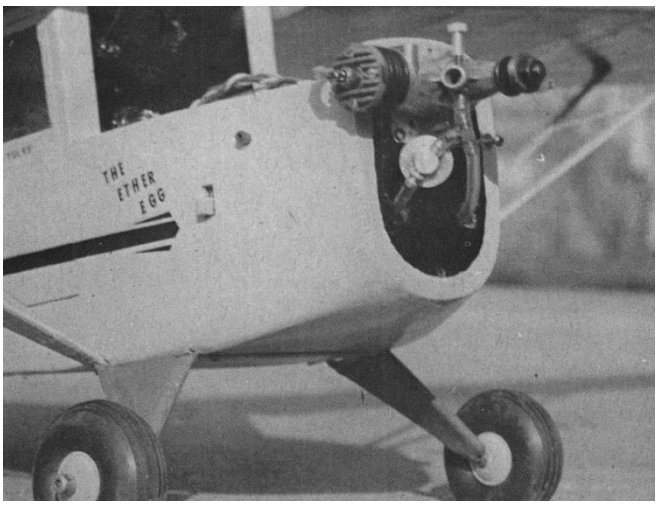
Aeronca K



Noted husband and wife modeling team, Ed and Doris Yulke, worked out this 1 3/4" to the foot scale model of a sturdy old plane which makes a perfect radio control job. Various R/C rigs will fit.

Twenty years ago (when the male member of this husband and wife modeling team was helping design the Luscombe Silvaire in West Trenton, N. J.) our flying club's "official" craft was an Aeronca C-3 "Flying Bathtub." About to spend one lunch hour upstairs in the 'Tub', we noticed a trim cabin ship settling down on the field. In those days, any airplane that was the least bit unusual drew the entire seven-man engineering department like a magnet . . . particularly since we were designing a two place cabin job, the first all metal production light plane.

The first "whatizzit" thrown at the pilot drew a proud "Aeronca K" from him. As things progressed, we found ourselves taking short hops, one at a time, around the field. The ship had a graceful yet "solid" feel to it, unlike most light planes of the late Thirties.

We admired it, noted the two cylinder single ignition Aeronca engine, boasted that our Silvaire would have the NEW four cylinder flat twin ignition engine of FIFTY horsepower! We hadn't flown the first "50", didn't fully realize that the extra weight of all-metal construction would more than eat up the difference between the Aeronca's 36 hp and our 50 and that our ship would have a "solid" feel bordering on being sluggish!
We saw "K's" around for several years, but it dropped from our thoughts until two years ago we were nosing around to find a suitable subject for an R/C scale plane. Wading through piles of plans, a ritual with any modeler who's been in the game for a while, with us is a disease.

We came upon a Megow rubber scale model of the Aeronca "K"—that did it! The discussion about the equipment she should carry as a radio job waxed hot and furious, until we narrowed it down to what the ship should be expected to do. We finally decided that right-left rudder, up down elevator (but not for full stunt), two speed engine control and engine cut off was required. This was before the advent of the A.M.A. Scale Event rules, but we felt even then that to require an exact scale job to do outside loops was ridiculous. The initial rules for the event have borne out our thinking. To fly any ship in the wind, it must be trimmed out fairly flat, hence elevator might be required for take-off. To be able to take off requires full power, to fly the pattern requires somewhat less power, hence the two speed set-up. To be able to cut the engine in the event of trouble and to bring the plane down where wanted was important, hence the cut off.

What size to build was the next question. We both like small airplanes, but the 1 1/2" to the foot scale first discussed was too small if four escapements were to fit into the cabin. When we went the other way 2" to the foot seemed too large with a 72" span we knew weight would go up as size did. Rough layouts at 1 3/4" to the foot seemed just about right.

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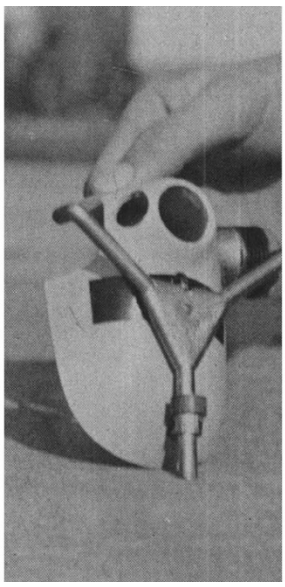
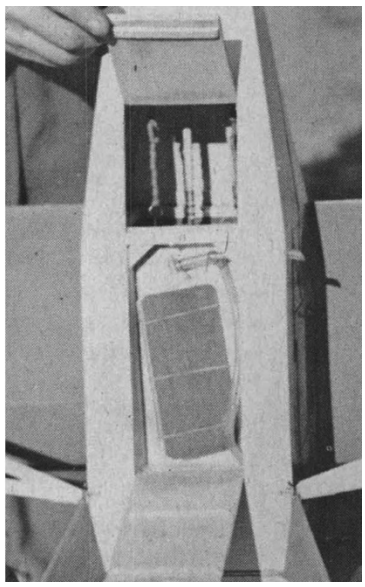
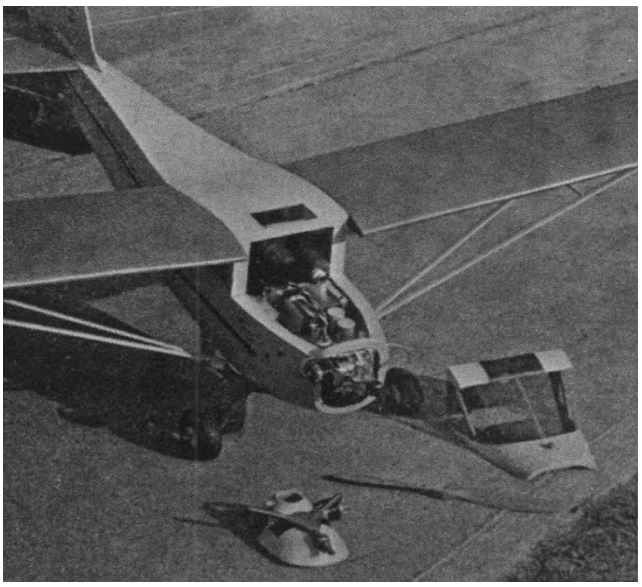






This came out at 63" span we figured a Torp 15 would do the job nicely with 55 to 60 ounces of weight.

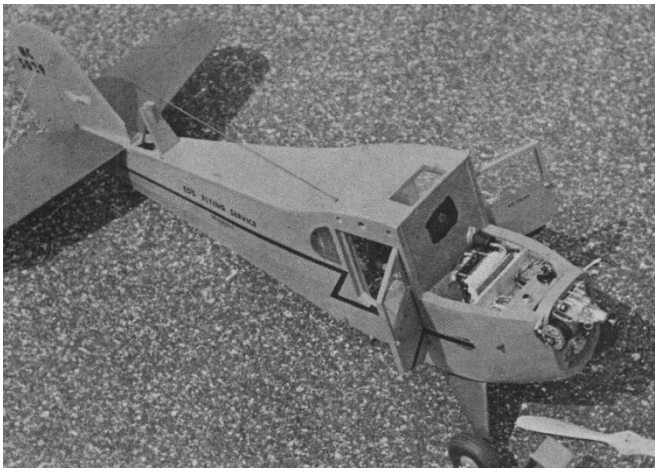
About this same time, cascaded escapements were being “wrung out” by West Coasters. We also liked the idea of the two channel, simultaneous feature of the then new Babcock 465mc rig. Since we had decided to build at least two airplanes, it was simple install one system in each. Doris, edgy of punching 4 for down, 5 for cutoff, preferred the 2 channel for its simplicity, Ed was curious about the cascaded deal.

From our experiences to date, we can point out that the 2 channel is the simplest to operate, particularly for flaring the ship off, close to the ground, with “up” elevator. Up can be held on the Babcock job, with right and left still available. The only part of the cascaded deal that is faster and simpler is the “quick blip” engine control instead of dialing 3 on the rudder of the Babcock job.

Here is something we hadn’t thought of until this article was being written the Babcock receiver is wired for the back contact on the relays. That lead on the rudder relay, pin 4 on the plug, could be used with a “quick blip” contact added to the rudder escapement, just as in the cascaded deal!

The importance of fast response to the engine control can best be illustrated by our experience at the field one day. Cascaded job #5029 was up and in low motor. We horsed it around until it swung low, near the car, gave it a quick blip and she literally “took off” from 5 feet up. Seemed so interesting we spent the rest of that flight and several more doing just that, letting the ship settle down to about 5 feet off the top of the weeds and then letting it buzz off again. Looked realistic as the devil.

(Additional instructions will appear on the full size plans available from Hobby Helpers.)



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Let's go back briefly and relate what lead to the airplane design as finally built. The structure of any scale job presents a problem, since balsa wood is bulkier than the materials used in the full sized plane. This shows up mostly in the fuselage around the cabin. If realism was wanted, a one piece wing was impossible. We investigated every possible way to have a one piece wing held on with the rubber concealed, yet not end up with a flimsy windshield or bulky balsa structure. Finally we obtained realism with two wing panels just like the real ships.

The wings themselves were no problem, though at first we had one hook halfway between the dowels, each panel. Flying that way was a bit scary, since the front of the wings could be pushed back quite easily. When we switched to hooks on the dowels, used two 1/4" wide rubber bands on the front and one on the back set of hooks, our problems were solved. We've …ver had a wing pull out or even ship the air.

One thing we will confess to despite our engineering experience we underestimated the load on the strut fittings in the wings, particularly the front one. On one early flight, after dialing 4 for down and holding the ship in a 45 degree dive, we let it snap out and the model sort of jumped, then veered off to the right. Not realizing what had happened, we swung the ship around for another dive. This time she twisted to the right on the way down. Realizing that something was amiss, the engine was chopped and she was brought in as gently as possible.

The front right strut fitting was pulled out of the wing structure under the load of diving it twisted to a high angle, causing drag on that side! The jump at pull out was when the fitting let go. The original fittings in the wing were brass control line hinge halves with the points bent into the balsa rib and liberally coated with glue. Believe us when we say that a plywood rib, with bolted on strut fittings is a must!

That lower wing strut fitting has proven practical and never given us trouble on either model. The wire must have that reverse-twist so the struts can be tight enough to snap on over the landing gear. There should be a definite snap action in putting struts in place. We tried leaving the upper ends of the struts free to slip out of the fittings, but this proved unnecessary. Small washers now hold the struts on the wings they fold flat against the wing for ease of transportation. This meant leaving out the small jury struts from the main struts up to the wing, but they would only cause damage if the wing tried to come off in a "hard landing."

When we considered built up tail vs solid sheet balsa, all were in favor of sheet balsa surfaces. The small amount of additional weight is more than offset in ruggedness.

Having established what we wanted the way of wings and tail, the fuselage came easily. Without a one piece wing to contend with, the sport type "lift off the whole nose" technique fitted in beautifully. When something needs checking on this job, we can strip the airplane down in two minutes flat! Quick access is an asset on an R/C job.

That one piece wire latch sticking through bulkheads F4 has drawn amused glances, but we've yet to have a cowl come off in the air. Doors open so we can get our fists into the cabin to hang on the wings. A rubber band between the doors keeps 'em closed, allows them to be opened . . . just don't get your nose too close when you let go. They snap shut!

To wind the escapements either some sort of plug with a winding loop sticking out or an access hole through which you grab the rubber off an internal hook is the rule. Our escapements are located so the rubber from the compounds (requiring winding almost every flight) is held at the rear for instant access. A hatch is held closed by the wound-up rubber. The small piece of fin acts as a land for the hatch.

At this point we'd like to advise against cloth hinges. Repeated opening and closing is sure to cause trouble; why use half-way measures? Thin brass tubing with .032 wire running through and bent over at the ends will last longer than the airplane.

The Walker fuel tank and regulator has been on 12 R/C airplanes we've built; the tank always goes down

in the “bilge” where it’s out of the way. Spillage during refueling drips off the structure instead of soaking into it.

Only requirement in using the Walker system is that the regulator be as close as possible to the engine. The tank can be in the wings or tail. The tank hatch makes replacing the rubber bands around the assembly a cinch, even on the field.

Getting to the back of the escapements to replace rubber is usually a headache. That bottom hatch just behind the tank takes care of this. These two hatches are held closed by a simple rotating latch cut from tin can stock or made from two soldering lugs folded flat and held to the fuselage by a wood screw coated with glue to keep it from turning.

Looking at the fuselage at this point, we decided something had to be added to hold the thing together. While the 1/16 plywood panels along nose from fire wall to cabin back might seem a bit heavy, this job has weathered pretty rough treatment, including the nose hitting the side of a deep rut in landing almost dead on during a down wing approach. Wings came off, cowl, too, the engine had a throat full of sand, but there was nary a crack anywhere!

Another occasion when “structure beef” in the Aeronca proved its worth we were flying various props one size seemed to pull the nose down. When we chopped the throttle, tried for "up” in landing, got “down” and the ship came apart in a heap. While it looked like an odd assortment of parts, it was together again in a few minutes and ready to fly. One “refinement” we recommend fiberglass the nose cowling, landing gear legs and under side of the nose. We gradually came around to that.

In building the sequence to follow is sides first, from the 1/4" square along the outside of station F4 back the tail, cut out plywood panels along the hatched lines in the side view and when the fuselage sides are dry cement these panels to inside suriace of each side. Be sure to lay the sides over the drawing when doing this, since you may have slipped a little bit on the outline and you want the nose to come out square with the rest of the fuselage.

The rest is just as simple. Add the rear landing gear strut and fittings to bulk-head F4, draw the bolts up snug and coat both nuts and bolt heads with cement. Add F4 bulkhead and two pieces of 1/4” square across the back of the cabin to hold the fuselage square like a box and you can start throwing pieces at the cabin area right and left.

Simplest seque would be the two formers F5 at the bottom, the 3/32" thick sheet balsa floor to give the structure a bit of rigidity, then the cabin roof of 3/16" sheet. Moisten the outside of the 1/16" plywood forward of the F4 bulkhead several times to make it easy to bend and add F3, F2 and finally the firewall F1 with rubber wound around to hold it together. If the cabin structure is allowed to dry thoroughly first, there should be little difficulty. The section aft of the cabin can be assembled while the nose is drying out. The top of a furnace is an excellent glue dryer!

When dry, finish the nose by planking the outside of the plywood with 1/4" x 1/8” balsa vertically, add the 3/16" and 1/4" sheet inside and top the nose sides off with the plywood rails, FR making sure that the surface is glue is scraped off from the planking operation and plenty of glue holds the rails on. Since there be end grain to attach to, coat the balsa with glue, then the plywood, let both stand for several minutes then coat the balsa again and press in place. Lightly glue the nose block in place, make up the three piece cowl block and tack glue that.to the plywood rails and cut out the plywood piece F4c.

At this point cut out the top window in the cabin. With spring type clothespins, clamp F4c in position on F4 and build up the windshield structure oi dowels as shown on the plans. Make every piece fit tight and when you’re finished, the spots of glue on the rails can be broken and you’ll have an exact fit on the fuselage. Don’t remove it yet, however, since the best way to match contours is to sand the whole fuselage as a unit, then separate the completed pieces. Add all the hatches, the sheet balsa on the bottom alongside the hatches, but leave off the stringers. Add the balsa

blocks at the bottom of the nose from F1 to F4 and 3/16" sq. balsa along the insides of the cabin at the rear of F6.