine plate with 1/8″ steel plate epoxyed and screwed on, then tapped the steel for engine hold down. The advantage with this arrangement is it gives a more rigid engine mount.

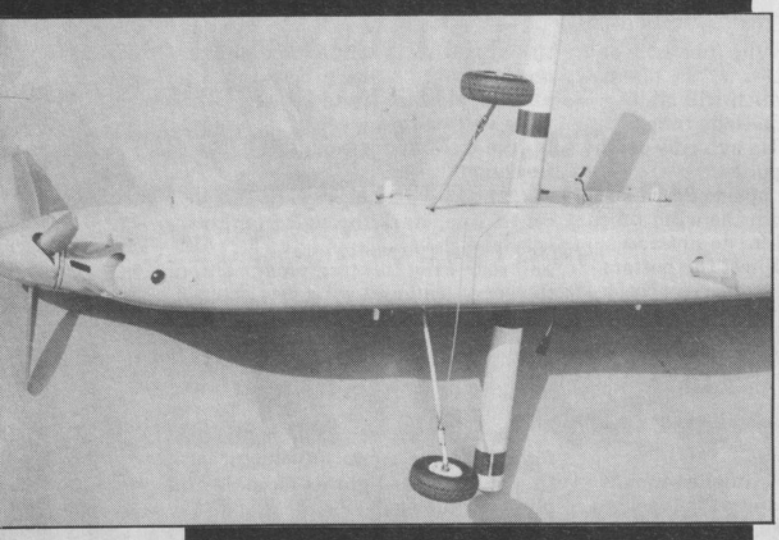
The cockpit area is removed to give access to the upper fuselage for tank and radio equipment. The amount of space inside is increased because the wing does not pass through the fuselage and the floor of the upper compartment isolates it from the engine/pipe.

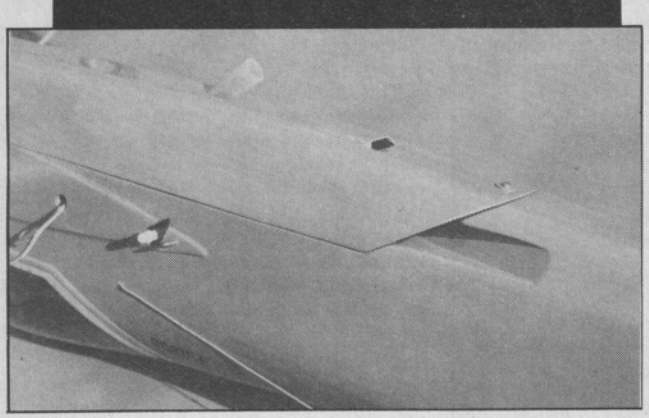
The engine and pipe compartments have a removeable cover, also the undercarriage is mounted in this area and is of the torque type.

The cowl/cover is made from wood planking and blocking and the inside of the cowl is shaped to force the air to cool the engine correctly. A glass fibre



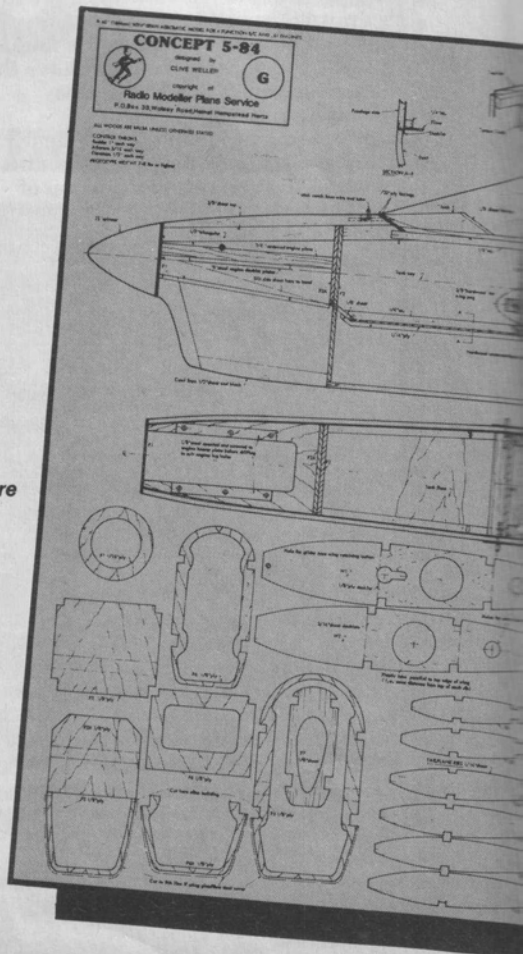






Illustrations above show the clean lines of the fuselage with the rear exhaust engine and tuned pipe fitted. Note the internal contouring of the bottom cowling to ensure the maximum air flow over the engine cylinder head. The fixed under-carriage eliminates the need for an extra servo and simplifies construction – it is barely visible in flight.

Full size copies of the plan, shown in reduced form on the right, can be obtained from MAP Plans Service, Wolsey House, Wolsey Road, Hemel Hempstead, HP2 4SS price £4.35 plus 55p postage – order Plan No. RM 282 Canopies are also available, price £2.75p plus £1.40p postage.



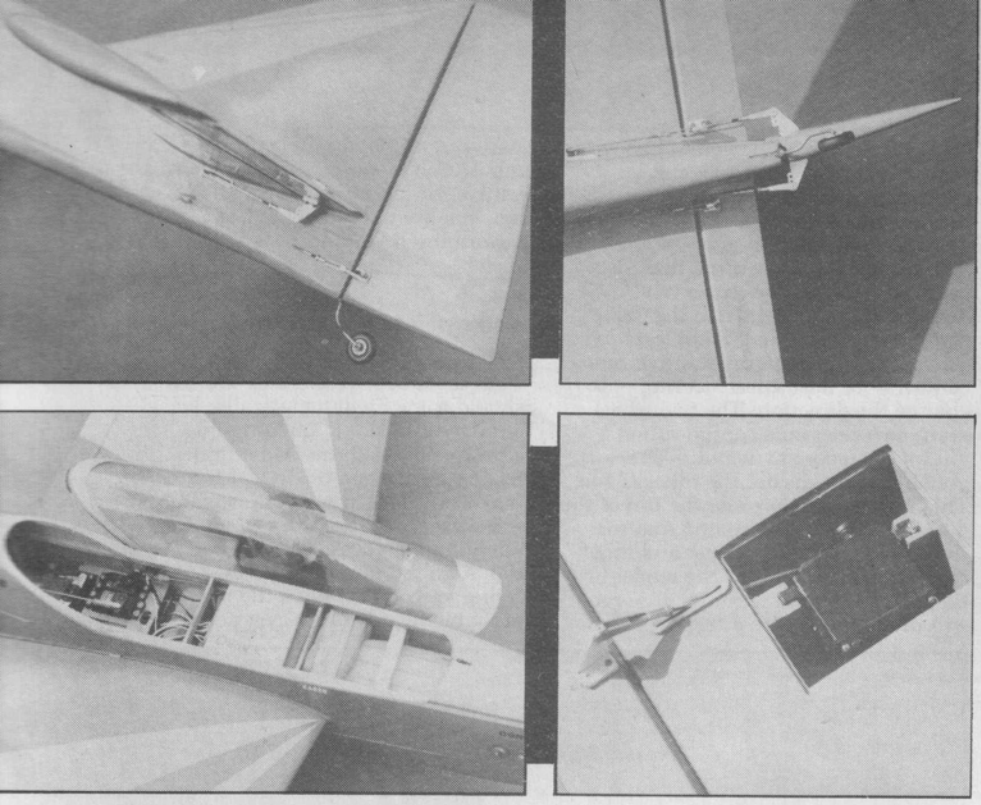
cover/cowl is also available and makes building easier, although this must be shaped inside and formers fitted. A strip of 1/8in. hard balsa wood must be added to the edge to ensure it holds its shape.

When John Thompson built his version he made the cowl and cover separate. The aluminium tube passes through the fuselage and fuselage treblers are fitted, also a piece of the tube used in the wing can be let into the sides for exterior strength and a cleaner looking hole.

The wing locating pegs are screwed or glued into the hard wood block once the wings have been located and are made of wire, or bolts with their heads removed. If you wish to use the camlocks to retain the wings the instructions are supplied with them — except they are mounted the reverse way round.

Finishing

In order to keep the weight down film covering can be used on the wing, fin/rudder and tail, although, providing



Twin elevator horn connections are used on the 'Concept' to ensure equal movement of the elevators, the rudder is operated by closed loop cables - by far the most efficient and positive linkages. Separate aileron servos are used, making the wing panel joining easier and giving a safety factor if one servo should fail. The removable canopy hatch allows good access to the servos, receiver and fuel tank.

one keeps in mind the weight, the conventional dope/tissue can be used.

The fuselage is stronger with a doped finish, followed by a coat of paint, then all the surfaces which are painted should have a coat of fuel proofer applied. I use Tufkote.

Installation

Wing servos are fitted to ply plates in wing access panels and the servos are connected, through outlets, to horns on the ailerons, a simple sheet cover is made and I held mine in place with clear tape. A "Y" lead is used to connect the two servos.

A closed loop system is employed on the rudder as it is simple and easy to install. For the elevator a push rod with connections to each side where a horn is mounted on each elevator.

All up weight 7-8lbs. or lighter
Movements — Rudder 1in each way
Ailerons 5/16in each way
Elevators 1/2in each way

Flying

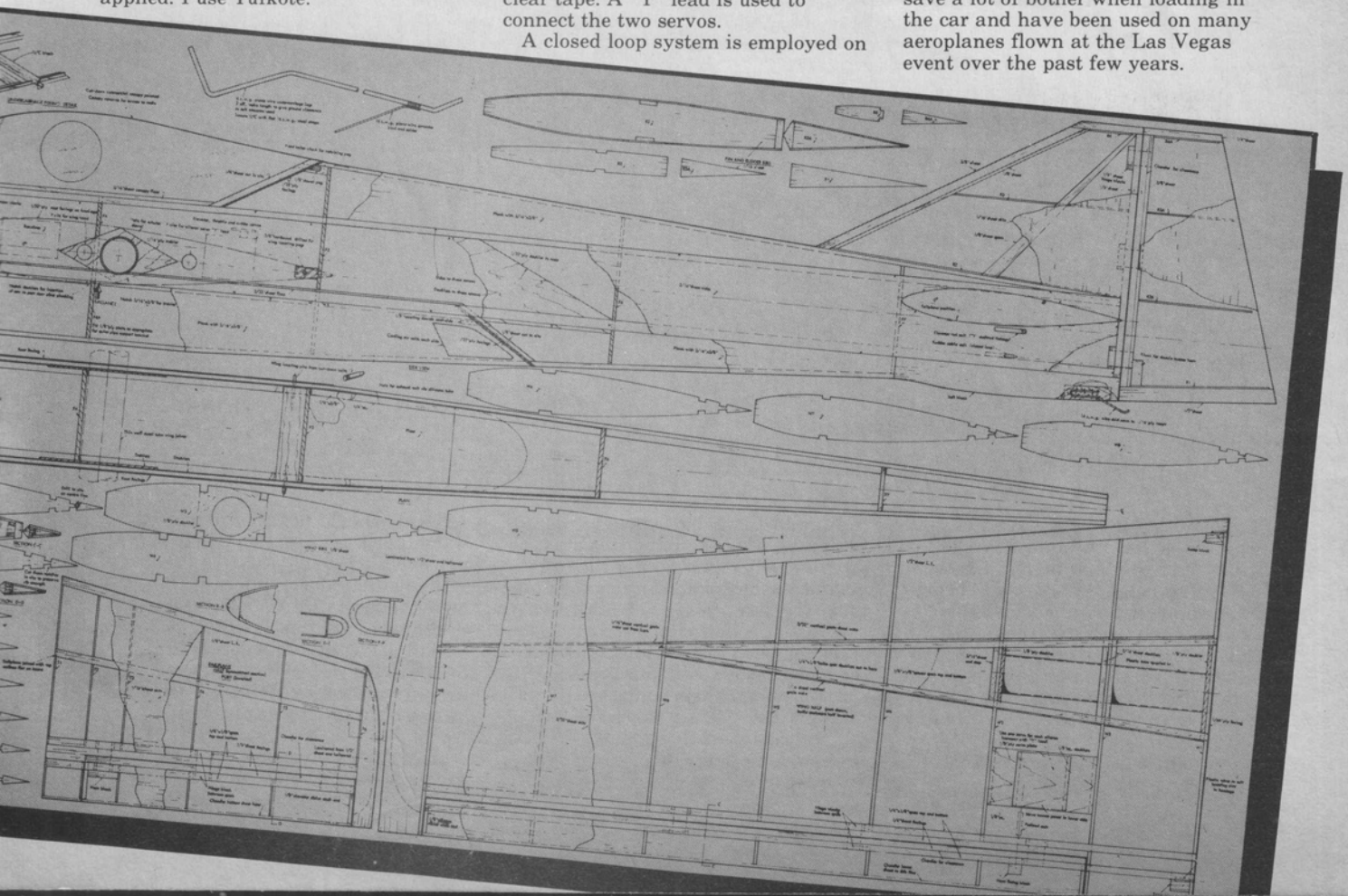
Flying will present no problems but remember this is a tail dragger and you should wait for the tail to rise before pulling on up-elevator.

Control response is good, knife edge flight in four point rolls need just a touch of rudder.

All manoeuvres can be flown with ease and the speed is fairly constant, very little elevator has to be used in level inverted flight. Turning tight corners and small looping manoeuvres have to be seen to be believed but be sure you make a good job of the wings and mountings if you are going to do many of these, as the load must be high in these violent manoeuvres.

This then is "Concept 5-84", you may notice that in the photographs the model shown has 6-84 on the nose, this is the same as 5-84 but this version has the glass cowl/cover and was being built when 5-84 was written off — following what was thought to be a bird strike.

I hope you enjoy flying this manoeuvreable but well mannered aeroplane as much as I have. Do not be put off by plug-in wings as they save a lot of bother when loading in the car and have been used on many aeroplanes flown at the Las Vegas event over the past few years.



CONCEPT
-exciting new style aerobatic model