

23 Sportster

by William Winter

● Free-flight gassies have become such temperamental critters that you rarely see anyone flying them just for the sport of it. Who would fly a modern contest design except at a meet or for testing? Chances of a good bash or an out-of-sight flight are too great. But why write off free-flight for everyday flying when a sport model can be so much fun?

The "23" Sportster was de-

signed around the popular mass-produced Ohlsson of that displacement. It is as large, and as small, as practical. Spanning a shade under five feet, it is about as small as you can go and still have sport performance from a good "23." Anything larger—and the Ohlsson will fly a ship that is plenty bigger and heavier!—would be impractical for most builders. Few people like to transport

If sport flying is what you're interested in, this new, different free-flight plane is right down your alley. Get out your "23" and start building!

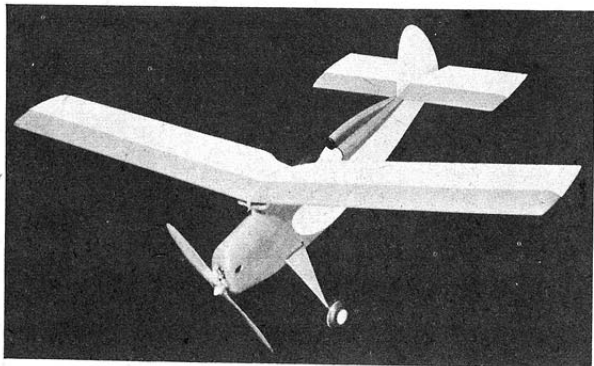
clumsy airplanes and, besides, materials cost a small fortune.

The wing area is approximately 400 square inches, and gross weight is about twenty-seven to twenty-eight ounces, complete with two coats of clear and three coats of colored dope. This works out to a power loading of roughly 120 ounces, or a bit higher than the rules require for contest airplanes, and to fourteen ounces wing loading, considerably higher than anything flying today. The result is a ship with fairly good power performance by any standards and a somewhat fast glide that isn't apt to flirt with thermals or lead you on a chase across county.

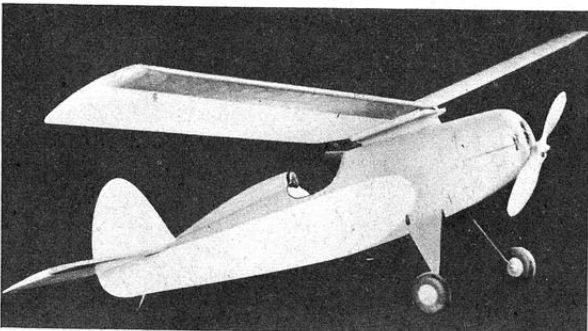
It would be difficult to cut down more on the power performance without increasing the size of the airplane or stepping up the gliding speed disastrously, but the builder can throttle back to keep the ship within the limits of his surrounding terrain. Outside of the usual and necessary fore-and-aft trimming for adjustment, you should resort only to mild rudder movement for controlling the flight path.

The original airplane uses conventional ignition with an Aero-spark coil and a Burgess battery pack. While glow ignition may be used, we didn't use it for the original model because, without coil and battery weight, performance would be stepped up too much. Also, a glow plug does not afford the degree of throttle control required for cruising flight. Finally, by using standard ignition, you avoid the necessity of hot-fuel proofing your plane.

A most unusual feature of the "23" Sportster is the large diameter propeller—a 14-inch Flo-Torque. Yes, we know the prop is too big for the engine—but we want realistic performance, in-



The large size of the 23 Sportster in relation to its power plant permits you to have a fully cowled engine. Simple sturdy construction prevents excessive damage in case of a crash, and prolongs the life expectancy of the ship. A far cry from a contest high climber, this realistic sport job boasts of hardly any climb at all—nothing but just plain flying fun all day long, with nary a worry about thermals and such!



stead of this standing-on-the-tail stuff. The O & R 23 does a surprisingly good job of driving this big prop.

If you want to use a smaller prop be sure that the diameter selected is still considerably oversized. Remember that bigger, overloaded airplanes—other things being equal—require more diameter and blade area than you might be used to.

FUSELAGE CONSTRUCTION: Two side frames are made in the usual manner, by pinning down $\frac{1}{4}$ " square hard-balsa longerons. Note that the cross pieces back to the cockpit are $\frac{1}{4}$ " square and, behind that, $\frac{1}{8}$ " x $\frac{1}{4}$ ". These frames are joined as on any box—the sides being flat to behind the cockpit then pulling together toward the rear. The formers are added next. F-1, F-4, and F-5, are $\frac{1}{8}$ " sheet; F-2 and F-3 are $\frac{3}{16}$ " sheet; and F-6 and the others to the rear are $\frac{1}{16}$ " sheet.

Cement in the two long pylon supports ($\frac{1}{2}$ " x 1") before adding the $\frac{1}{16}$ " sheet turtleback, forward of the cockpit. These two pieces are slotted to fit over the formers, and around the fuselage cross pieces that support the formers. Add the sheet turtleback before completing the pylon support, or the pylon itself. One-eighth-inch square stringers fair the top of the fuselage behind the cockpit.

The head-rest fairing block is soft balsa, hollowed, made from an 11 inch long 1 inch square block. The firewall is cut from $\frac{1}{8}$ " plywood and is cemented in place after you've cut out the holes for the motor bearers. While these bearers are quite deep, being cut from $\frac{1}{4}$ " hardwood, even $\frac{1}{4}$ " x $\frac{1}{2}$ " standard bearers can be used. In either case, carry the bearers back to the fuselage station that supports the Burgess battery box (see side view), and cement them to the inside face of the nose block cowl.

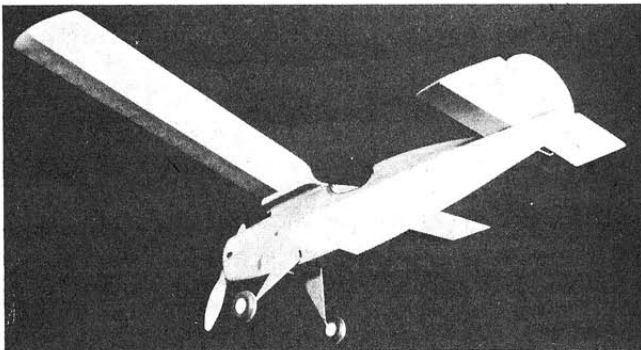
Fill in the second station (by the battery) with $\frac{1}{4}$ " sheet balsa to support the rear ends of the bearers. The battery box is built from $\frac{3}{32}$ " sheet balsa, using the battery itself as a template. A snug fit holds the battery in place.

Note the location of the coil, between F-1 and F-2. Don't for-

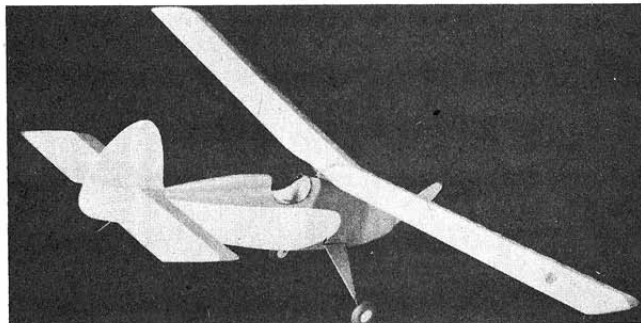
get to take care of the ignition hook-up wiring! A timer is not essential. If used, it should be mounted through a sheet balsa support on the left side of the fuselage.

Three pieces of music wire are used for the landing gear. There are two axle pieces of $\frac{3}{32}$ " wire

which run up to the fuselage, projecting about $\frac{3}{4}$ " into a piece of aluminum tubing ($\frac{1}{8}$ " O.D., $\frac{3}{32}$ " I.D.) which extends through the fuselage. This tubing runs through the center of a $\frac{3}{8}$ " square piece of hard balsa and may be seen on the side view, where the (Turn to Page 63)

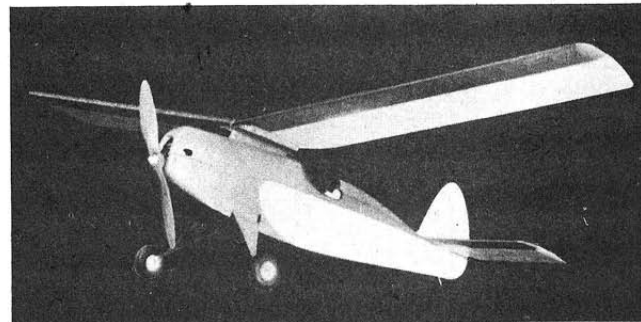


An easy model to build, the slow stable flight characteristics make the 23 Sportster an ideal medium for learning the fine art of adjusting model planes for good flight performance. Although massive in size, it should present few problems for the novice.



Believe it or not, an engine of .23 displacement provides ample power—in fact, a .19 engine with glow-plug ignition can also be used. Build it and fly it yourself!

The general lines of the Sportster have purposely been kept sweet and simple—yet you'll find that take-offs and flight performance approach full-scale plane realism.



23 SPORTSTER

(Continued from Page 23)

end projects to the outside face of the $\frac{1}{8}$ " sheet fill-in. The third piece of wire ($\frac{1}{16}$ ") runs from one wheel up to the fuselage, then through the slot seen on the side view, through the fuselage, and down to the other wheel. Where this wire meets the axle, close to the wheel, bind it with thin wire and solder. Use acid core solder, or solder and flux, making a sweat type joint.

The struts are filled in with $\frac{1}{8}$ " sheet (keeping the grain running vertically) laminated with $\frac{1}{16}$ " sheet (with the grain running across the strut). The finished strut is sanded and covered with silk.

Note the hook-and-rubber arrangement for attaching the rear wire to the bottom cross piece in the fuselage. This provides ample shock-absorbing action. In a bad crack-up, the front wire pieces will pull out of the fuselage without harm. The tail skid is bent to shape from approximately .032" wire and cemented in place.

The cowl is built up from five balsa blocks (see detail). The two side blocks are each $\frac{3}{8}$ " thick and should be the full depth of the cowl to permit safe carving. The top block is $\frac{3}{8}$ " thick (use 1" plank and cut away later) and 1 $\frac{1}{4}$ " wide. It should be exactly 3 $\frac{1}{16}$ " long after carving and sanding has been done, so allow an extra $\frac{1}{4}$ " at this stage.

The bottom block is $\frac{3}{4}$ " thick, the same width, and—allowing for slanted ends to fit both the firewall and the front block—4 $\frac{1}{2}$ " long. Add $\frac{1}{4}$ " temporarily to allow for spoilage. Use wood chisels to hollow the nose to an average wall thickness of about $\frac{1}{4}$ ". For the exact cross section of the rear of the block hold the assembly against the firewall and trace the outline.

The nose block itself may be marked out on a 1 $\frac{1}{2}$ " thick block (1" is okay too) that measures 2 $\frac{3}{4}$ " x 4", by standing the cowl assembly on end and tracing around its nose with a pencil. That portion of the cowl that lies between the front block and the firewall above the top line of the engine bearers is made removable, for working on the engine. It fits snugly enough to eliminate the need for hinges or dress-snap fasteners.

The front block is cut out as seen on the front view, to permit passage of the shaft and to admit cooling air. A cooling louver is made on each side of the cowl close to the firewall by cutting the proper sized hole and cementing a small heavy celluloid fairing over it.

Inasmuch as the engine is readily accessible through the nose opening, no provision need be made for holding the mounting bolts in the holes in the bearers. Be sure to make a drain hole at the bottom, just in front of the firewall, and to coat the entire inside of the cowl compartment with two coats of cement. Cut choke and exhaust holes as necessary.

Now complete the pylon structure, following the plans. A piece of $\frac{1}{8}$ " very

hard sheet balsa is holed for the two vertical supports over which it fits, its top surface flush with the tops of the supports. The grain should run spanwise. Over this piece, cement $\frac{1}{4}$ " sheet, with the grain fore and aft, cutting away the sheet to a Vee after the cement sets, to agree with the dihedral angle of the wing.

Fill in between the supports with $\frac{1}{8}$ " thick pieces of scrap balsa, rounding the front of the foremost piece and shaping the back of the rearmost piece to a pointed edge. Note the .045" ($\frac{1}{16}$ ") will do in a pinch) music wire rubber hold-on hooks. $\frac{1}{4}$ " dowel may be substituted if you prefer. This wire or dowel fits between the filler pieces and the supports, sticking into the supports as shown on the side view.

TAIL SURFACES: The stabilizer is built as you would make a wing, with two spars of $\frac{1}{4}$ " x $\frac{1}{4}$ " laid flat on the bench, and the ribs cemented down on the spars. The $\frac{1}{4}$ " square leading edge and the $\frac{1}{4}$ " x 1" trailing edge are then added, but are not shaped until the surface is completed. Triangular trailing edge stock can be used.

All wood, excepting the medium hard ribs of 3/32" sheet, should be hard. Since it carries no loads, the tip shaping piece can be soft, perhaps slightly hollowed if the builder desires. Note the trailing edge notches for the ribs and be sure that the ribs are not force-fitted or warps will result.

The vertical tail is cut from 3/32" sheet balsa, with three widths butted together for a single surface. Round the edges and sand the wood smooth—do no other shaping. A hardwood 1/16" dowel fits in a slot that runs cross grain. Dope both sides of the rudder with clear dope that has been well plasticized (Mix a half teaspoonful of castor oil in a large bottle of dope). This prevents warping and adds toughness to the wood.

The rudder is cemented to the top of the stabilizer and the entire assembly cemented onto the fuselage when the covering has been finished. Note the two fairing blocks at the rear of the fuselage, at each side of the rudder.

WINGS: Each wing panel is made in a similar manner to the stabilizer. That is, the two bottom spars are pinned to the plans, after which the ribs are inserted in position, and the edges and tip added. When the structure has been laid out, finish it by putting the top spar in place. The soft balsa tip blocks may be slightly hollowed if desired.

If any of the material sizes prove hard to get, cut them from sheet balsa. The $\frac{1}{4}$ " x $\frac{3}{8}$ " leading edge, for example, can be cut from $\frac{1}{4}$ " sheet; the $\frac{1}{8}$ " x $\frac{1}{2}$ " spars from $\frac{1}{8}$ " sheet, and the 3/32" x $\frac{1}{2}$ " top spar from 3/32" sheet.

Note that the center 3/16" sheet rib is not located until it is time to join the two panels.

To install dihedral, place one panel flat on the bench and, when joining the other to it, raise the tip 8" for dihedral (or raise both tips just 4"). Then cement the 3/32" balsa sheet spar joiners in place against the spars where the dihedral break occurs.



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COVERING: Each side of the fuselage should be covered with one piece of heavy gas model silkspan, with the grain running from nose to tail. Each piece should extend up over the sheet turtleback and the stringered section behind the cockpit. Use a third piece for the bottom of the fuselage and as many small pieces as necessary to cover the exposed wood surfaces of the nose cowl.

Coat all large wood areas with dope and allow to dry before starting to cover. Then wet the covering—the dope will adhere through the moist tissue and wrinkles will be virtually eliminated.

Cover the stabilizer with two pieces of silkspan, one for the top and the other for the bottom. Four sections will do for the wing.

In covering, it is a good idea to dope one end of the paper first, stretch it taut, dope down the other end, then stretch it toward the outside edges to dope them to the wood. Wet the ragged edges with dope and rub down with a finger tip. After the covering is dry, it should be given two coats of clear dope, followed by two to three coats, as necessary, of colored dope. The original ship was yellow with red trim.

FLYING: Since this is not a tricky high-performance airplane, no intricate adjustments are required. The ship should balance at about 50% of the chord back from the leading edge. Hand-rotate as usual for preliminary testing. If tail heavy (stalling or mushing)—very unlikely on this airplane—remove incidence from the wing by placing a sliver of balsa under the trailing edge. More likely, the ship will prove nose heavy on first tests. Positive incidence should then be used by raising the

leading edge of the wing as necessary. Use the rudder for controlling the circle of the power flight. If a stall or mush is evident under power, but not in the glide, add down thrust by placing washers under the rear of the engine mounting lugs.

BILL OF MATERIALS (Balsa unless otherwise specified)

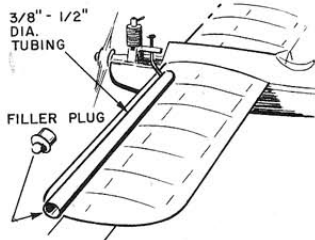
6-1/4" x 1/4" x 36"	Longerons, cross pieces, stab leading edge
4-1/4" x 1/4" x 36"	Cross pieces, stab spars
1-1/4" x 1" x 36"	Stab trailing edge
2-1/4" x 1/4" x 36"	Wing trailing edge (can be cut from 1/4" sheet)
1-1/4" x 3" x 36" sheet	Landing gear leg, formers
1-1/16" x 3" x 36"	Turtleback, formers, landing gear leg
2-1/4" x 1/4" x 36"	Stringers
1-1/4" x 1" x 11"	Head rest (can be cut from soft 1" plank)
3-3/32" x 3" x 36"	Wing and stab ribs, rudder, battery box
1-1/4" x 5/16" x 2 1/2"	(plywood) Firewall
1-1/4" x 1/2" x 2 1/2"	(hard wood) Motor formers
1-3/8" x 3/8" x 14"	Wing tip blocks (can be cut from soft 1" plank)
1-1/2" x 9/16" x 14"	Stab tip blocks (can be cut from soft 1" plank)
1-3/8" x 2 1/2" x 4"	Tail fairing blocks
4-1/4" x 1/2" x 36"	Wing spars
2-3/32" x 1/2" x 36"	Wing spar, joiners
2-1/4" x 1/2" x 36"	Wing leading edge
1-3/8" x 5/16" x 8"	Cowl (or butt-joint 3" wide 1/2" thick wood)
1-1/4" x 3/8" x 8"	Cowl (can be cut from soft 1" plank)
1-1" x 3" x 4" block	Cowl (can be cut from 1" plank)
3/16" scrap sheet balsa	Center wing rib
1/2" x 1" scrap	Pylon support struts
3/8" x 3/8" scrap	Fill-in formers
1-1/4" O. D. x 2 1/2"	long aluminum tube
3"	.032" wire (diameters up to 1/16" okay)
1-24"	length 3/32" music wire
1-24"	length 1/16" music wire
1-4"	length 1/16" dowel
1-6"	length .045 music wire

Wing hold-down fittings (diameters up to 1/16" okay)
Scrap silk or linen for landing gear leg covering; "23" engine; Aerospark coil; condenser; half-teaspoonful castor oil; clear dope; colored dope; two sheets heavy silkspan; thinner; masking tape; hook-up wiring; two 3" wheels (Banner, if possible); celluloid.

HANDY HINTS

(Continued from Page 62)

Running time for a 2 cc. diesel is about five minutes per foot of 3/8" diameter tubing (2 cc. is equal to .12 cubic

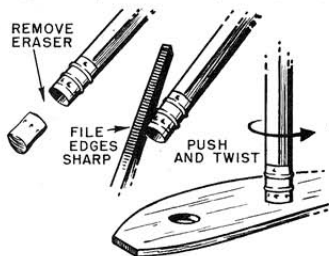


inches). The opposite wing tip should be weighted to balance the model laterally.—ROLAND COTT, St. Helens, England

Homemade Punch

No, this isn't a recipe for party refreshment! Punching neat holes in wing

ribs and nose blocks is always a tedious chore. Try using this hint if you don't have any commercial tools available: Simply remove the eraser from an ordinary pencil and carefully file the metal edges sharp. When using the punch,



turn as you push it through the wood.—WILLIAM L. CARR, Omaha, Nebr.

Removing Extension Shafts

Some modelers may have had trouble removing Froom extension shafts from the spinner head or prop shaft nut. Using pliers, of course, does not do the threads any good! Instead, drill holes through the ends of the shaft. Then,