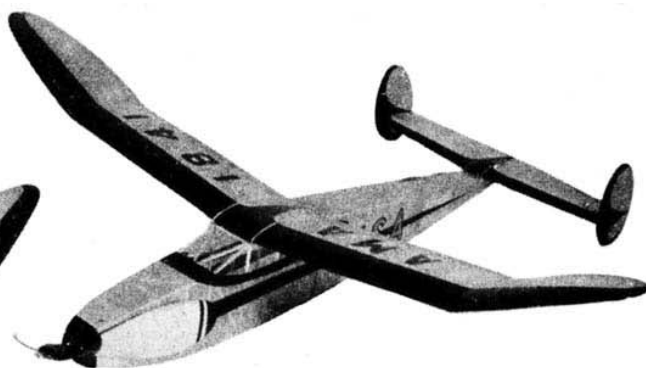


# THERMAL CHASER IV



This twin-tailed beauty should do well for you in the '51 Wakefield Eliminations. Full-Size Plans!

by Earl L. Cayton

• This Wakefield model is simple to build, easy to fly, and well tested, the first model in this series having been built in the fall of 1940. The construction is that of a typical American slab-sided "box" which has been tested and found worthwhile by such out-standing experts as Korda, Lanzo, Reiche, Nelder and others.

On the performance side of the ledger, the Thermal Chaser IV certainly is no "clunker"—it out-climbs most gas jobs. A good portion of the climb is straight, up and, in dead air, the ship turns in consistent 3-1/2 minute flights.

The 1951 Wakefield Eliminations are not very far off, so grab that beat-up razor blade and battered tube of cement, and let's start construction. The plans are drawn full size so you can begin as soon as you've gathered together

the necessary materials. Note that, to conserve space, the stabilizer had to be superimposed over the wing plan.

Use medium balsa throughout except for the longerons, leading edges and nose block, which are very hard balsa. Use pine for the fuselage cross pieces and the cross piece holding the landing gear.

**FUSELAGE:** The fuselage is a simple "box," so merely construct two sides of 1/8" square strips one over the other, split apart, and then cement in the top and bottom cross pieces. Carve the nose block from hard balsa.

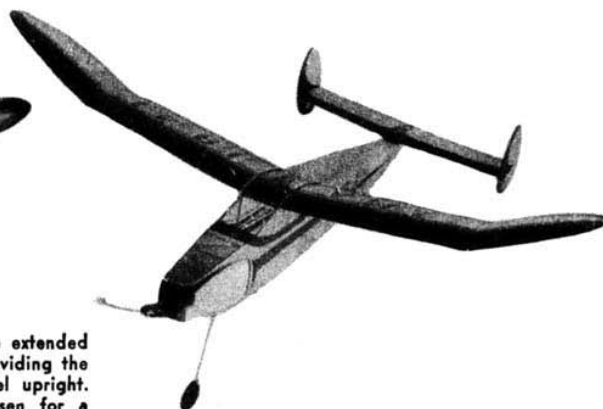
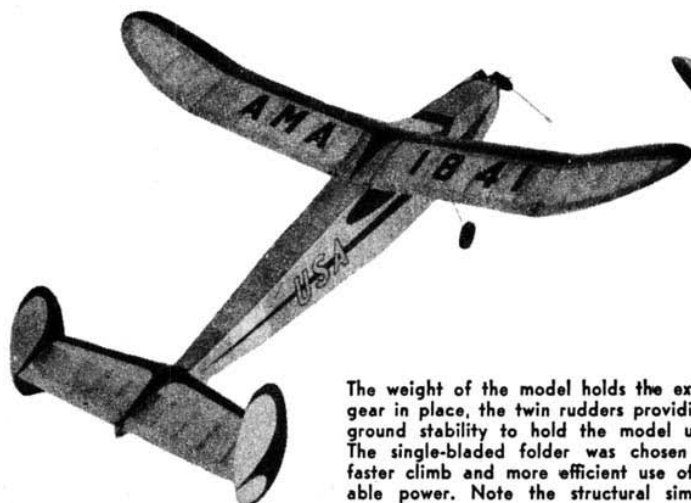
Next, install 1/16" sheet fill-in at the nose sections and around the rear motor anchor. The rear motor anchor consists of a piece of 1/4" I.D. aluminum tubing.

For winding the rubber motor, the fuselage is held by a piece of 1/8" landing gear wire which is

inserted through the tubing. In this manner no strain is put on the fuselage during wind-ups. This is a very good kink that we learned from our very good friends Chuck Hollinger and Hank Cole years ago.

The retractable gear is not difficult. The weight of the model keeps the gear extended. A rubber band snaps the gear up after takeoff. Actually, the model has such a powerful initial burst that it hops off the ground without any run whatsoever.

Use 1/16" wire for the gear and carve the wheel from 1/4" sheet. Use 1/16" I.D. bushings for the wheel bearings. Sew the 1/16" I.D. pivot tube to the pine cross piece and cement well. Bend an anchor clip from a common straight pin and attach the rubber band for retracting power. Fill in the section where the wheel retracts with 1/16" sheet. Leave just a large enough hole so that the wheel will fit snug and not allow the entrance of grit



The weight of the model holds the extended gear in place, the twin rudders providing the ground stability to hold the model upright. The single-bladed folder was chosen for a faster climb and more efficient use of available power. Note the structural simplicity.

**WING & TAIL:** Lay out the simple wing and elevator using 1/8" strips for the leading edges, 3/4" x 1/8" for the trailing edges, and 1/16" sheet for the ribs. Cut the wing tips and elevator tip ribs from 1/8" sheet.

The elevator has a 1/8" square spar and the wing is spar-less. Add gussets to the wing when the dihedral is put in. Planking comes last.

Cut the rudders from 1/16" quarter-grained sheet, Cut a tab in one rudder and use copper wire for a hinge. Cut the elevator platform from 1/16" sheet.

A pop-up tail dethermalizer is used. Common butcher's cord dipped in saltpetre is used for the fuse, 1" of it burning for approximately 1 minute. A "U" shaped hinge is formed from 1/16" wire. This hinge turns in a 1/16" I.D. brass tube cemented to the front of the elevator and bound with silk or gauze. The ends of the hinge slip into 1/16" I.D. brass tubes in the fuselage so that the tail may be removed for easy transportation.

A piece of string limits the elevator movement to a 35° negative angle. Use a slip knot on this string for easy removal.

**COVERING:** Sand the entire model thoroughly and then cover. Remember that the difference between a novice and expert is that the expert uses plenty of sandpaper. Enclose the cabin with celluloid. I used yellow, pre-war Silkspan on the ship. Light Silkspan was used on the wing and tail and heavier gas-model Silkspan was used on the fuselage. Dope the model with four coats of 50% thinned clear

dope and trim with maroon colored dope.

Use 1/8" square strips to key the rear of the elevator and the wing in position. This is important—too many free-flight models spin in because surfaces shift during flight. Also, the keying of surfaces eliminate the necessity of retesting the model every time the wing and tail are removed. Hold the wing and tail in position with rubber bands attached to straight pins inserted at junctions.

**PROPELLER:** The prop and tensioner is the point where many beginners at rubber-powered models foul up. It is imperative that the prop be carved properly to take advantage of the large rubber motor, and that the blade folds properly when the power is exhausted.

Mark off the prop on a 2-1/4" x 1-3/4" x 10" block. Drill the prop shaft dead center. Carve the bottom of the blade with 1/8" under-camber. Carve the top so that the airfoil is 1/8" thick half way out, and tapers to 1/16" at the tip. Sand thoroughly and cement Jasco folders into position.

Now, cut the blade from the hub and alter the hinge positions, if needed, until the prop folds flat and straight along the fuselage side. Next, attach the 1/16" wire counterbalance arm and install the 1/16" I.D. bushings around the prop shaft. Tension for the tensioner is furnished by a small coil spring. Sew hinges with counterbalance arm securely with a needle and thread.

Cover the entire prop, preferably with silk or Silkspan.

Five coats of sanding sealer are then brushed in and sanded down smooth with No. 400 Wet-or-Dry paper, using plenty of water. The blade is then simonized and waxed. The counterbalance is formed from a leader sinker, scraped until it balances. If the prop balances on one side only, then the counterbalance is not parallel with the blade. Keep bending the counterbalance up until the prop will balance in any position.

Use a B.B. washer between the prop and nose and a large Jasco bobbin on the front motor hook. A wood screw acts as the tensioner stop. Next slide a 1" length of 3/8" I.D. rubber tubing over the motor behind the bobbin to keep the rubber from bunching up around the front hook.

Our rubber motor consists of 12 strands of 3/16" Dunlap black rubber, 92" long. This is lubricated and wound backwards approximately 95 turns, then doubled for the necessary 24 strands. The rubber will then braid together, giving a pre-tensioned motor. If you prefer T-56 brown rubber, use 16 strands 92" long, doubled to form 32 strands, pre-wind before installation. The motor should take 800 turns. Seven hundred turns are plenty, though, for average flying.

**FLYING:** Any modeler who takes enough time and effort can build a nice looking rubber job but the secret of a good *flying* model lies in correct adjustments. This is the reason why many experts can come out to a flying field with an old model that's hanging together with pins. Scotch tape, rubber bands, and sheer luck and still walk off

with the prizes.

Make up your mind to take plenty of time and thought in adjusting this model. Try and pick a calm evening or early dawn for testing. (Yes, some darned fools, including the author, like to do their testing at sunrise!) First, try a few hand test glides. If the model stalls, decrease incidence in the wing by adding a 1/16" strip at a time under the trailing edge. If it dives, place a 1/16" strip under the leading edge. If the model should turn too sharply in either direction,

give it some opposite rudder with the tabs.

Once the model hand-glides to your satisfaction, try some low-powered flights—using about 100 turns of the motor. With the built-in right turn in the rudders, the model should normally glide to the right. If it should still glide to the left, better leave well enough alone and let it continue to do so. The turn under power, however, should always be in large circles to the right on a high-powered Wakefield like this one.

Once you have the glide down pat, never make adjustments on the wing or tail surfaces. This only sacrifices the glide for the climb. From here on out, adjust the climb only, by adding thrust adjustments behind the nose-block. Use 1/32" pine for thrust adjustments, adding one strip at a time. If the model loops or stalls, add down thrust. Add opposite side thrust if the model turns too tight in the climb.

### **BILL OF MATERIALS**

**(Balsa unless otherwise specified)**

- 1—1/14" x 3" x 34" (medium quarter-grain) Ribs and rudder**
- 2—1/16" x 2-1/4" x 34" (medium, straight grain)**  
**Elevator and wing planking, elevator platform**
- 2—1/8" x 3/4" x 34" (medium, straight grain)**  
**Elevator and wing trailing edge**
- 6—1/8" x 3/4" x 34" (hard) Longerons and leading edge**
- 10—1/8" x 1/8" x 36" (medium) Fuselage cross pieces, elevator spar, etc.**
- 1—2-1/2" x 1-5/8" x 1-1/4" (hard) Nose block**
- 1—1/4" x 2" x 6" (medium) Wheel, dethermalizer anchor, nose plug, gussets, etc**
- 1—1/8" x 3" x 18" (medium) Wing tip, elevator, tip ribs, gussets, and fill in**
- 1—1-3/4" x 2-1/4" x 10" (medium) Prop block**
- 1—12" x 1/8" x 1/8" (pine) Front fuselage crosspieces and cross piece holding landing gear**

Seven 1/16" I. D. bushings for prop, nose block, and wheel; 3" x 1/16" I. D. brass tubing for landing gear hinge, dethermalizer hinge; and dethermalizer anchor tubes; One 12" x 1/8" diameter steel wire to act as fuselage holder during winding; 1/16" plywood scrap for rear motor anchor reinforcement; Two Jasco lug-type folding prop hinges; Rubber tensioner spring; B.B. washer; 3/4" wood screw; 1" length of 3/8" I.D. rubber tubing; 92" of 3/16" Dunlap black rubber or 125" of 3/16" T-54 rubber; Lubricant; Celluloid; 1/4" dia. aluminum tubing for rear motor hook; Cement; Small lead sinker for counterbalance; 1/16" washer wheel retainer; Dope; Silkspan covering; Silk (optional) for covering of prep; Large bobbin; Sandpaper; One 36" x 1/16" diameter steel wire landing gear, prop shaft, elevator dethermalizer hinge, and counter balance holder.

### **FLYING MODELS**