

BOBCAT



A One Sixth Scale Version of an Ultralight

Once upon a time a form of flying came into being and the machines were called Ultralights. Wow! The guardians of our existence who reside in our nation's capitol decreed that these machines could enjoy the freedom of flight with neither the machines nor the pilots requiring a license to fly.

Now, there is this RC'er named Bobby Baker who lives in Arkansas, and he had studied aeronautical engineering at the University of Arkansas. This avid RC'er really got turned on over this "no license" concept, and since he had designed and flown numerous R/C models, he proceeded to design an Ultralight.

Naturally, he built an R/C model of his design to confirm its flight characteristics and was delighted with the results. Among the design requirements was the desire for a craft that resembled an airplane instead of a hang glider with an engine. This was accomplished and the next requirement was a safe, lightweight and easy to build structure. What else

would an RC'er do but a great big model airplane.

The structural design was not taken without serious consideration, however, with the judicious combination of spruce, foam, and light plywood, it did resemble a large, well designed R/C model. Also, with the tall windshield and the fiberglass canopy top, it makes one think of a crop duster. It only follows that Bobby Baker's pride and joy was named Bobcat.

When you have an attractive (and different) home-built, and if you don't live too far from Wisconsin, what do you do? You take it to Oshkosh, of course. Bobby did and the Bobcat was a sensation and Bobby was deluged with requests for plans. Bobby had a better idea, he formed a company, First Strike, and now produces kits for building the full size Bobcat.

We saw an article on the Bobcat in the now defunct Ultralight Aircraft magazine that also contained a small ad stating, "... Send \$1.00 for full information to: First Strike, #4 Wade



BOBCAT

Designed By:

Dick Tichenor

TYPE AIRCRAFT

Sport Scale

WINGSPAN

54½ Inches

WING CHORD

8 Inches

TOTAL WING AREA

430 Sq. In.

WING LOCATION

Low Wing

AIRFOIL

Flat Bottom

WING PLANFORM

Constant Chord

DIHEDRAL EACH TIP

1 Inch

OVERALL FUSELAGE LENGTH

30½ inches

RADIO COMPARTMENT SIZE

(L) 6¼" x (W) 4½" x (H) 1¾"

STABILIZER SPAN

15½ Inches

STABILIZER CHORD (incl. elev.)

5 Inches (Avg.)

STABILIZER AREA

75 Sq. In.

STAB AIRFOIL SECTION

Flat

STABILIZER LOCATION

Mid-Fuselage

VERTICAL FIN HEIGHT

8 Inches

VERTICAL FIN WIDTH (incl. rud.)

7 Inches

REC. ENGINE SIZE

.19-.25 2-stroke

.20 4-stroke

FUEL TANK SIZE

4 Oz.

LANDING GEAR

Conventional

REC. NO. OF CHANNELS

4

CONTROL FUNCTIONS

Rud., Elev., Ail., Throt.

BASIC MATERIALS USED IN CONSTRUCTION

Fuselage Balsa & Ply

Wing Balsa & Ply

Empennage Balsa

Wt. Ready To Fly 3½ Lbs. (56 Oz.)

Wing Loading 18.7 Oz./Sq. Ft.

By Dick Tichenor

Ave., Piggott, Arkansas 72454." We did, they did, and we did a 2" = 1' model, and here it is.

Before getting into the construction, a couple of comments are in order. First, we tried to retain the personality of the Bobcat. For instance, the notch in the aft fuselage below the tail surfaces where the tail wheel assembly is installed. Bobby Baker lays up an unidirectional fiberglass tail wheel strut to handle the shock loads. We sorta substituted sheet brass and wound our own springs. We could have omitted the notch and used a plastic tail wheel bracket, but that isn't the way that Bobby did it.

receptacle. We reproduced the original prototype design that had a rather flat cockpit canopy top. It was later changed to a taller dome shaped top to allow a bit more clearance for the pilot's helmet.

We usually build the wing first because we don't enjoy building wings. Our usual approach is to make a rib template of 1/16" plywood with a couple of 3/16" tooling holes. The template is placed on top of a stack of sheet balsa, 3/16" holes are drilled through the stack, and lengths of 3/16" dowel are pushed through the holes. The stack is trimmed and sanded to the template resulting in a stack of uniform ribs.

The flat bottom airfoil allows the wing to be assembled on a flat building board. Simply position the bottom

the aft side of the upper and lower spars. Here again you can use 1/16" sheet balsa if you prefer.

The usual strip aileron control system is used with the servo linkage being slightly aft of the center of servo output shaft to obtain aileron travel differential (more up than down). We favor the Goldberg pin point hinges for small models due to the ease of installation. Wait until after covering has been completed to glue the hinges in place.

Complete the wing structure by adding the tips and sanding all the outer surfaces smooth with a fine grit sandpaper.

The tail surfaces are quick and easy to make as they are basically made of 3/16" sheet balsa. The exception being a piece of 3/16" x 1/2" spruce to join the



We shot a comprehensive photo coverage of this project during the construction process in order to reduce the instruction requirements. If our readers elect to build this model, we recommend that they save this issue of RCM for the photos, as only the text is furnished with the purchase of plans. As an example, the fuselage construction is a basic box with a few subtle details that are more obvious in the photos.

We must call our effort a sport scale model, as it isn't exact scale. Most prominent among the deviations is our use of a flat bottom airfoil for easier building, whereas the full size craft has an undercambered section. Our cockpit uses a simulated instrument panel and contains the radio switch and battery charging

spar over the plans, locate the ribs, place the top spar in the rib cutouts, and pin the leading and trailing edges in their respective positions. Do not install the two center ribs at this time. Now apply Zap to all the joints.

With one panel flat on the building board, block up the outboard rib of the opposite panel to two inches for dihedral. Install the dihedral doublers, center ribs, and aileron servo mounts.

We used 1/64" plywood for the leading edge and center sheeting, because Bobby Baker used 1/32" ply wrapped around the leading edge all the way from the top spar around to the bottom spar. If you prefer to use 1/16" balsa sheet, you can adjust the rib nose and spar notches to suit. We used 1/64" ply for spar webs Zapped to

elevators and to provide a firm base for attaching the elevator control horn. Goldberg short control horns were used on the elevators and rudder. Hinges for all the control surfaces are Goldberg Klett Hinge Points.

Before starting the fuselage construction, several determinations should be made. First is engine selection. We used an O.S. .20 4-stroke, and suggest that if you use a 2-stroke engine, stay within a .19 to .25 range. Select an engine mount to fit the cowling length.

Next, make sure that the placement of servos have sufficient clearance. We used an Airtronics radio with small servos. The rudder and elevator servos are located close to each side of the fuselage in order to clear the aileron servo and control linkage mounted on



Now you can position the left hand side panel and tack it in place. Double check that everything is square and where it should be before securing all the joints.

This is a good time to make the saw cuts in the 1/8" x 1/4" spruce stringers between Formers 4 and 5. Now you can proceed with assembling the rest of the fuselage in the normal manner. We suggest that you follow the sequence shown in the photos. If you have a favorite procedure that is more comfortable, be our guest, as there are many ways to skin a cat.

Don't forget that fine grit sandpaper with ample elbow grease will make you happier at the end of this project.

Carefully position the wing on the fuselage checking for centering and squareness. Drill through the mounting holes in the wing, and the mounting blocks in the fuselage with a No. 43 drill. The rear blocks will be tapped for 4-40 screws. The front blocks will be opened up to insert 4-40 blind nuts.

The fuselage fairing beneath the wing is best assembled on the wing in order to obtain a good fit with the dihedral. Cover wing with plastic wrap to keep from sticking them

together. Back drill through the wing and fairing with a No. 40 drill. The 4-40 screws hold the fairing tightly against the wing as well as to retain the wing to the fuselage.

The main landing gear struts are 1/8" diameter music wire, drag struts are 3/32", and spreader struts are 1/16". We have found that we can bend 1/8" and smaller with two pairs of vise grips. The struts were formed and fitted to the fuselage with any minor bend corrections being made. Then with struts plugged in and secured, a 1/4" length of 1/4" o.d. brass tubing was slipped over each of the three wire assemblies and crimped snugly with a pair of pliers. Hard solder was sweated through the assembly. Wrap with copper wire and solder if you prefer.

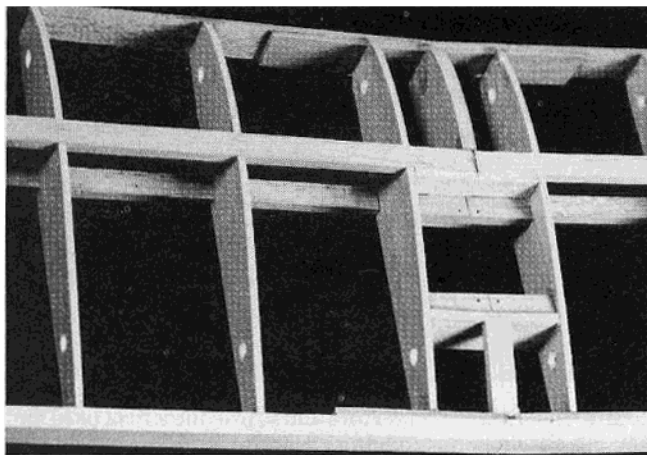
We used 2 3/4" diameter Kraft Racing Profile (slim line) wheels as they are very close to scale. The struts were painted a cream color. File a suitable flat on the axles for the retainer, secure tightly and apply a drop of Zap to the set screw. Believe me on that detail.

The tail wheel assembly is clearly shown on the drawings and in the photos. It takes a bit of patience and

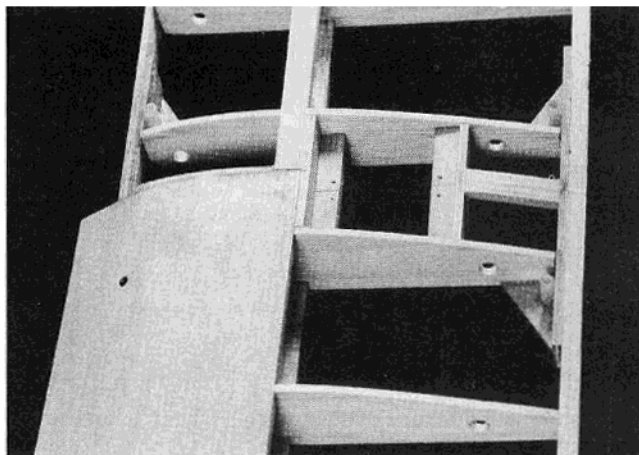
the wing.

The fuselage construction starts with cutting out the required parts and assembling the left and right hand sides as shown in the photo.

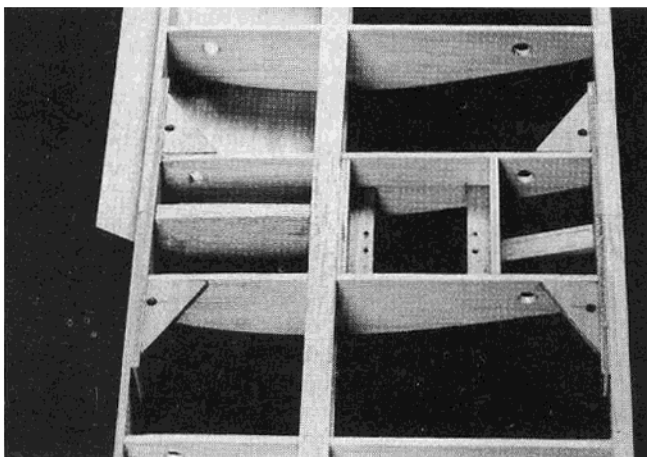
With the right hand side panel flat on your building board, assemble the cockpit floor and Formers 3 and 4 onto the side. Check for squareness and Zap in place. Then locate Formers 1 and 2 and tack each with a couple of spots of Zap.



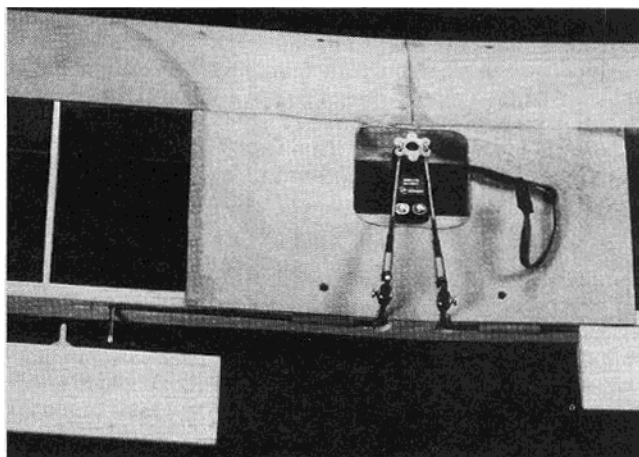
Basic wing structure with left and right panels joined.



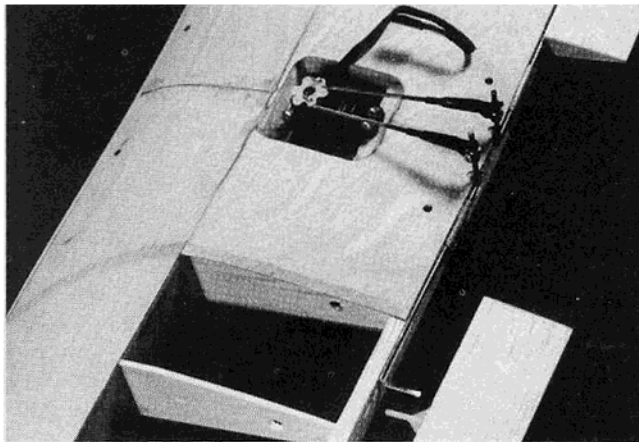
Plastic tube guides for wing mounting screws are installed.



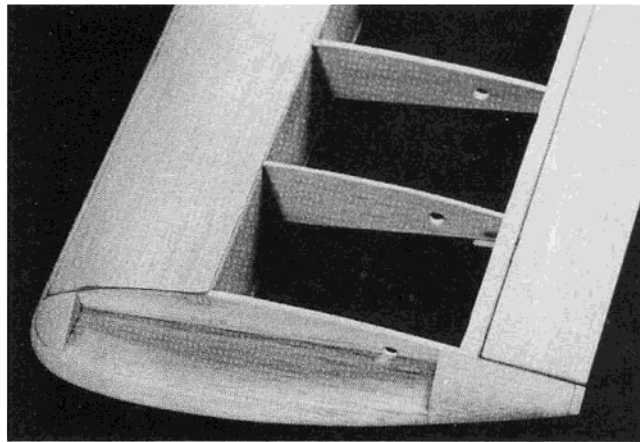
Bottom view of wing center section.



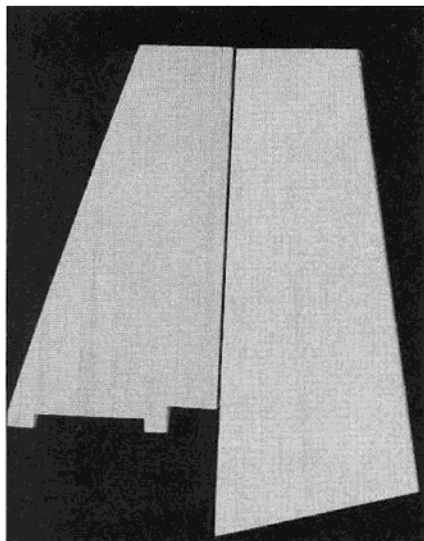
Wing structure completed showing aileron installation.



Note aileron pushrod connection to servo for differential throw.



Wing tip with spruce reinforcement at trailing edge.



Vertical stab and rudder are 3/16" medium balsa.

effort but the comments from your buddies make it worthwhile. An easier approach would be a regular plastic tail wheel bracket, but it just isn't the same.

The cowling is a simple frame with 1/64" plywood used for the upper and lower skins. The photos show the sequence, and we can build one quicker than we can describe it. Our only comment is that the frame should be assembled on the fuselage as shown.

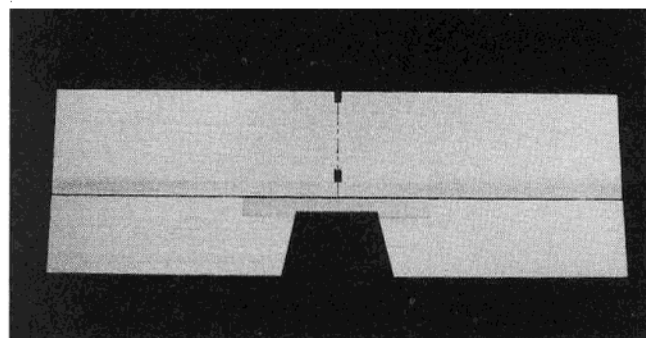
The cowl must provide openings to fit the engine of your choice. You will notice the fuel lines, breather line, exhaust tube, needle valve, and choke wire are for the O.S. .20FS that we used. We love that little hummer, and it does everything we want with a Top Flite 10 x 4 propeller.

MonoKote was our covering

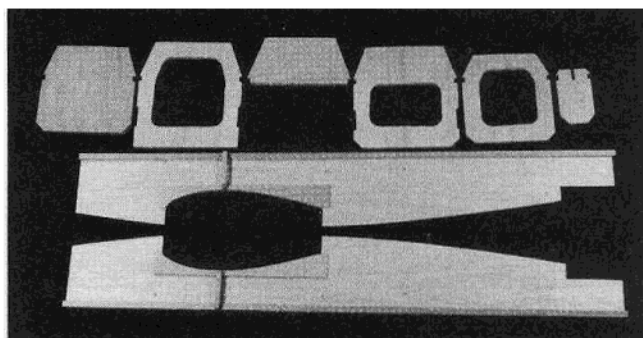
material. Mostly cream with black and the striping is bronze and orange. Hope this doesn't upset Bobby Baker but this is as close as we can get with commercial model products. Maybe not exact but it isn't very far off.

Our cockpit canopy was assembled on the covered fuselage. The frame is 3/16" x 3/16" spruce strips. The fore and aft vertical strips were each held in place during assembly with two pins. The front and back pieces were located in the notches in the top deck, but not glued in. The frames were removed for painting and attaching the transparent plastic windshields. Then they were Zapped in place. Strips of black MonoKote was used for final trim.

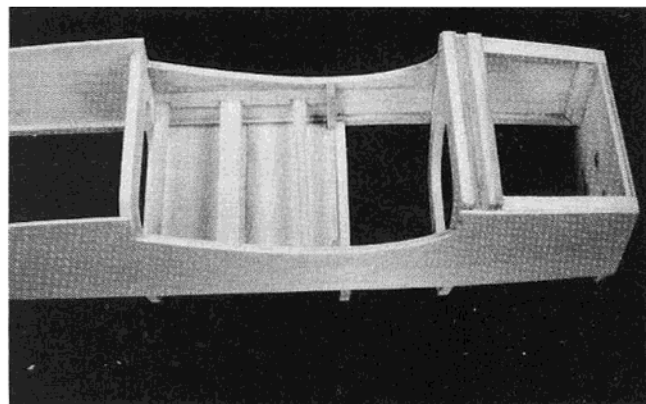
Locate the covered tail surfaces and carefully align them. Secure with pins and double check the alignment. Zap



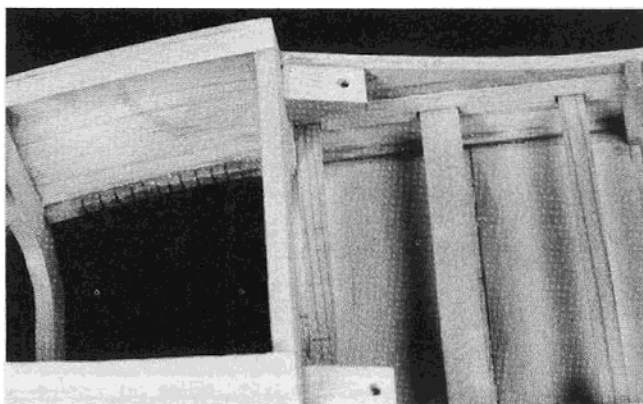
Horizontal stab with elevators joined.



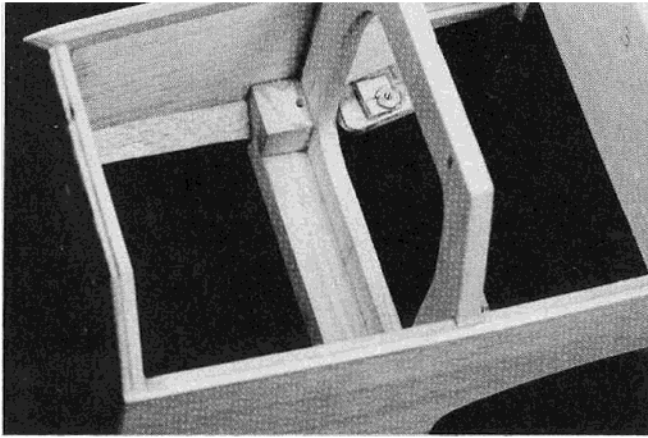
Parts required to start fuselage assembly.



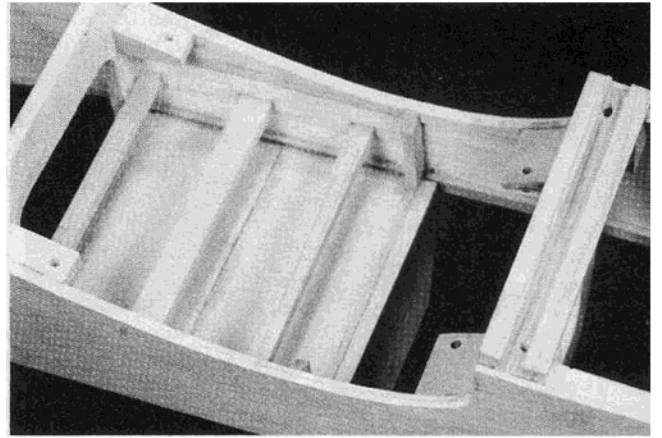
A reference shot of how things go together in forward fuselage.



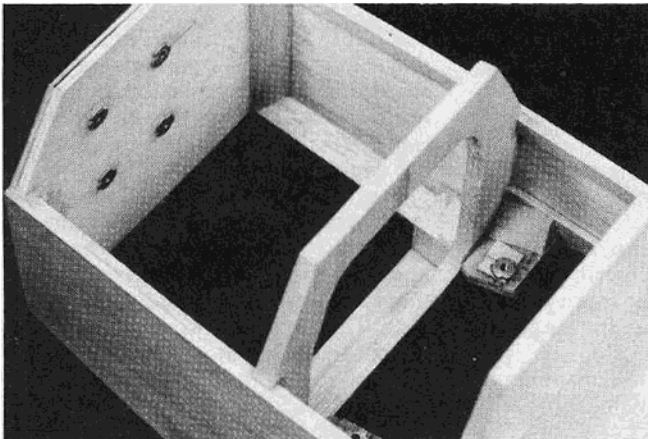
Rear wing mount blocks installed. Note saw cuts in upper longerons to allow curve in fuselage sides.



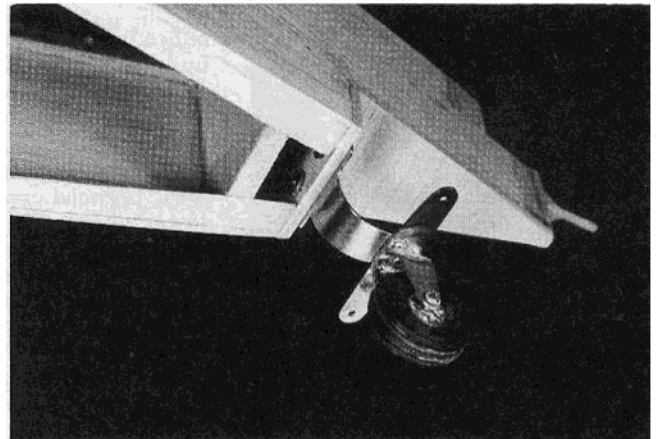
Landing gear blocks and forward wing mount are shown.



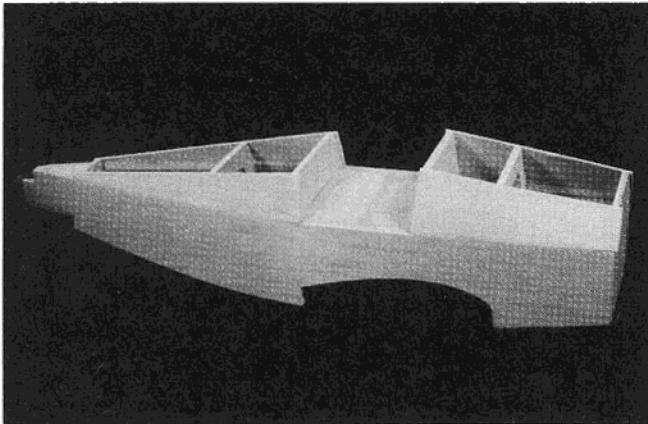
Overall shot of bottom of center fuselage.



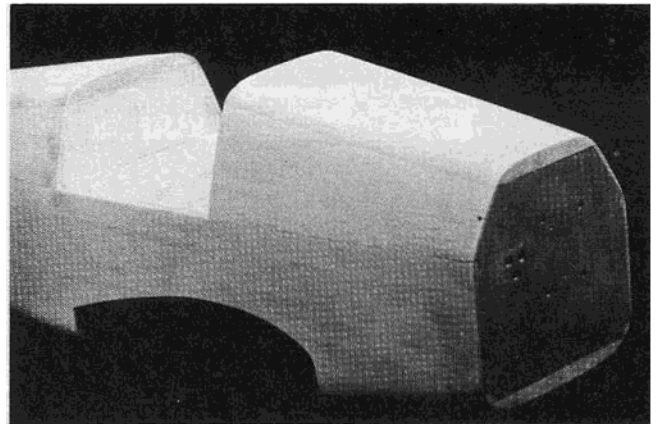
Top view into forward fuselage.



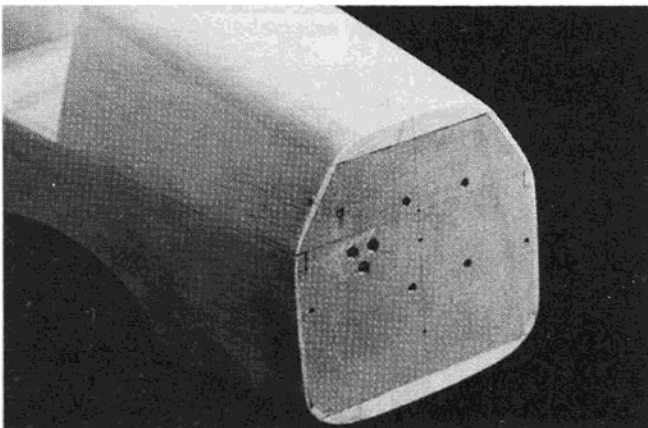
Tail wheel installation details.



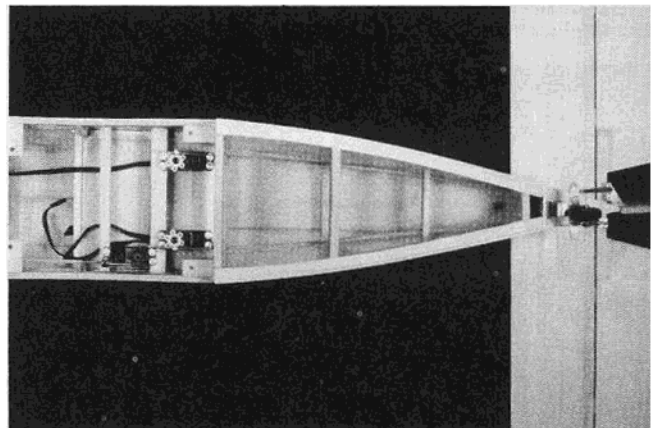
Upper side panels have been attached.



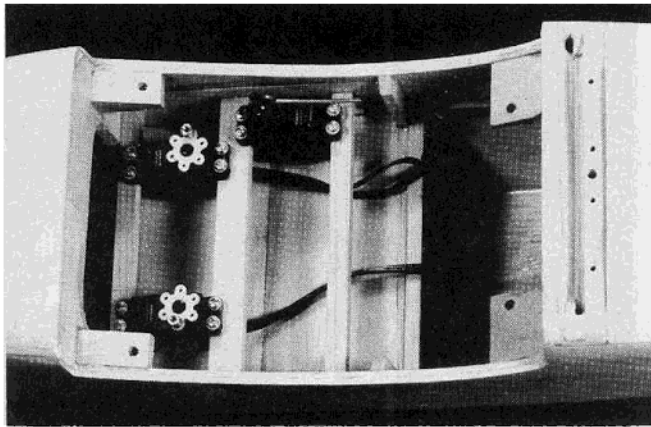
Top and bottom sheeting are installed and shaped.



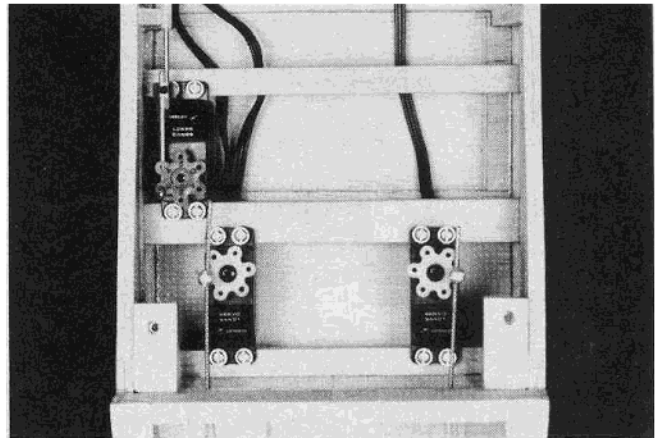
Holes required in firewall. Three 1/16" holes on vertical centerline facilitate assembly of cowling.



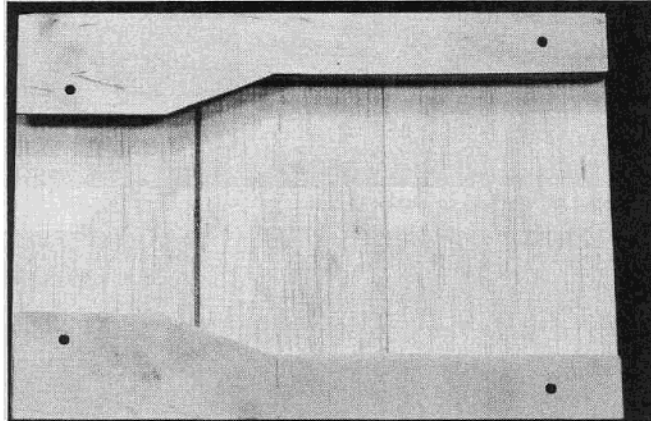
Overall bottom view of control arrangement.



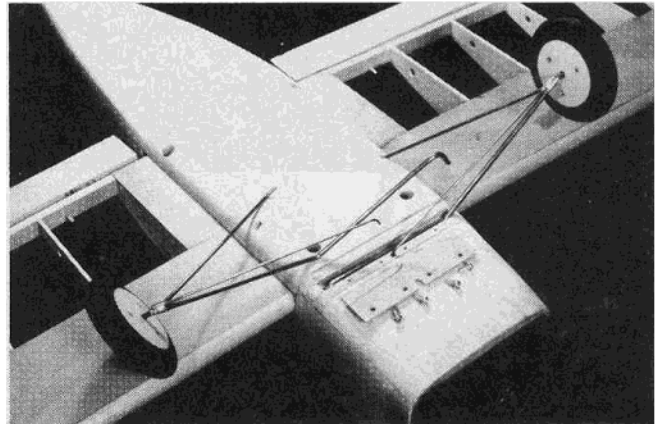
Servo mounting rails must be located to fit your own servos.



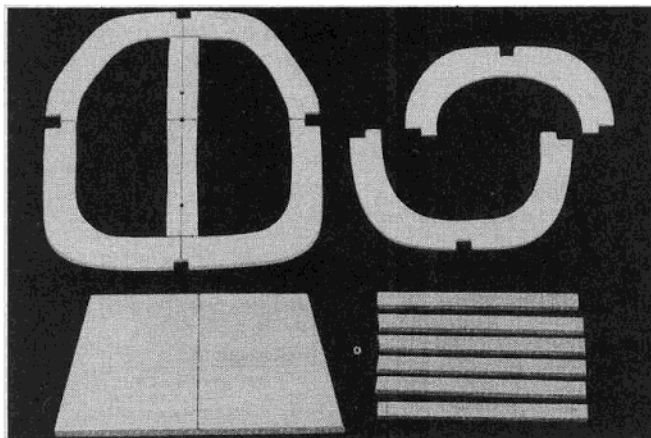
A good view of servo installation. Plenty of room.



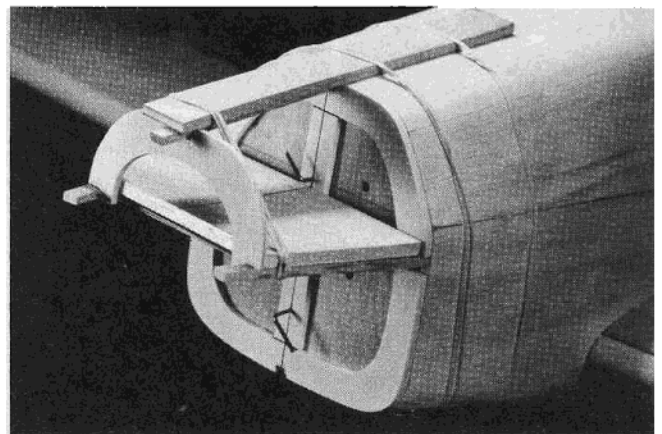
Top view of bottom fairing. Heavy vertical line is 3/32" i.d. aluminum tubing recessed into wood.



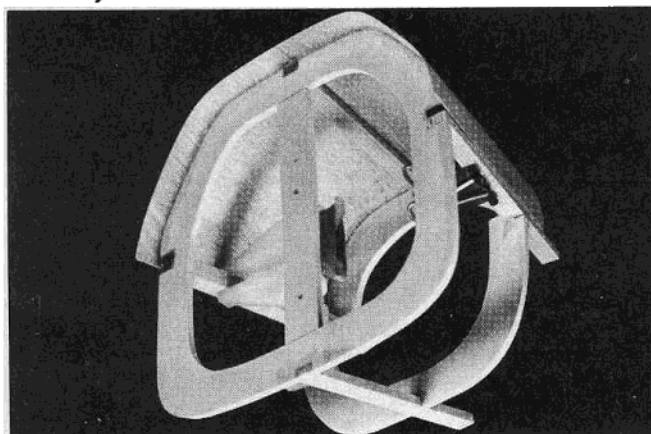
Landing gear installation details.



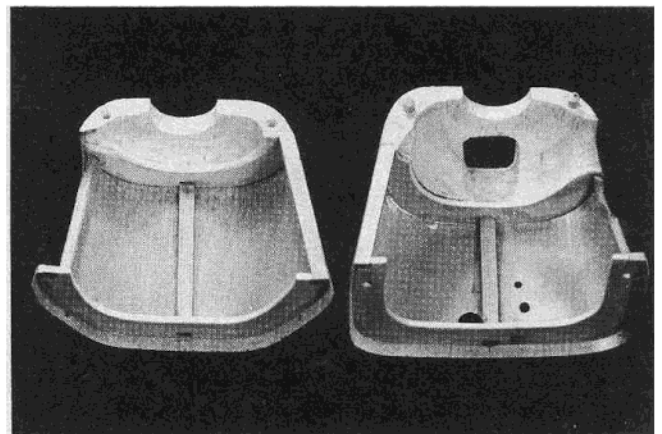
Parts needed to start cowl assembly. Center post of large former is for alignment with fuselage and is removed after assembly.



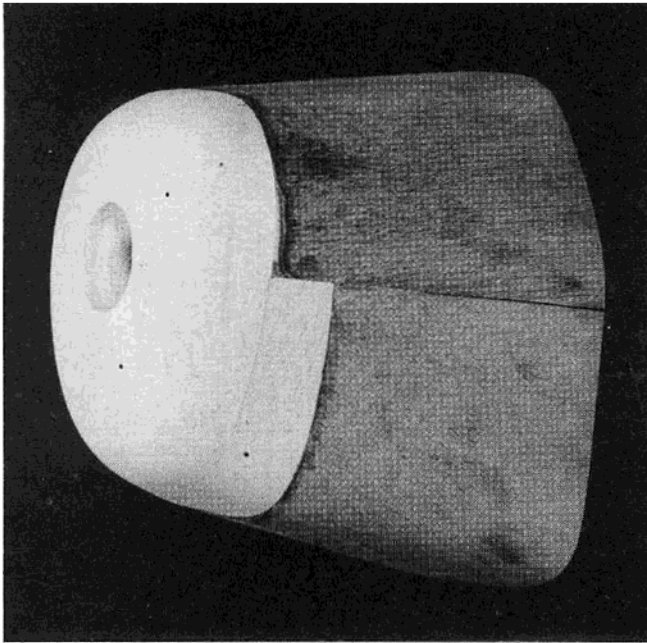
First step in cowl assembly.



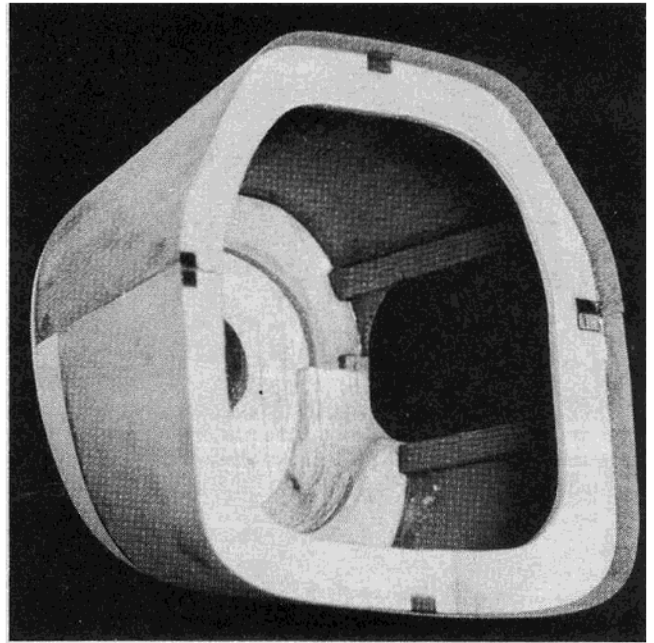
The 1/64" plywood top skin has been added.



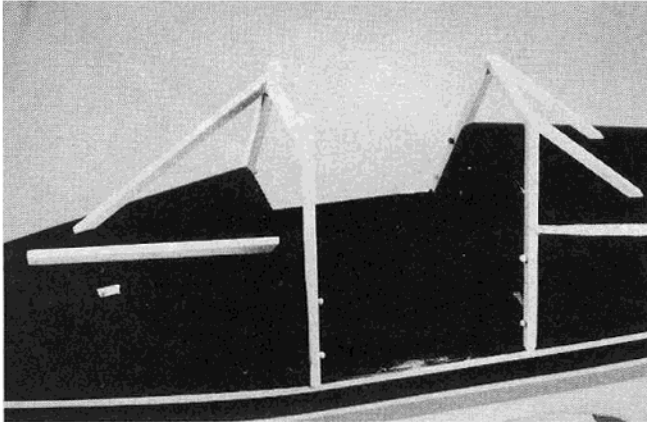
Inside view of top and bottom halves of cowl.



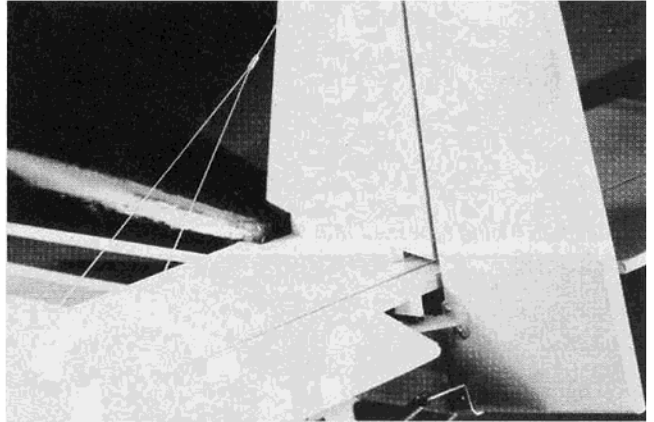
Completed cowling.



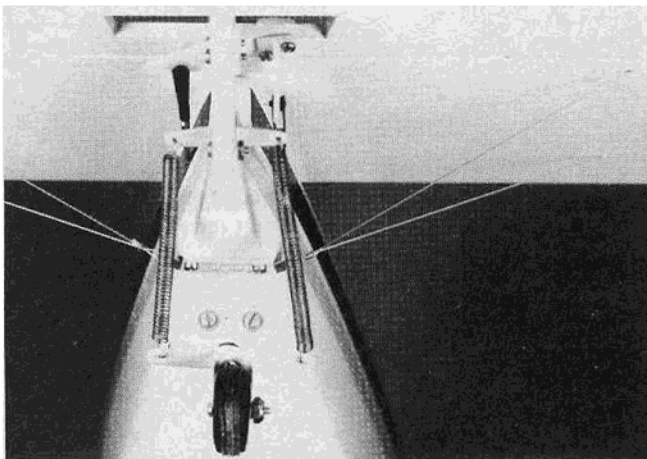
Relief for engine is shown.



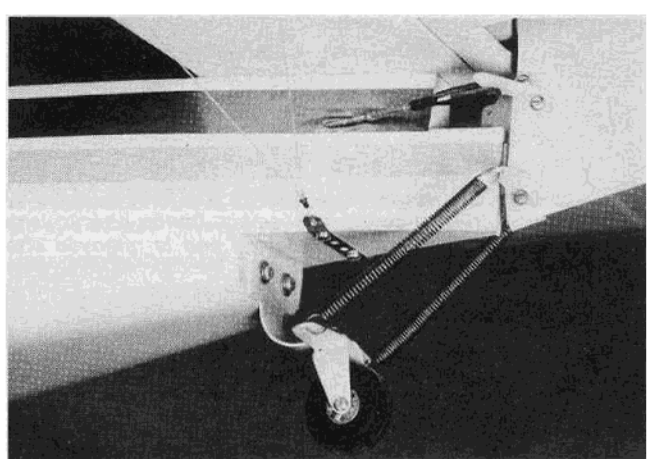
Canopy frame is made of 3/16" square spruce. Frame is secured to fuselage with pins at this time.



Tail support wires are monofilament fish leader lines, and duplicate the arrangement used on the full size Bobcat.



Rear bottom details.



Side view of rear bottom details.

applied to all the appropriate joints will hold them forever.

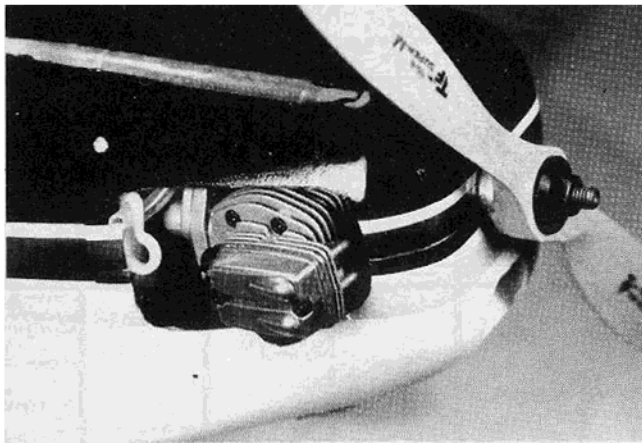
Final detail such as a pilot, instrument panel, gas filler cap, and tail support wires will give your Bobcat a finished touch. We tinkers enjoy making them, and get to grin a

lot at the field.

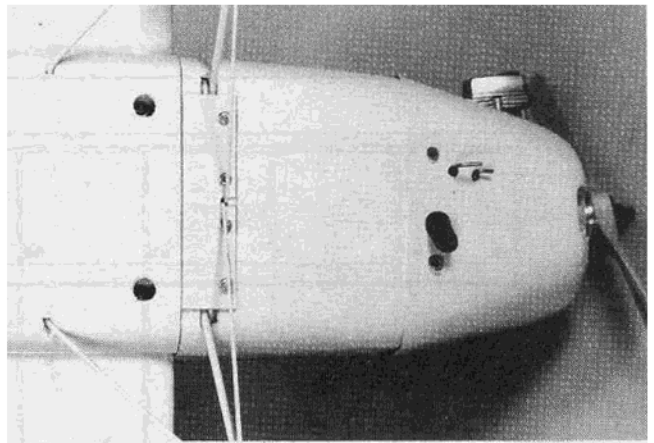
Our first flight test went well except for being a bit more heavy. We added a chunk of lead above the tail wheel, and our Bobcat flew like a good thing. Before our second trip to the field, we moved the battery pack from under

the fuel tank to the space behind the trailing edge of the wing, and removed the obnoxious hunk of lead. Now the Bobcat does everything we ask of it.

We have had only one unpleasant incident on this fun machine. The left wheel fell off in mid-flight. Someone



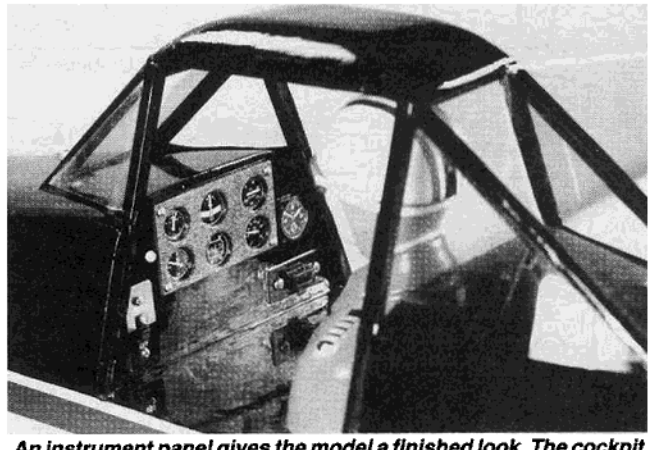
O.S. .20 4-stroke engine was used in our Bobcat. Tube on left is fuel fill line.



Finished bottom nose details.



We gave Bobby Baker his captain bars and racing stripes.



An instrument panel gives the model a finished look. The cockpit is a handy location for the radio switch and battery charging receptacle.

(me) did not properly tighten the wheel collar. Mr. Cool, Joe Zdankiewicz, made a neat one wheel landing and held the left axle off the runway until it had almost come to a stop. The resulting ground loop did not put a scratch on the machine.

The Bobcat has a distinct personality that creates a lot of

compliments at the field. Bobby Baker can be proud of his design.

We will end this article by relating a frustrating event. At a 4-stroke scale contest, one of the static judges stepped over to me with his finger planted firmly on a photo in my documentation package. With a rather annoyed tone to his voice he

said, "You are supposed to use a picture of the full size airplane, not one of your model." And he walked away. I received very good scores on everything, but proof of color and markings — zilch. That particular color photo had been sent to me by Bobby Baker and was of his prototype Bobcat. Win a few, lose a few. □



This is a flight photo of Bobby Baker in his full size Bobcat.