

#909

■ Clark Salisbury



*Relax with this larger-than-average flyer*

# SkyCrawler



With a planform reminiscent of the French Demoiselle, the SkyCrawler is very easy to build and deceptively rugged. It's a great daily flier!

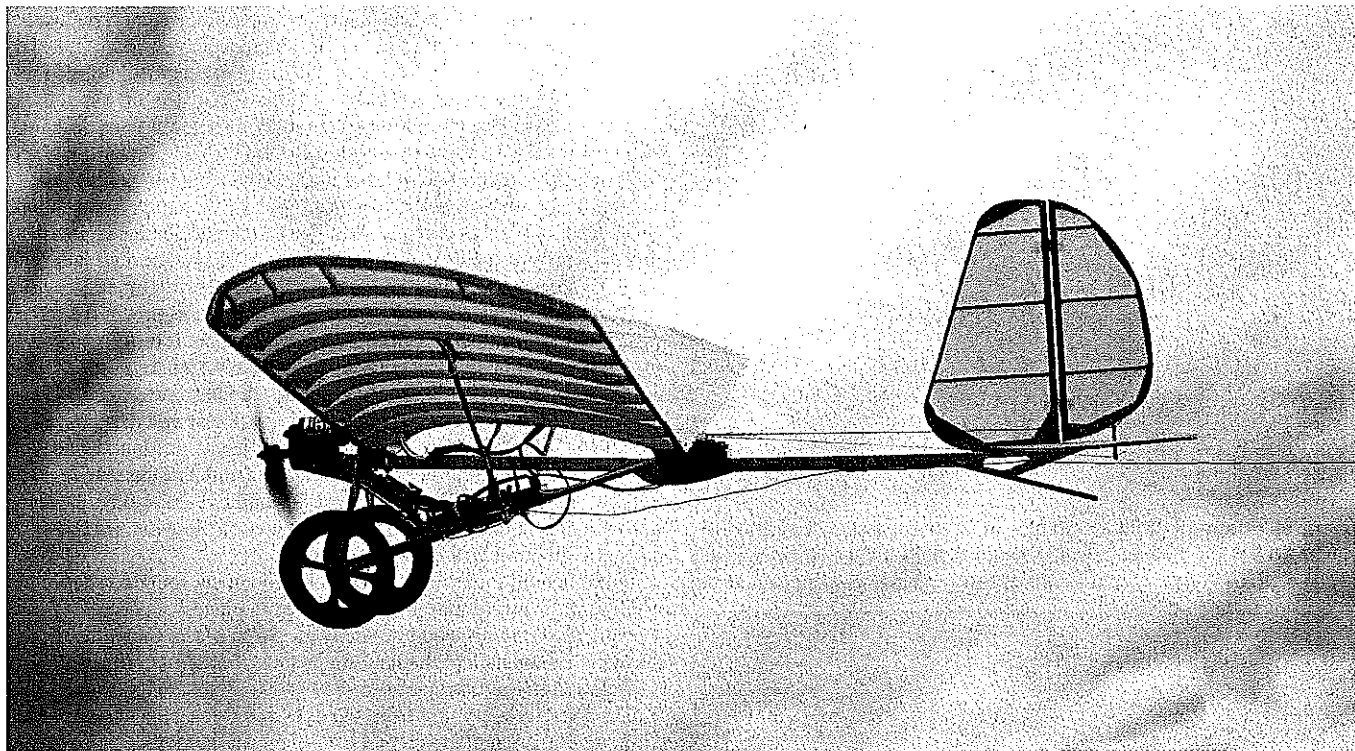
**BEFORE WE BUILD** SkyCrawler, I would like to share a few thoughts on coming up with this type of airplane in the first place.

I live in Cache Valley, which is located at 4,500 feet elevation in Northern Utah. We are blessed, for the time being, to be able to fly on an abandoned runway at our local airport. That situation may change in the future, and our club has been very worried about that possibility.

I decided to try a so-called "park flyer" to see what flying at a local park is all about. My experience was basically good; however, I wasn't satisfied with the total flight time so I started changing things, such as the motor and the battery pack, which greatly increased performance and flight time.

The basic airframe couldn't handle the extra weight, so I strengthened that. Then I ended up changing the wings and the tail, and a totally new model was born; I call it the SkyCrawler.

This airplane can take a light breeze, and it will climb as high as you want. I have an altimeter watch that weighs two ounces. I



The SkyCrawler model doing what it does the best: flying slowly and precisely, with a maximum fun factor!

Photos by the author Graphic design by Carla Kunz

strapped the watch on the model one time, and started it climbing. My watch recorded a 400-foot altitude gain.

The main word used to describe this airplane is "fun." I have flown it at more than 25 locations, all within five miles of where I live, and even Radio Control (RC) pilots who have flown Pattern airplanes and everything else imaginable love it, because it is so easy to fly and field setup is a thing of the past.

I even use this model when my wife sends me on errands; it fits nicely in the back seat, and I can stop at any park and fly for six to 10 minutes in the middle of the trip.

### CONSTRUCTION

All the pieces should be cut out with a scroll saw before putting anything together. Note that all plywood pieces are actually made from Lite Ply or poplar plywood.

Cut all of the wing ribs at the same time, after stacking sixteen  $\frac{1}{8}$  sheet balsa pieces together. Use a small amount of glue on the outside edges to hold the stack together.

Build the tail surfaces by laying all the pieces over the plan, pinning, and gluing, as with any conventional airplane. After these structures have dried, it is good to install the nylon hinges. Slot the balsa very carefully, since these surfaces are only  $\frac{1}{8}$ -inch thick.

Start the fuselage stick construction by gluing the firewall and the plywood engine mounts in place.

Glue the  $\frac{1}{8}$  plywood reinforcing pieces along the entire length of the fuselage stick. Make sure these parts are glued to the bottom of the stick, and notch the balsa stick, as shown on the plans, where the nylon battery ties hold the battery.

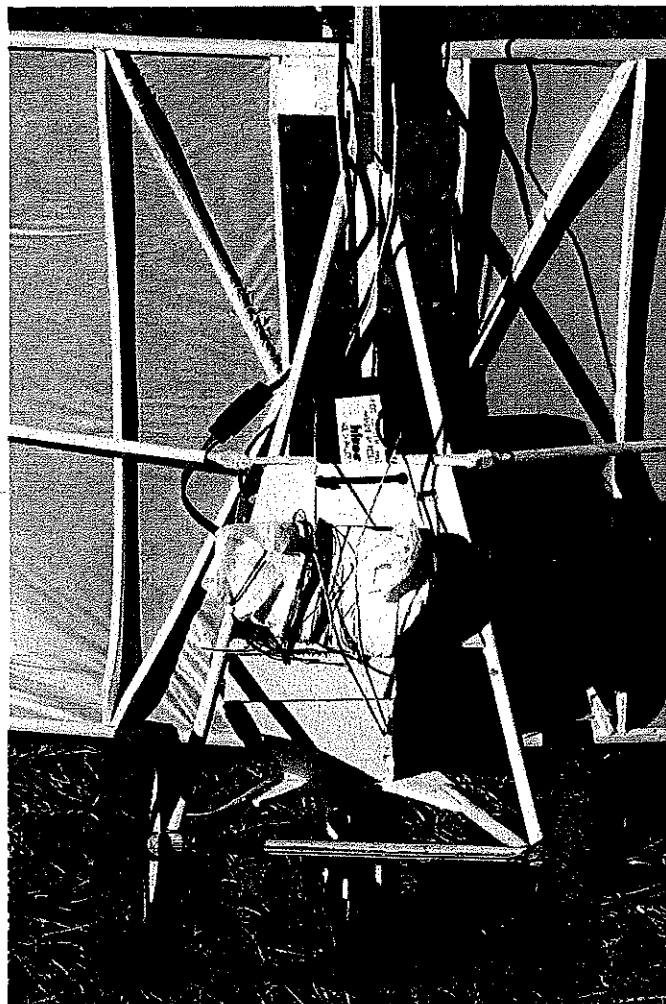
If you are going to do the parachute-drop option, this is a good time to glue in the  $\frac{1}{8}$  plywood piece that will hold the parachute servo.

Glue the tail skids to the back of the fuselage stick. Make sure the two-degree angle of incidence is held with respect to the fuselage stick when gluing these pieces in place.

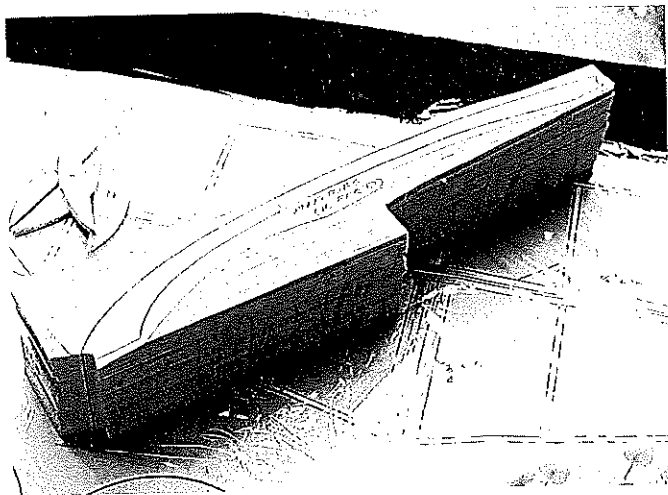
Glue a piece of  $\frac{1}{8}$  balsa to the inside of both tail skids, to help hold the vertical stabilizer in place. These pieces should be  $\frac{1}{4}$  x 2 inches each.

After that entire assembly is dry, glue the wood dowel to the left tail skid piece, as shown on the plan.

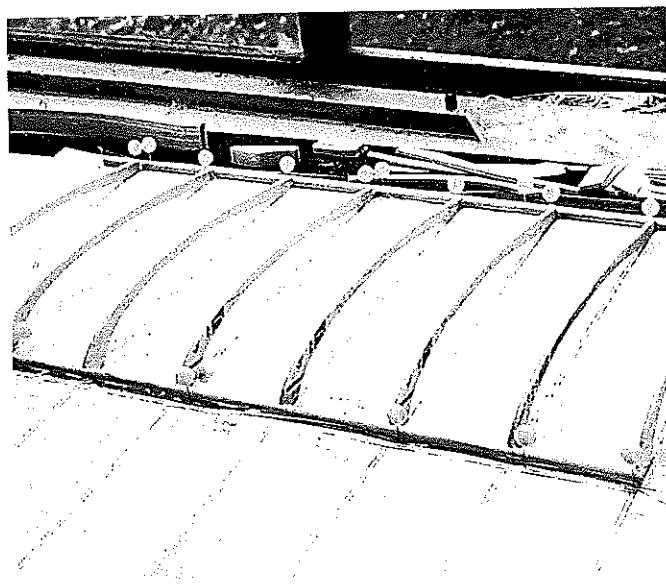
The landing gear support structure can be built by laying the  $\frac{1}{4}$



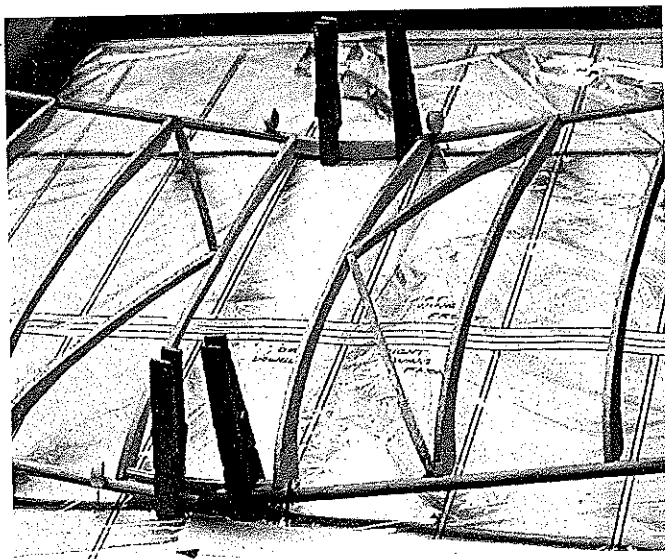
RC gear and batteries are mounted to the  $\frac{1}{4}$ -inch-diameter dowel fuselage substructure. Construction is light and strong.



To make ribs, tack-glue 16 blanks of  $\frac{1}{8}$  sheet balsa. Lay the rib shape on the top blank and cut the stack with a scroll saw.



Assemble ribs and  $\frac{1}{4}$ -inch-diameter dowel leading and trailing edges over plan. Flats on rib bottoms ensure accuracy.



The two wing panels are joined with the dihedral braces. Clothespins are used to clamp this assembly until the glue dries.

dowels on the plan's front view and cutting as necessary. The lower ends can even be beveled to better fit the crosspiece.

This is also a good time to glue the  $\frac{1}{8}$  plywood wheel hubs to the wheels you have cut out, on both sides.

Start the wing by laying the entire second sheet of plans down with plastic or wax paper over them. Both wings can be built at the same time. Basically glue the ribs to the wood dowels, holding the ribs in place with pins at the front and back of the wing.

Make sure the wood dowels lay flat on the surface, or you will introduce a warp into the wing that won't be easy to correct later. When the panels are complete, add the diagonal wing braces.

It's time to build the wingtips. This is a five-part process and the most time-consuming part of the construction, but it must be done one piece at a time. However, both wings can be worked on simultaneously with a two- to three-hour wait between each step.

Start with the front of the wing, and roll the wing to the rear as each piece is added.

Glue the dihedral joiners in place at the front and the rear of the wing. Make sure the dihedral is held. If you lay a 2 x 4-inch piece of lumber at a point  $8\frac{1}{2}$  inches from the center of the wing, on both sides, the dihedral will be held perfectly.

Sand the wingtips carefully, to achieve a nice, rounded shape.

Glue the wing-mount plywood pieces in place.

Glue the wing plywood butterfly pieces in place, then glue the oak wing mounts. Glue the landing gear-support structure to the firewall and to the fuselage stick.

The  $\frac{1}{4}$  dowels coming from the axle to the fuselage stick need to be sanded on an angle to meet the fuselage stick.

After the landing gear structure is dry, you could wrap some thread around where the three dowels meet, on each side, and add cyanoacrylate (CyA) glue to strengthen the joint.

Glue in place the front oak motor mounts and the oak servo-mounting "T" piece. Also glue on the plywood radio platform.

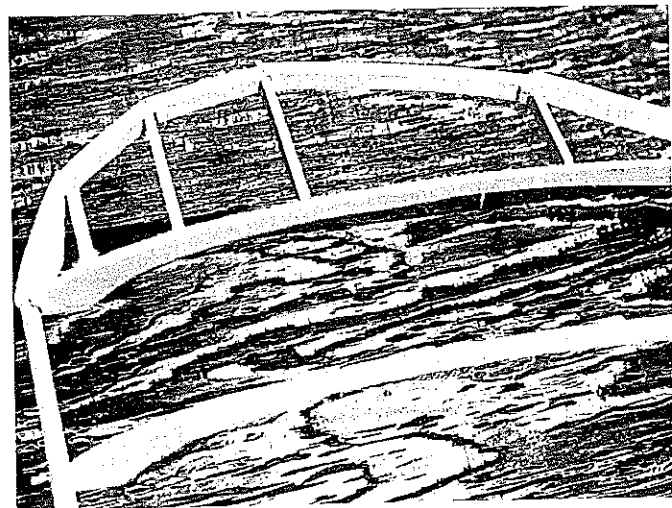
Epoxy the  $\frac{1}{16}$ -inch-diameter axle rod to the bottom of the lower  $\frac{1}{4}$ -inch-diameter dowel.

**Finishing:** Covering with Oracover presents some unique challenges, since I was used to using MonoKote®. Oracover does not shrink with heat, and all the surfaces to be covered must first be coated with a heat-sensitive adhesive that can be brushed on.

I didn't check for warpage of the wings until I had made my first flight, which was a near disaster. When I got the model down, luckily still intact, I looked at the wings more carefully and learned that the left wing had considerable warp.

I would normally just twist the wing into proper shape and heat the covering material to bring it in, but this doesn't work with Oracover.

I took most of the covering off, put on new adhesive, then twisted the wing. While holding the twist, I put the covering back on with my iron.



The wingtips are fabricated from several pieces of  $\frac{1}{4}$  scrap balsa. Note spanwise braces. Sand tips smooth after assembly.

That worked fine, and my flights since then have been great.

**Final Preparations:** The gearbox must be modified before you install it and the motor. Grind away the plastic where the motor "can" sits, and enlarge the hole in the small gear to 1/8-inch-diameter, to fit the 480 motor.

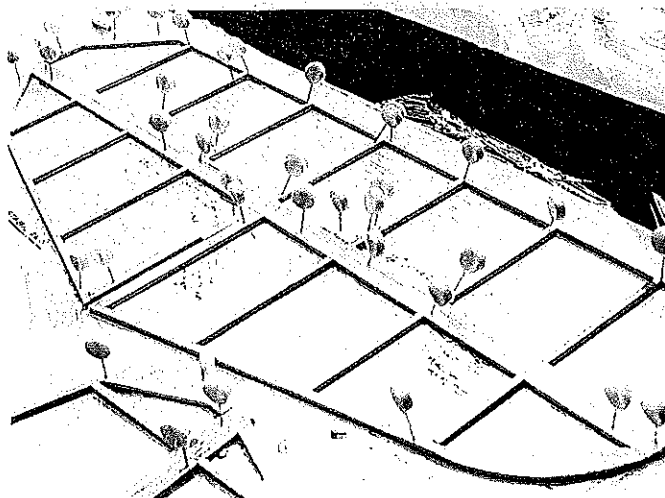
You will also have to use longer 2.5mm screws, and slot the mounting holes outward where the motor bolts to the gearbox. Install the motor and gearbox onto the oak motor mounts with small screws, and epoxy the servos in place into the servo-mounting "T" piece.

The battery is held in place with two nylon ties, and the radio is mounted to the plywood platform with nylon ties. The servos are connected to the control surfaces with the thread.

Glue the 1/8-inch "horn" dowels into the rudder and the elevator if you haven't already, and glue the horizontal and vertical stabilizers to the rear of the fuselage stick.

When attaching the threads from the servos to the control surfaces, make sure you end up with the amount of travel shown on the plans.

Install the 3/16-inch wood dowel wing struts as follows. Drill 1/16-



Stabilizer/elevator and fin/rudder assemblies are made from 1/8 sheet and strip balsa, by pinning the pieces over the plan.

Hobby Lobby Int.  
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Type: RC slow flyer

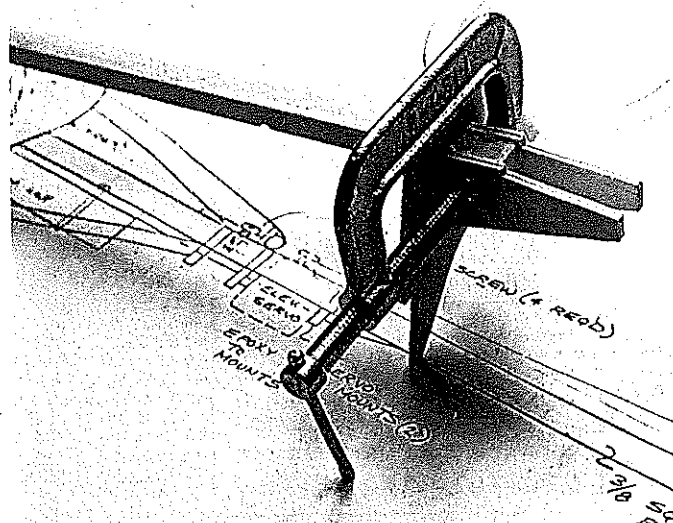
Wingspan: 48 inches

Power: Graupner Speed 480 with 2.5:1 Red gearbox and eight-cell 1200 mAh battery pack

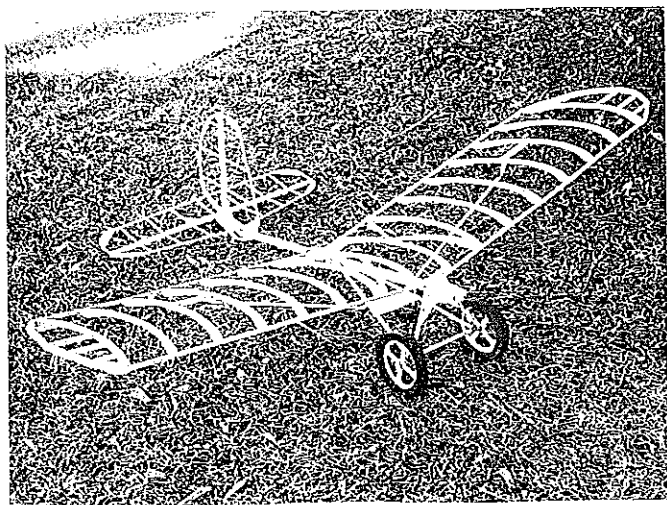
Flying weight: 22 ounces

Construction: Sheet and stick balsa, plywood

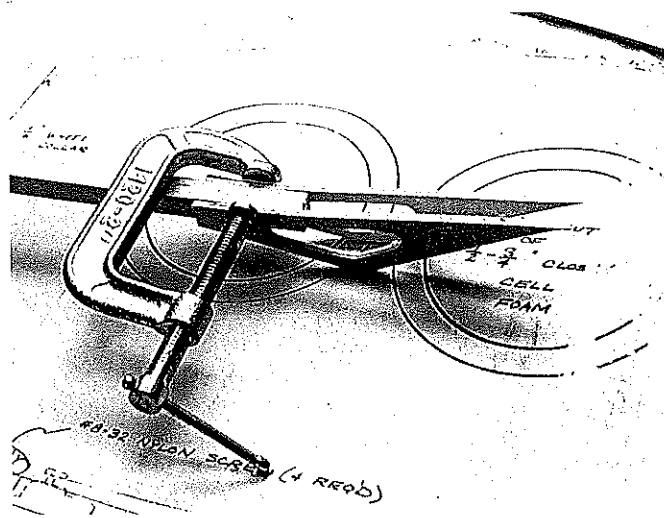
Covering/finish: Oracover



The 1/8 Lite Ply motor mount frames are attached to the 3/8 square balsa fuselage stick. Clamp until the epoxy cures.



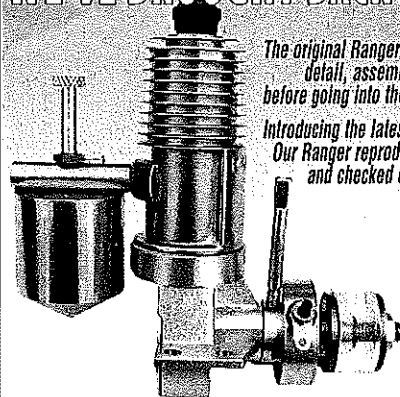
The completed framework is light, strong, and accurate. The author covered the original SkyCrawler with popular Oracover.



Pieces of 1/8 Lite Ply glued to either side of the aft end of the fuselage stick serve as tail assembly, tail-skid mounts.



# WE'VE BROUGHT BACK A LEGEND: THE RANGER 'B'!

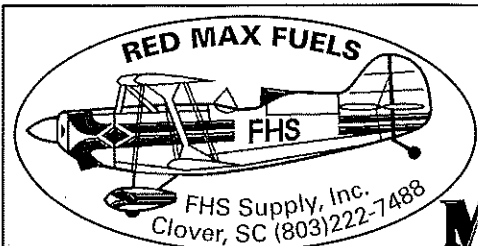


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inch-diameter holes into both ends of the dowels. Insert 1/16-inch threaded rods into both ends of the dowels. Put epoxy on the threaded rods as you screw them into the dowels.

Adjust the nylon clevises to meet the wing, and slide a small piece of silicone fuel line over the clevises so they don't come off in flight.

The wing is held in place with four 8-32 nylon screws, as shown on the plan. Drill and tap the oak wing mounts on the fuselage to 8-32, and drill holes in the plywood pieces at the center of the wing so the nylon screws can be installed.

**Flying:** This is the best part of the project. I have been amazed at how much fun this airplane is to fly. It is not aerobatic, and it can't be flown in anything but a light breeze—no more than three to four mph—but that doesn't mean it can't be a heck of a lot of fun.

Because of SkyCrawler's slow flying speed (five to 10 mph), it can be hand-launched at just a walk. Make sure it is a straight-and-level launch if you are launching with your right hand, but holding your radio with your left hand.

It takes two to three seconds to transfer the radio from your left hand to your right hand after the launch, so make absolutely sure the trim adjustments on your radio are correct so the airplane will fly level.

I made this mistake once, and the consequence was that I had to build a new airplane.

You should be able to fly the SkyCrawler in any park as large as a regulation baseball diamond, even if there are big floodlights around the field.

Enjoy, and don't be surprised when people stop to watch.

**Parachute-drop Option:** For the fun of it, I decided to try dropping a parachute from the model, since it could easily carry my two-ounce altimeter watch to 400 feet.

I installed a third servo that pulls a pin into a hole, thereby releasing a rubber band that holds a parachute.

I made the parachute by cutting a 28-inch-diameter circle in a plastic grocery bag and attaching a 2/3-ounce weight using six strings. The parachute is held under the battery with the rubber band.

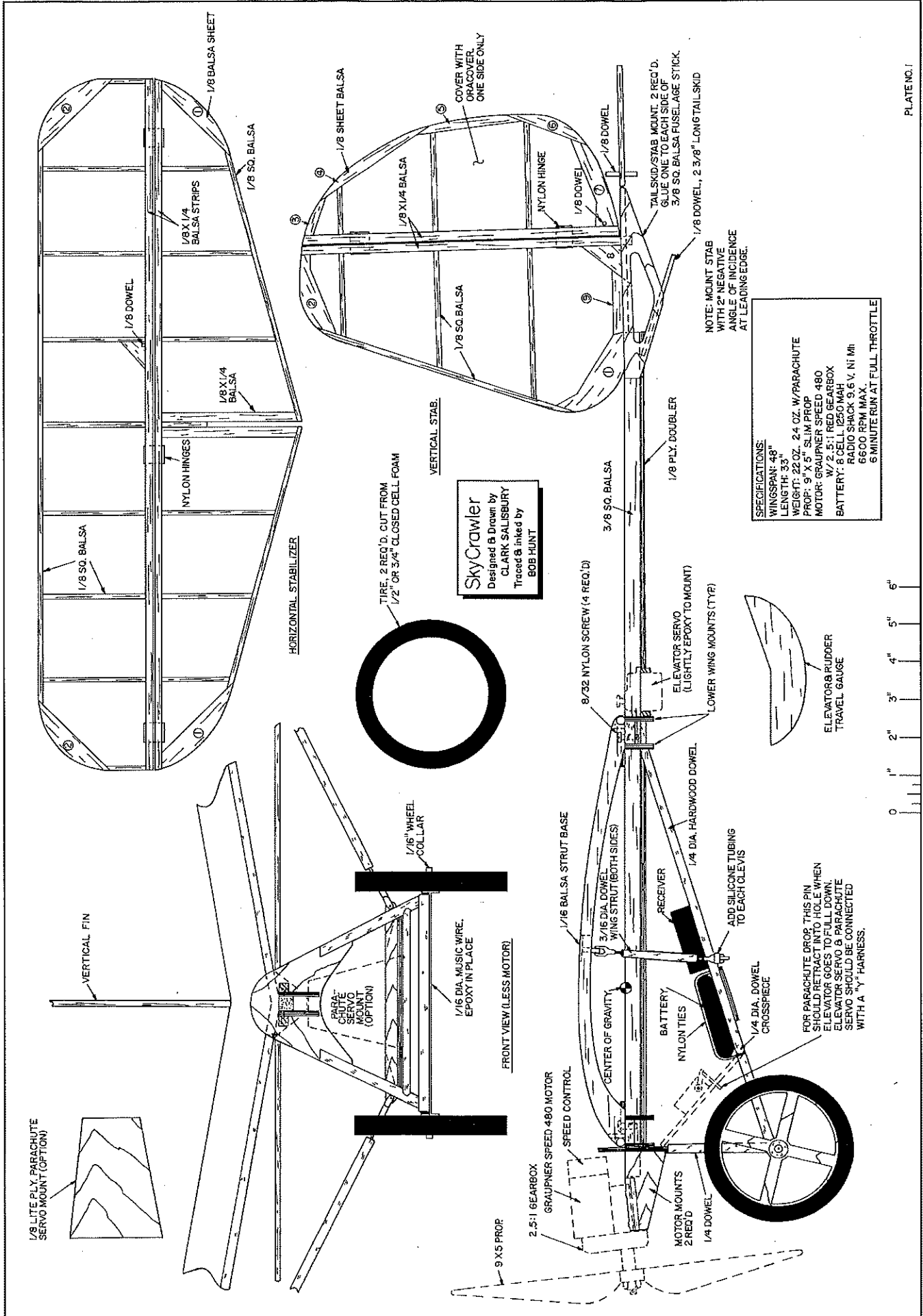
I installed the parachute-drop servo with a "Y" harness and mounted it so that it is common with the elevator servo. This way, a three-channel radio can still be used.

When I push the elevator stick all the way forward (down control), it also pulls the pin into the hole, with the parachute servo.

It only takes a half-second to do this and the airplane hardly even noses down, but the parachute is dropped. It is a lot of fun—especially if your kids are with you; they will have a blast going after the parachute. **MA**

Clark Salisbury  
671 E. 2160 N.  
North Logan UT 84341

PLATE NO. 1

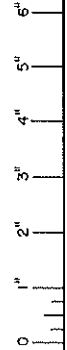


**SkyCrawler**  
 Designed & Drawn by  
 CLARK SALISBURY  
 Traced & Inked by  
 BOB HUNT

**SPECIFICATIONS:**  
 WINGSPAN: 48"  
 LENGTH: 33"  
 WEIGHT: 22 OZ. 24 OZ. W/PARACHUTE  
 PROP: 9" X 5" SLIM PROP  
 MOTOR: GRAUPNER SPEED 480  
 W/ 2.5:1 RED GEARBOX  
 BATTERY: 6 CELL 1250 MAH  
 RADIO SHACK 9.6 V. NI MH  
 6500 RPM MAX.  
 6 MINUTE RUN AT FULL THROTTLE

NOTE: MOUNT STAB WITH 2° NEGATIVE ANGLE OF INCIDENCE AT LEADING EDGE.

FOR PARACHUTE DROP THIS PIN SHOULD RETRACT INTO HOLE WHEN ELEVATOR GOES TO FULL DOWN. ELEVATOR SERVO & PARACHUTE SERVO SHOULD BE CONNECTED WITH A "Y" HARNESS.

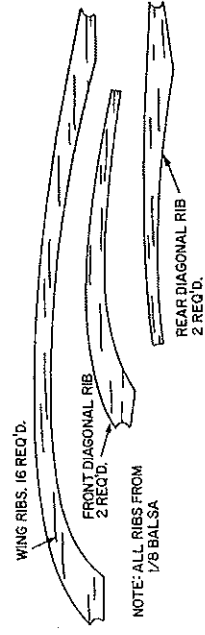


# SkyCrawler plate no. 2

WING MOUNT PAD (TYE)



WING STRUT BASE  
2 REQ'D 1/16 BALS



ALL PARTS IN THIS BOX FROM 1/8 BALS

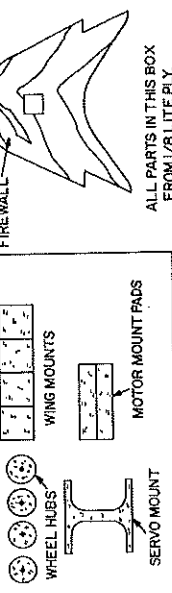
HORIZONTAL STAB PARTS



VERTICAL STAB PARTS



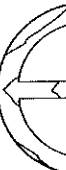
ALL PARTS IN THIS BOX FROM 1/4 OAK OR MAPLE



WING MOUNT PADS



WHEEL  
2 REQ'D.



LOWER WING MOUNT  
4 REQ'D.



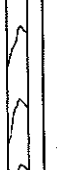
RADIO PLATFORM



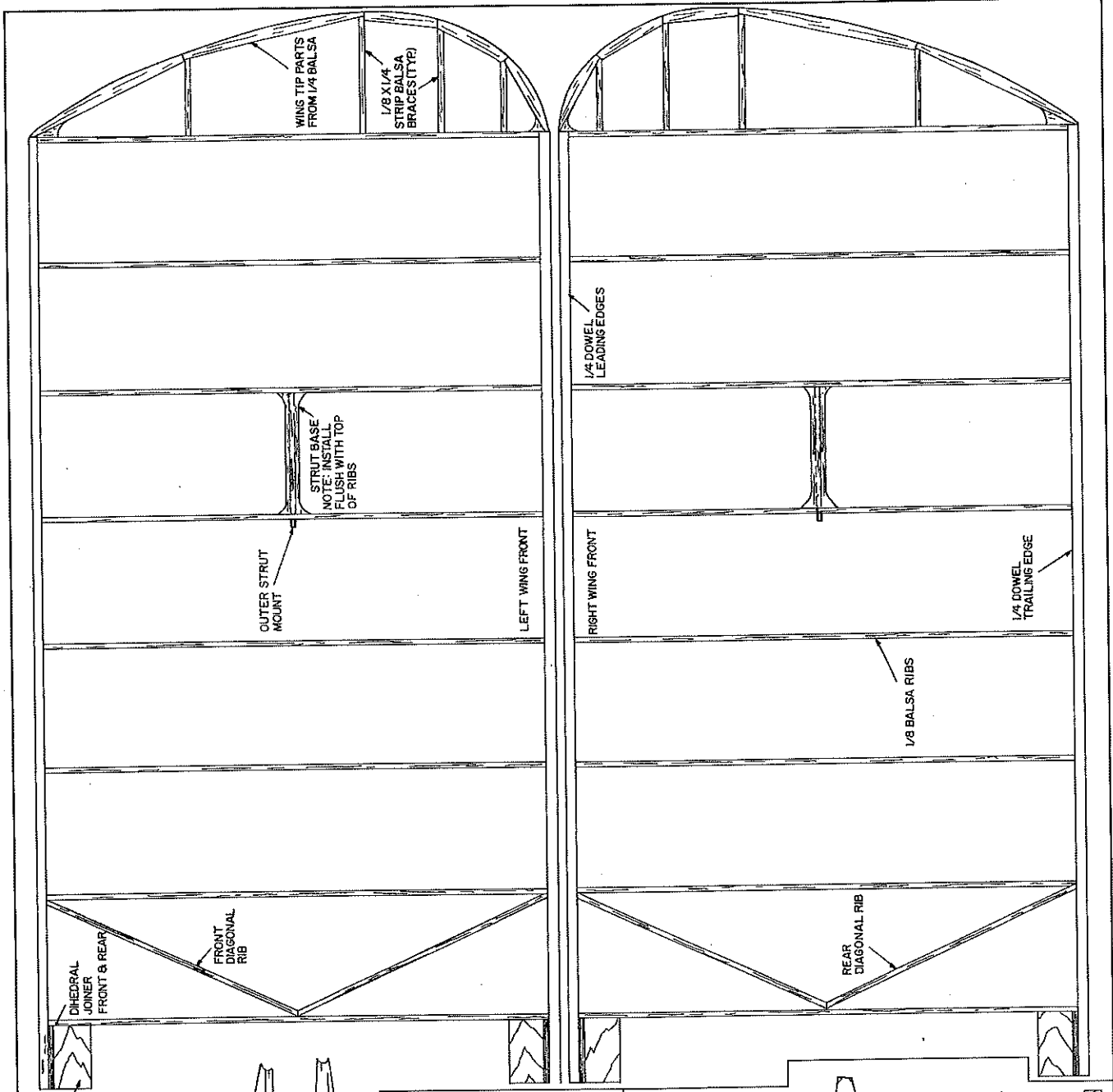
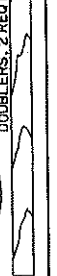
DIHEDRAL JOINER 2 REQ'D.



TAIL SKID/STAB MOUNT

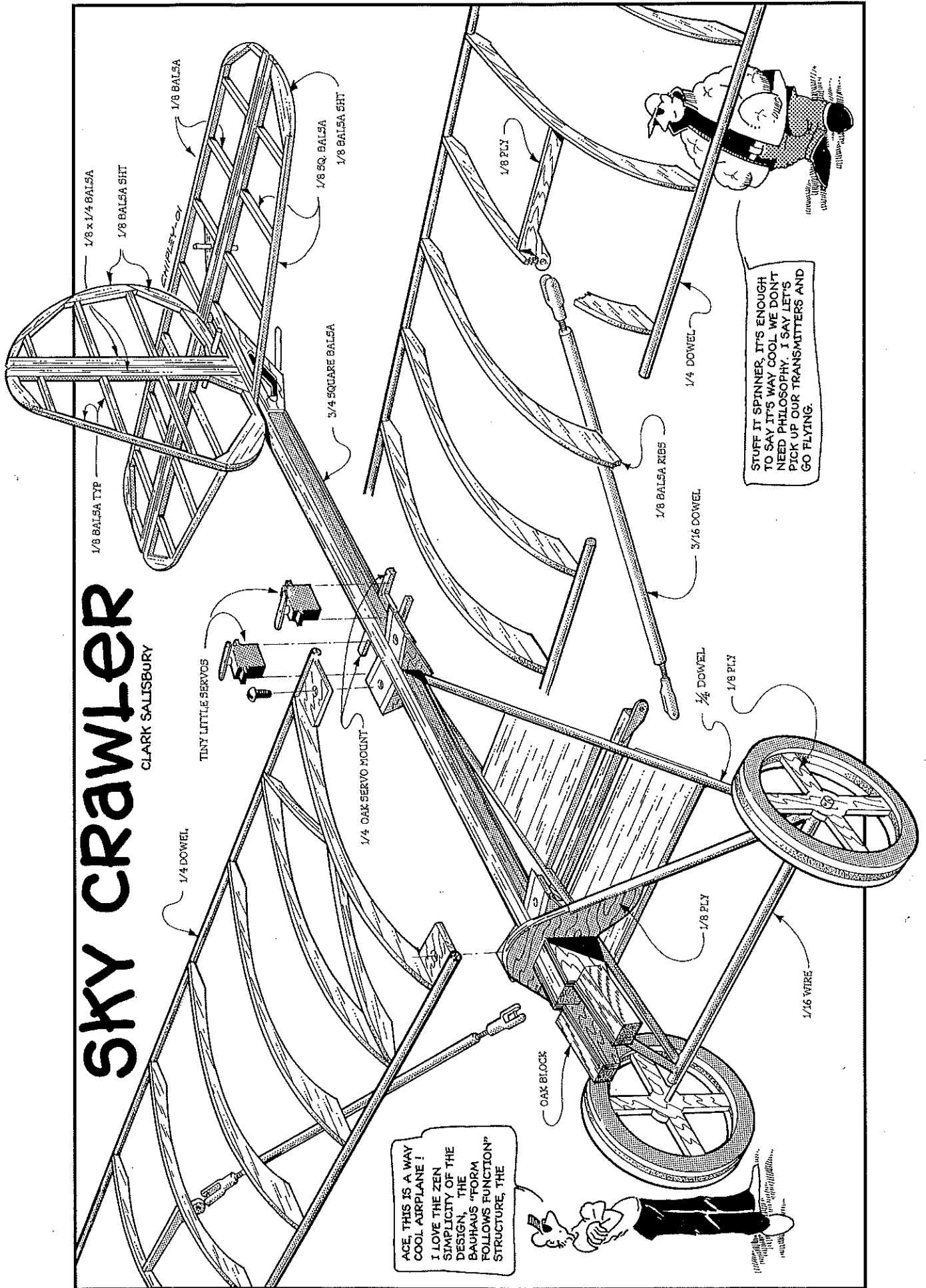


UNDER FUSELAGE DOUBLERS, 2 REQ'D.



# SKY CRAWLER

CLARK SALLSBURY



STUFF IT SPINNER, IT'S ENOUGH TO SAY IT'S WAY COOL. WE DON'T NEED PHILOSOPHY. I SAY LET'S PICK UP OUR TRANSMITTERS AND GO FLYING.

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