

Small edition of big-engined stunters, Spooky features traditional sheet balsa fuselage and built-up wing. But it's easier, cheaper to build.

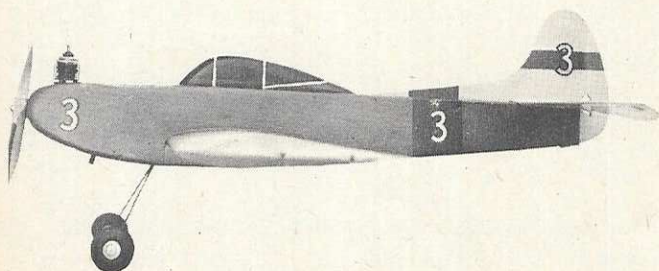
At same time, it has better ground handling characteristics than the Half-A jobs. Picture shows anti-clockwise rigging—that's up to you.

# Spooky



By H. A. WILLIAMSON

*Do you scowl at big models? Tilt your nose at little ones? This .09 stunter will please.*



One-piece wing slides into cut-out from bottom of fuselage. Opening then built over. Bubble canopy is a block of balsa carved and painted.

► Spooky as shown in the photographs is over a year old and still in the prime of life. Figuratively speaking, we've flown the socks off the little rascal, without paying any attention to weather conditions or selection of flying site. This is the way we like to measure the worth of a model! If it can survive the rigors of flight, the merciless poundings and bouncing in the trunk of an automobile, occasional crackups and still come up off the deck and fly, what more can we demand of a ship?

Spooky was actually designed and built in a hurry, to give us some economical fun and relaxation on those long summer evenings. It lived up to and exceeded these design requirements. Many flights have been made in the parking lot of the plant (where we allegedly work) during a 30 minute lunch period. Ever try eating or gulping your lunch at the end of a pair of lines with glow fuel smeared hands? Lotsa fun and raises hob with the digestion!

This little ship can be built for an absolute minimum of time, effort, materials and cost. Most of the materials required can be found lying around in the scrap box and unused kits.

Engines from .065 to .099 displacement will provide plenty of sock to do a complete stunt pattern. The .099 powered jobs, if kept to 10 oz. in weight (the original weighs 9 oz.) will be hotter than a Mexican hamburger!

Since Spooky is a "minimum" airplane that can be built in a hurry, it makes a darned good beginner's project and as such is strongly recommended for individual or club undertaking.

Well, don't stand there flat-footed, twiddling your scarred thumbs!

To begin wing construction, trace the rib outline very carefully on a piece of hard cardboard or similar material. Cut this template very accurately. Then use it to produce 14 identical ribs from 1/8 in. thick



## Spooky

medium hard quarter-grained sheet balsa. Notice that slots for lead-out wires are cut only in seven of the ribs to be used in the left wing panel, since the model will be flown counterclockwise.

After the ribs are cut out, they should be stacked and pinned together and then sanded very carefully with a SANDING BLOCK. This will insure uniform accuracy and will make the assembly job much easier.

Medium hard  $1/8 \times 3/4$  in. tapered trailing edge stock should be selected for straightness, then laid over the wing layout on the drawings and the rib position accurately marked with a pencil.  $1/8$  in. wide  $\times$   $1/8$  in. deep notches are cut at each position and checked for a smooth sliding fit by actually slipping a rib in each notch. Touch up each notch with the file to make each rib fit just right. Too tight a fit will make the wing warp hopelessly and too loose a fit will result in a very flimsy structure.

Trace the tip outlines directly from the plans on  $3/32$  in. medium hard sheet and cut to size.

Select a piece of  $1/4$  in. square medium hard balsa strip, carefully avoiding warps and twists, for the leading edge.

A wing of this type is most easily assembled in a vertical position, and not by laying it over the plans, as is commonly done with wings using lifting airfoils. We assembled the original wing by first standing the trailing edge with the notches facing up and holding it in this position with scrap balsa blocks pinned to it and the workbench. Starting at one tip we started gluing the ribs in the notches, checking each rib for squareness with respect to the trailing edge and sighting along the ribs from one end to insure proper alignment. The ribs should be pinned in place as they are aligned to insure accuracy while the glue is drying.

As soon as all the ribs are cemented to the trailing edge, a dab of glue should be put in the V-notch of each rib and the leading edge dropped in place. This portion of the wing assembly should be allowed to dry very thoroughly, preferably overnight, before disturbing the set-up. The sheet tips are now glued in place along the centerline of each rib and the  $1/16$  in. sheet gussets should be located on top and bottom of each tip as shown on the drawings and  $1/8$  in. outside diameter tubing glued in place at the same time in the left tip.

Select a piece of  $1/4$  square hardwood, motor mount stock. Cut it to fit snugly between the center ribs and drill to receive the bellcrank mounting screw. Check the wing drawing and fuselage side view for the exact location of the bellcrank and glue the hardwood block in place. Fasten the .016 dia. flexible steel lead-outs to the bellcrank and then bend the push rod to shape, as shown in the full size detail at the right side of the plans, and fasten the bellcrank permanently in place with the lead-outs and push rod attached. The center panel of the wing should now be covered with  $1/16$  in. thick medium hard sheet balsa top and bottom.

Very carefully sand the entire wing structure, using a sanding block, using progressively finer grit with No. 8-0 sandpaper used last. Take considerable time and care with this step, removing all lumps and bumps and excess glue. Sanding the structure carefully not only makes for an easier and better looking covering job, but also reduces the final weight, without sacrificing strength: the mark of the expert modeler.

Add  $1/2$  oz. of weight, either clay or solder, to the underside of the right tip and glue it securely in place. Give the wing structure one or two coats of thinned dope, sanding after each coat and then cover with



silkspan. By eliminating colored dope on the wing, a great deal of needless weight is saved without sacrificing appearance.

At this point the wing should be carefully checked for warps. If any warps are present they may be removed by proper application of dope. Brush thinned clear dope on the side opposite the direction of warp, allowing each coat to dry thoroughly before coating the warped side. Twisting the wing to remove the warps while the dope is setting up will also help remove some of the really stubborn twists. Continue this process until six coats of clear dope thinned 50-50 are applied. To insure a warp-free wing for the life of the model, the last three or four coats should be plasticized with castor oil (approximately 20 drops to 4 oz. of dope), making the covering tough and resilient. So much for the wing. Let's get on with the rest of the job.

Since the fuselage is the easiest and most enjoyable portion to build (for us, anyhow), we'll slide through in a hurry. The fuselage sides should be traced on 1/8 in. thick medium hard sheet balsa directly from the side view of the plans and cut precisely to size. Mark the position of the bulkheads on each side, making certain you have one right side and one left.

Cut out two plywood doublers from 1/16 in. thick aircraft plywood, tracing them from the shaded outlines on the drawings and cement one doubler to the inside of each side piece. Place all the heavy objects you can find in the basement on these assemblies while the cement is drying to insure a good bond between the plywood and balsa. Trace and cut out one of each of the formers shown on the drawing, using the materials noted on the plans.

Cut motor mounts to length from 1/4 x 3/8 in. hardwood, shaping them as shown in the top view of the fuselage. Cement the mounts to the inside of each half of the fuselage. Cement the mounts to the inside of each half of the fuselage, using a good grade of fuelproof cement. Before the cement dries, check the alinement of the mounts for zero degrees vertical thrust and location from the top of the fuselage sides.

Begin the fuselage assembly by cementing forms F-1 and F-4 in place to one side and then cementing the other side in place. Pull the sides together at the rear and add F-3 and F-5 in their respective places. Bend the landing gear to shape over the fullsize projected outlines, and then sweep forward as shown on the fuselage side view. Sew the gear to F-2 with soft copper wire, coat liberally with cement and then insert F-2 in the fuselage at the front of the wing cut out. Add the 1/8 in. diagonal balsa gussets as shown.

The wing assembly should now be placed and centered, after slipping the pushrod through the openings in F-4 and the slot in the right side of the fuselage. Cement the wing securely in position and replace the small cut-out segments of the fuselage side underneath the wing. The bottom portion of the fuselage may now be covered with 1/16 in. thick medium hard sheet balsa.

Before going any further with the fuselage, make the tail feathers. The rudder and dorsal fin are cut from 1/8 in. thick soft balsa sheet and lightly sanded to an approximately air-foil shape. The stab and elevators are cut from 3/32 in. medium hard sheet and, like the rudder, lightly sanded to shape.

The control horn should be cut out of 1/32 in. thick aluminum or tin can stock as shown in detail and bent to shape. Place the horn in the position shown on the elevators, cementing and sewing it in place with cotton thread.

Before covering the top of the fuselage with 1/16 in. sheet, the stab and elevator assembly should be securely cemented in place. Cut the canopy from 1/2 in. thick

## AMERICA WINS!

### WAKEFIELD

1. J. Foster, USA, 15:00
1. H. O'Donnell, GB, 15:00
1. E. Scotto, Argentina, 15:00
2. G. Reich, USA, 14:59
3. Mme. L. Ferber, Belgium, 14:55

### FAI GAS

1. D. Kneeland, USA, 15:00
2. G. Fuller, GB, 13:18
3. G. Vidossich, Italy, 12:54
4. P. Buskell, GB, 12:30
5. A. Lederer, Austria, 12:27

(Under section 16 of the Wakefield rules, the jury decided that the Wakefield Cup had been won by three nations, because of a three way tie, but should be held by the U. S. since Joe Foster topped the fly-off. America was the team winner in both FAI and Wakefield, with British second in each.)

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balsa scrap and sand to a teardrop shape.  
Cement the rudder, dorsal fin and canopy to  
the top of the fuselage, checking the aline-  
ment very carefully.

Although a metal wedge or square tank  
may be used successfully, we strongly recom-  
mend a balloon tank for this model to insure  
proper fuel flow at all times. If a balloon  
tank is decided upon, build a compartment  
for it by cementing a piece of 1/16 in. sheet  
balsa on top of the mounts and adding a  
piece of sheet between the mounts and the  
top as shown to form a box. Bend a tailskid  
to the shape shown from 1/16 in. wire and  
fasten to the underside of the fuselage with  
a piece of muslin and plenty of cement.

Complete the construction by sanding the  
complete fuselage and tail structure in a  
manner similar to that used on the wings.  
For additional strength and a good finish  
with no extra weight, dope 1 in. wide strips  
of silkspan on all sides of the fuselage.

The upper portion of the tank compart-  
ment is hinged at the firewall with a piece  
of elevator hinge material to provide access  
to the balloon. This cover may be held down  
best with a lightweight rubber band stretched  
over the top and looped over two hooks bent  
from 1/32 in. music wire and cemented on  
each side of the fuselage.

Finish the construction with approximately  
five coats of thinned color dope on the fuse-  
lage and tail surfaces and in the engine and  
tank compartments. Use a good fuelproof  
dope such as Aero-Gloss or Sta in the colors  
of your choice. The original Spooky had yel-  
low wings and tailfeathers and a red fuse-  
lage. The canopy frames were striped in white  
and the remainder of the canopy was black.  
Decals and license numbers make for a more  
finished appearance and don't cost very much,  
so use them liberally for effect.

Ready to fly, the model should balance on  
the leading edge of the wing or within 1/2  
in. of that point. If it doesn't, add weight to  
the nose or tail as required and don't attempt  
a flight until it does balance properly. If  
you have built and flown a "Ukie" job be-  
fore, it would be ridiculous for us to tell you  
how to do it. If, however, this is your first  
project, we strongly urge you to find an ex-  
perienced pilot and let him check both you  
and the ship out.

Spooky, properly constructed, is steady and  
forgiving but designed primarily for stunt  
work. So, give it and yourself a break. All  
that work merits a greater reward than a  
pile of assorted scrap smothered in tears.

### BILL OF MATERIAL

(All measurements in inches)

3 pieces 1/8 x 3 x 36 medium hard sheet  
balsa; 2 pieces 1/16 x 3 x 36 medium hard  
sheet balsa; 1 piece 3/32 x 2 x 36 medium  
hard sheet balsa; 1 piece 1/16 x 6 x 12 air-  
craft plywood; 1 piece 1/4 x 3/8 x 12 hard-  
wood motor mount stock; 1 piece 1/16 dia.  
steel music wire 3 ft. long; 1 piece 3/64 dia.  
steel music wire 3 ft. long; 1 pkg. .016 dia.  
flexible lead-out wire; 1 2-in. bellcrank; 1  
pair 1-1/4 dia. wheels; 8 oz. clear dope; 8 oz.  
thinner; 4 oz. colored dope; 1 tube cement.