Stinson Detroiter

OUR Stinson Detroiter has been thoroughly tested, both as a rubber-powered flying scale and as a gas model with the OK Cub Spanning approximately three feet, with material sizes selected to hold down weight, it is an excellent flyer. The rubber motor is tensioned and wound like any contest model (though this is optional); the Cub engine is fitted with an 8″ x 3½″ Top Flite propeller which holds down the rpm enough to provide realistic performance. An Infant should give realistic scale-type flight, but will be unable to take off such a big airplane

The plans show the true-scale outline, which will enable solid fans to reproduce the ship as a replica U-control enthusiasts can use the same scale outlines to modify the Stinson for their kind of flying. With the light structure shown, U-control models will be limited as built to small engines, from .09 to .19. But by redesigning the structure with typically sturdy wing edges, sheet fuselage sides, and sheet tail, the Stinson can be made to handle engines commonly used in ships of this span and area.

Flying scale models seldom trim out as built. Rubber motors for instance, cause the c.g. position to fall far to the rear and, in this size, the gas engine shifts the c g. correspondingly far forward. For rubber, your Stinson will balance at the 75% chord point before ballast is added for trim, and, with gas, balances at or about the leading edge of the wing. For the latter condition, ballast is added to the tail. While some liberties were taken

with scale, such as additions to dihedral, landing gear length, and tail area, every effort was made to hold the wing and other assemblies in their proper position, hence the use of solder ballast.

Although the original model used interchangeable gas and rubber motor assemblies, making dozens of flights with each type of power plant, it is better to decide which version you wish to fly. If it is to be gas, it then will be possible to expend more weight on heavier covering, filling, fuel-proofing, and finishing. However, the structure is so light that it is possible to fly the rubber version when also finished for gas. The original had two coats of clear dope, followed by one of Testor's sanding filler, and two coats of orange, and was then fuel-proofed—yet it put up a creditable performance under the winder! Except for the nose, both versions are identical in structural design.

Fuselage: All longerons and cross pieces are of very hard 3/32″ square If hard wood can't be obtained, use ⅛″ square The sides are pinned down, superimposed, on wax paper directly over the plan Note that the upper part of the cabin, on the sides, is 3/32″ sheet with two 3/32″-square holes cut precisely to key the wing spar ends in final assembly Finished fuselage sides are joined first with the cross pieces that are located at the leading and trailing edge station of the wing. This section of the fuselage is flat sided and cross pieces between these two stations may be added next When dry, the rear of the fuse is drawn together and remaining cross pieces added To build up the nose, crack the longerons (see top view) at the forward edge of the windshield, then cement in 3/16″-wide cross pieces cut from 3/32″ sheet Finally fill in the other nose cross pieces add the 1/32″ sheet fairing formers and the 1/16″-square nose stringers

The bottom of the fuselage is faired by means of two soft 3/32″-square pieces, glued onto the cross pieces as seen on the bottom view The top of the fuselage is faired with 1/32″ sheet strips set on edge These strips can be sanded to the proper taper after the cement holding them in place has set firmly Note the installation of the 3/16″ dowel rear rubber peg the 3/16″-thick nose former that simulates a collector-ring exhaust, .028″ tail skid and gusseting at points where the landing gear attaches The top of the cabin is covered with 1/32″ sheet, grain running crossways, close to the windshield. (See top view)

Tail Surfaces: Stabilizer is of symmetrical cross section. There are three 3/32″-square spars, two (one top and one bottom) at the elevator hinge line position, and one farther forward on the bottom only The ⅛″-square leading and ⅛″ x ⅜″ trailing edge should be hard balsa, and the ⅛″ sheet tip pieces at least of medium weight The ribs can be cut as rectangular blanks from 1/32″ sheet then cemented down on the two bottom spars, directly over the plans The top spar and tip pieces are added Be sure to place pieces of scrap sheet balsa beneath the edges to support them above the bench halfway up the thickness of the ribs If the edges are pinned down on the bench, the final cross section will be a low-lift airfoil The trailing edge is notched for the ribs When the stabilizer is completed sandpaper the ribs to a streamline cross section flowing smoothly into both edges

The vertical tail, being flat, may be laid out on the plan just as the fuselage sides were The ⅛″ square spar and ⅛″ square and ⅛″ x ¼″ edges are put down first, then the 1/16″ x ⅛″ cross pieces and ⅛″ sheet tip pieces filled in Note that the lowermost cross piece of the fin proper is cut from ⅛″ soft sheet balsa and permits a small movement of the stabilizer for trimming purposes

Wings The wings consist of a right hand and a left hand panel each being built separately on the plan When completed, these panels glue lightly to the fuselage sides so that they can be removed if necessary with a sliver of a razor blade

With the exception of the root or base rib, which is of 1/16″ sheet all ribs are made from hard 1/32″ sheet balsa Note that the ⅛″ x ½″ trailing edge (triangular edge stock) is notched for each rib as a precaution against warps There are four spars of 3/32″ square After matching all ribs for exactness of length pin down on the plan the trailing edge and the two bottom spars using one of the ribs to space the work Cement the ribs in place then the two top spars The ⅛″ x ¼″ leading edge is cemented in place on edge but is not shaped until the wings are complete and removed from the board Both tip pieces are cut from 1/32″ sheet (see front view of wing tip for shape of tip gussets) Be careful that the root ribs are properly slanted for dihedral—make a cardboard template if necessary to align the rib—and reinforced, top and bottom with 1/32″ sheet cut ¼″ wide The lower spars are allowed to extend slightly to fit into the key-holes in the fuselage sides

Dummy Motor The dummy motor serves as the nose block on the rubber model and is holed to take the nose plug proper which can be withdrawn for winding and rubber replacement The crankcase is laminated from two ¼″ soft sheet balsa pieces the plug itself from two discs of the same material There are nine dummy cylinders (See detail) Sandpaper round a short strip of ½″-square soft balsa for the cylinder barrels dome the end of each cylinder by rubbing with sandpaper then notch to take the rocker arm cover boxes These were made from short pieces of ⅛″ dowel rounded on the ends Glue the boxes to the cylinders, and fit the cylinders onto the crankcase. The dummy motor is cemented to the collector ring former, but the plug remains loose The square key of the plug is two-ply hard ¼″ balsa

Propeller The prop is cut from a fairly soft block of balsa, measuring 1 5/8″ x 2″ x 10″ A machine-cut balsa blank for a larger diameter may also be cut down to give the wide blade necessary for a flying-scale job Note, however that the spinner is cut integral with the prop on the original model. Blank out the block, first in depth, then in width, and drill a hole for the shaft After carving and sanding, round the corners, resand, then balance A ⅝″ x ¼″ piece of brass—any thickness but heavier than shim brass as used in small tanks—is drilled to take the shaft, and the U-shaped end of the shaft in front of the prop When the tension of the wound rubber motor pulls back the U-shaped shaft it fits through the hole in the brass plate which is cemented to the front face of the propeller The tensioner spring should not be heavier than #8 and may be obtained from any of the better hobby shops or wound around a dowel from light music wire. A sheet brass bearing is cemented to the rear face of the propeller hub, and a similar bearing to the front of the nose plug Cut this bearing from the sheet metal washer shaped but with two pointed ends which may be bent over and imbedded into the wood The tensioner screw is a ⅝″ woodscrew, positioned to stop the prop in a crosswise position.

Wire Parts The propeller shaft and wheel axles are bent to shape from .040″ music wire Heavier, but not lighter wire may be used for a shaft To make the shaft, begin by bending the rubber hook then slide the plug over the straight portion, slide two or three loose friction washers in place then the prop The winding loop and U-shaped end bent with the spring already in place The wheel axles are short pieces (see side view) with the ends bent at right angles and are bound in place with fine thread and thoroughly cemented The tail skid wraps around and is glued to a wide cross piece cut from 3/32″ sheet

Covering Tissue is best for the rubber job, light Silkspan for the gas model If the latter, the neatest job results from wet covering Dip the Silkspan in water, then place over the surface to be covered, working into place with the finger tips, and doping down to edges, longerons and so forth, as usual Grain runs lengthwise on the fuselage chordwise on the wing Spanwise grain frequently pulls down the trailing edge The original model was covered throughout with Silkspan for both gas and rubber If dry covered, water spray the finished job and allow to pull taut Silkspan will require at least two coats of dope If the dope appears thick, thin it down slightly with thinner

Landing Gear: Build up the struts from hard ⅛″ x ¼″ with 1/16″ dowels, fitted into the front edges of the struts To grove the balsa for the dowels, gouge out the proper edge with a short piece of dowel sliding it along as you would a chisel Cement the dowels in place and, when dry streamline the struts with your razor blade and sandpaper. Glue together two landing gear vees, according to the actual length pattern given on the plans To attach the vees to the fuselage scrape away the paper at the joints to be so that the cement will hold wood against wood Slant the ends of the vees for the proper fit, then cement in place holding with pins until dry Attach the axles and the wheels Try to use lightweight wheels unless it is to be a U-controlled model On the original model it was necessary to make home-made wheels by laminating three ⅛″ sheet balsa discs, with washers cemented over the hubs as bearings

Assembly Cement one wing panel in place First, mark with a soft pencil the intended bottom line of the wing to insure accuracy Make four wing struts from ¼″ sheet balsa cutting them ⅝″ wide Note that two of the struts (front) extend only from the landing gear out to the wing the short piece between the gear and the fuselage being an extension of the ⅛″ x ¼″ landing gear material Slant the ends of the wing struts and scrape away the paper where the struts will glue to fuselage and wing Cement the two struts in place and complete the landing gear, as seen on the front view The shock absorbers are simulated by rounding square soft balsa and forcing ⅛″ dowels lengthwise through them After the wing has been installed on one side, and the gear and wing struts filled in, position the other wing panel and complete the details as before Be sure, however that the incidence is exactly the same for both panels otherwise banked flight will result Draw the bottom line of the wing on the fuselage side and before the cement has set during assembly measure from the top longeron down to the trailing edge position

To install the stabilizer cement a piece of 1/16″ hard balsa over the top of the rubber post to insure the incidence specified on the plans then cement the stab itself lightly in position The rudder cements over the stabilizer and to the rear face of the rudder post. It should be possible to elevate the leading edge of the stabilizer with trim shims if required Stabilizer struts (see rear view) are cut 3/16″ wide from 3/32″ sheet balsa and streamlined with sandpaper Brace wires are added after painting

Finishing For lightness and maximum duration the rubber model should be tissue-covered and unpainted Colored tissues may be used for any desired color scheme The original was color-doped all-orange, somewhat reducing duration but not handicapping gas engine performance The gas job may be given two or three coats without fear; use one full strength coat, followed by one or two coats cut half and half with thinner Color the wheel tires and dummy motor black and outline the control surface post with black tissue or dope The gas model should be well fuel-proofed around the nose, back to the trailing edge of the wing on the sides, and to the very rear on the bottom Fuel-proof the wing center section, to about one-third span on each side

Gas Motor Instead of the dummy motor and plug face the nose with a piece of very hard ¼″ thick sheet balsa To this is attached a disc of 1/32″ ply and, when the cement bond has dried, the holes for the radial mounting of the engine are drilled The nuts are cemented behind the balsa bulkhead It is advisable to use wide washers to avoid crushing of the wood due to tightening of the machine screws

An Infant-type wedge tank is installed with filler and ent of neoprene sticking out through holes in the top and bottom of the fuselage (See detail.) A piece of ⅛″ square balsa is run through the fuselage beneath the tank as an added support

Rubber motor The rubber motor consists of ten strands of ¼″ flat T-56. If no tensioner is used, make the strand length agree with the distance between the rubber hooks If a tensioner is used, make each strand double the distance between hooks To tension the rubber hook one end of the motor over a door knob, then divide the motor into three sections of four, four, and two strands respectively, then stretch and wind each section about 35 turns of your winder Slide a clothespin through the winder end of each section and then braid the sections, while stretched. Have someone help you When done, stretch each end and tie tightly near the end with a strand of rubber Rub commercial rubber lube or glycerin and greensoap into the rubber and wipe off the excess matter that will splash against the fuselage sides.

Flying Hand-glide the model over tall grass This is essential because ballast will be added for trim first glides producing a stall in rubber, or a dive in gas The idea is to produce a *fast* glide before trying power To get this trim, add strip solder inside the nose for the rubber model, or in the rear tip of the fuselage for the gas model When trim has been obtained, put about 50 turns on the rubber motor and hand-launch over the same tall grass Add downthrust as necessary to obtain power trim. If the glide is satisfactory but the model persists in stalling under power, downthrust is the only solution. If the glide becomes a dive, then too much ballast has been used on the rubber model, or not enough on the gas model Turns may be added in increments of 10-20 a flight as trim is worked out. In gas, control the motor run either by using a fuel shut-off device or by carefully measuring the fuel If the gas model glide is satisfactory, first power flights should produce a stall approach, so it is advisable to offset the rudder to the right. Instead of complete stalls followed by a possible nose-in, the rudder offset will insure that the ship slides off making for a transition into a glide for recovery Fly the gas model with minimum power possible, for the excellent thrust of the Cub is certain to result in a flying speed sufficiently great to cause a nose-up condition. The proper procedure of course, is to carve a prop of extremely flat pitch, which, being inefficient, holds down flying speed for reasonable, realistic performance Retain large diameters to retard rpm's