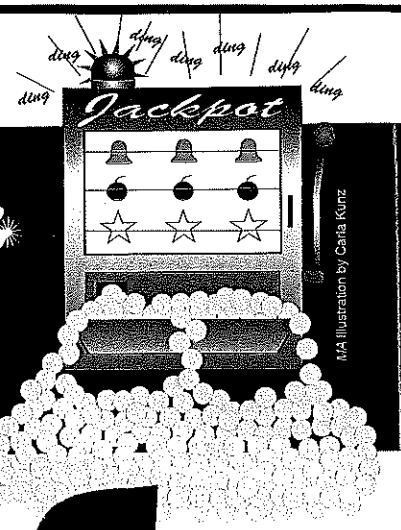
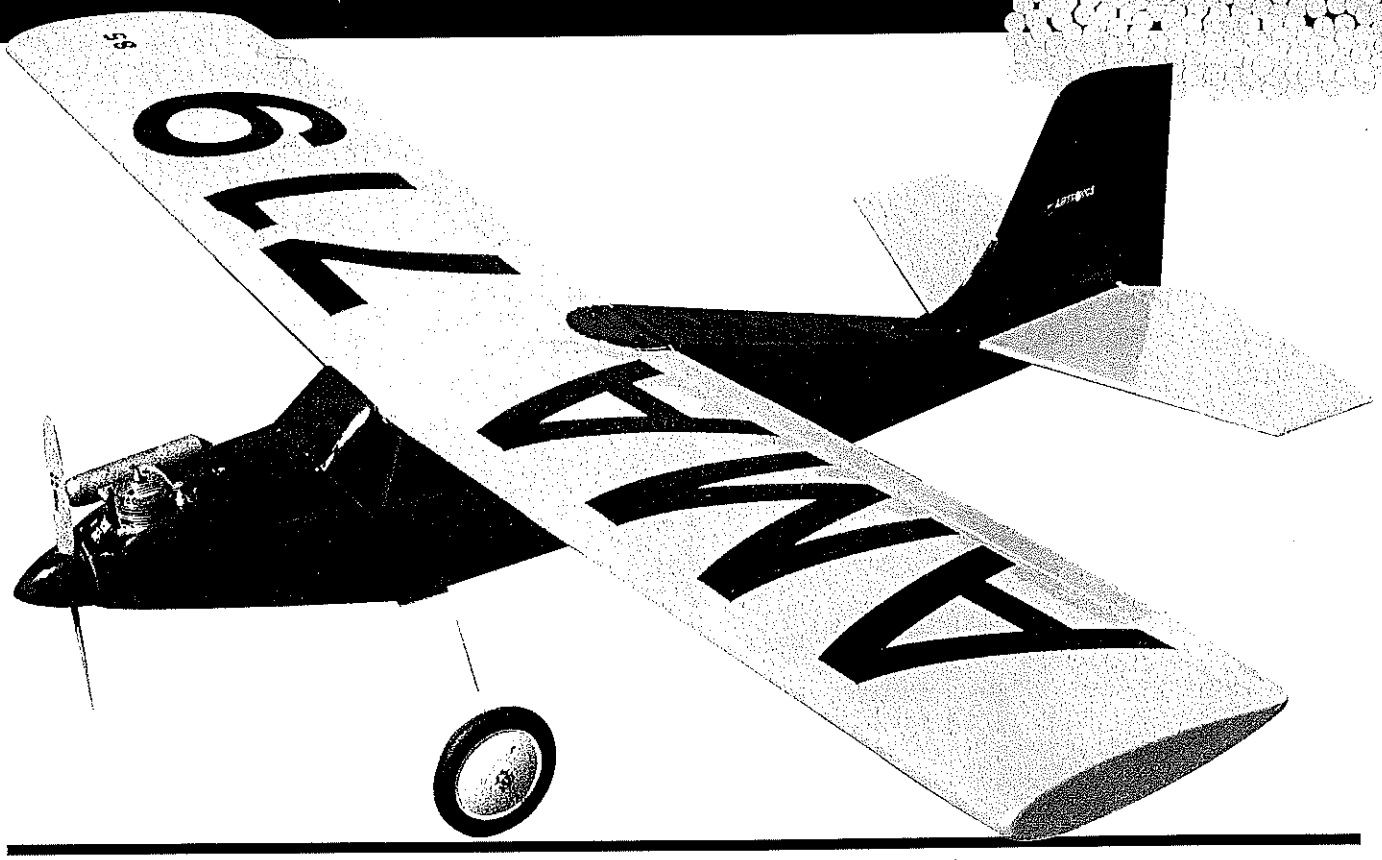
Jackpot



M/A illustration by Carla Kunz



Strike it rich with the final installment in the Winter trilogy

■ **Bill Winter & John Hunton**

It is one thing to test a model in isolation and get to know how it flies, but at a recent gathering of Bill Winter and his friends I was privileged to fly at least 15 different airplanes before taking Jackpot up, and this comparison might help you to prepare to fly this model. Even though we RCers fly our models through a control system which, unfortunately, does not provide sensory "feedback" from varying air pressures and perspectives from the cockpit, Jackpot provides strong feedback through its visual cues.

Of all the models that I flew that day, Jackpot was the most rock-stable of all. It is a completely forgiving and insensitive airplane, just like a well-designed trainer, yet it provides a great platform from which to explore advanced areas of flight. If you can fly any trainer you can fly Jackpot, and Jackpot will do so much more.

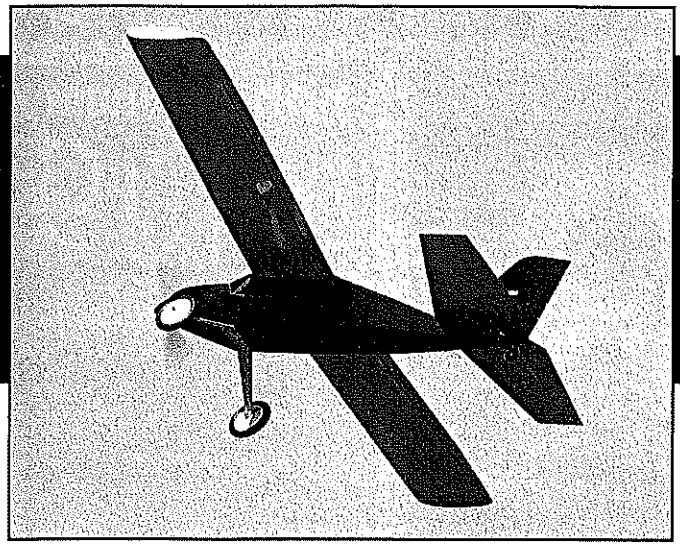
John Hunton

CONSTRUCTION

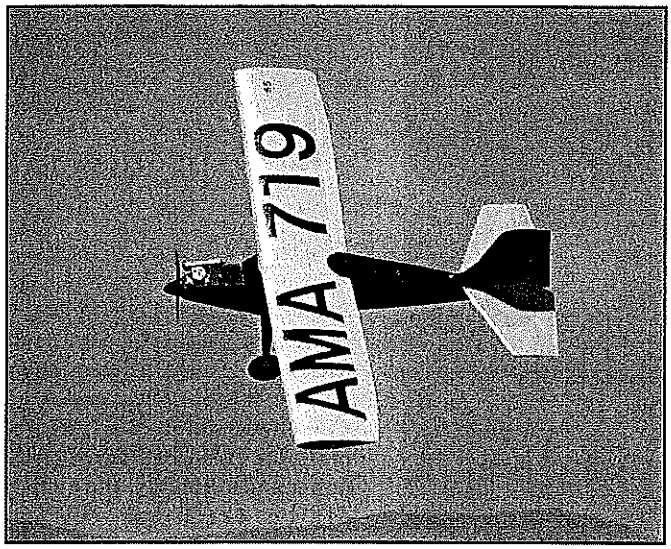
General: Select light balsa (less than six pounds per square foot). Some balsa-supply houses will even hand pick all of your wood for a specified surcharge, or they may list some common sizes separately as guaranteed light weight. Order extra pieces to ensure matching substitutions if needed.

Balsa for wing sheeting cannot be quarter-grain, which splits upon bending; it must "curl" easily along its length to facilitate matching airfoil contours and to eliminate any tendencies to pull free.

While you want light wood, eliminate anything too "mushy." You may still have to pick out a few firmer strips for wing and tail leading edges, which are (ideally) medium-light. Aileron and tail spars are medium. All blocks must be light wood. Wood size specs are given on the plans and are generally not mentioned in the directions. Covering materials are of your choice, but we use Coverite films and paints.

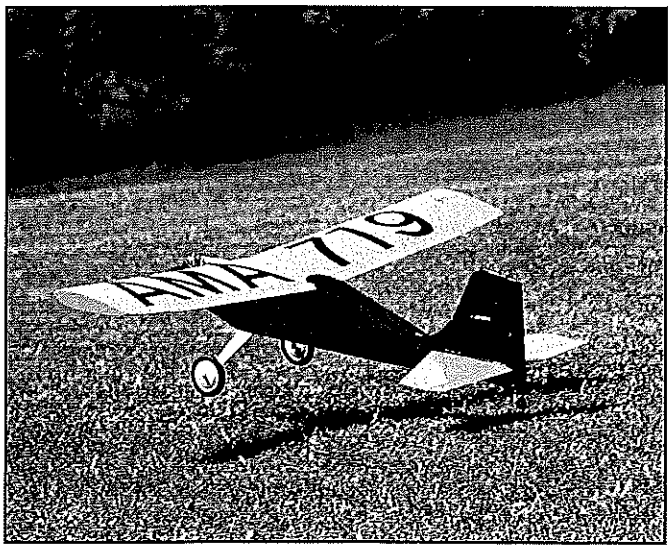


Classic proportions and cabin-type layout belie the aerobatic capability of Jackpot. An excellent "step-up" trainer.



Jackpot can "extend the envelope" into respectable inverted flight and basic aerobatics, including outside maneuvers.

Photos by Bill Winter and Bernie Stuecker Graphic Design by Carla Kunz



Rudder becomes primary directional control surface when landing. Little or no flare is better than flaring too high.

Like its predecessors in this trilogy (Osprey and Ascender), Jackpot is a special design. How so? Well, in spite of its high-wing cabin theme, that pleases sport fliers, it has a symmetrical airfoil; a flat-bottom-wing cabin model is not in the same ballpark. Jackpot is a worthwhile step up, without intimidating any pilot who is adept at thrashing around with so-called trainers.

Powered by the economical K&B .45 Sportster (or the .40 or more of your choice), this 68-inch smoothie has an area of 4.518 sq. ft. at seven pounds, five ounces gross, a 15% thick airfoil of the NACA 00 series mounted with three degrees decalage.

Because this wing section is extremely stable, a smaller stabilizer could be used, but we elected for one of 1.78 square feet area. Jackpot flies "on the step" and has superb stall characteristics.

The wing is sheeted top and bottom, a built-up structure that is accurate and as efficient as a foam-skinned wing (it can also be open-sheeted).

Jackpot is a small big airplane in that like any well behaved full-scale of its type, its control responses around all three axes are perfectly coordinated; consequently, the model is pleasant to fly and a delight to watch. It is fully aerobatic with a nice roll rate, good tracking, easily inverted, outsides, etc. and yet it flies "on-the-wing" and not like a powered surfboard. Two wing servos allow a flaperon option.

The genealogy of Jackpot goes back to the early 1960s Lightning Bug, a published and kitted .010 powered escapement (rudder only) cabin which was, at the time, the world's smallest RC. The popular Bug had a flat-bottom wing. That midget subsequently appeared as a larger .09 version, and as a published "standard" can Electric motor electric or .049 gas. The original force diagram was employed in Jackpot, except for the nose length change and the symmetrical airfoil. Why reinvent the wheel? Gilding the lilly is much more fun.

Jackpot, in my mind, is flawless; that is a warranty.

Bill Winter

The frame has noteworthy features. The wing (optional open framing) and stabilizer are sheeted with balsa top and bottom. The aft top and bottom fuselage sheeting runs lengthwise to the fuselage. The flying surfaces are true (efficient) and strong. If wood is selected as indicated, the gross weight is quite acceptable.

Fuselage: Make a thin cardboard side template of the fuselage profile at the wing mount, using the front butt line of the side sheeting as a baseline, and cut another template for the aft end extending forward, by one station, from the stab leading edge. Use these templates for marking outlines, guaranteeing precise duplication of the relative incidence angles of the wing and stab. Do not complete assembly of the windshield area until holes for the two wing hold-down dowels have been drilled through the predrilled former holes into the wing "grabber" plate. Note that the dowels are integral with the fuselage.

True the edges of the side sheeting by clamping a metal straightedge over the sheet to the bench top and trim with a #11 X-Acto™ knife. Extend sheeting as required at the kerfed joint if you cannot get 48-inch balsa for the sides. Use pins and/or masking tape to hold seams together. Join with cyanoacrylate (CyA) glue. Align the bottom edges of both side sheets and clamp to the bench, opposite sides up, and mark off former positions with a soft pencil and a T-square. Downthrust and side thrust (to the right) are provided by tilting and slanting the firewall.

Each side will be preassembled as far as possible before joining.

Cut inner and outer nose doublers, trial-fit, and attach the outer doublers with spray contact cement (such as 3M™); repeat for the inner doublers. Pin, then CyA all longerons and cross pieces into place.

Cut the firewall, bulkheads, formers, and similar plywood parts. Drill all required holes (including for the fuel lines, throttle linkage, etc.) in the firewall. Drill for blind nuts in the landing gear plate and install them with epoxy.

Place the completed sides flat on the bench and trial-fit key bulkheads to one side at a time. Install formers C and E on one side only, using yellow (carpenter's) glue to allow shifting of the parts for precise positioning). Start with former C and position it at right angles to the side by using a small triangle, then repeat for former E (recheck alignment before glue finally sets). Note that former C is ¼ inch above the bottom line of the side sheet; E is flush with the top surface of the bottom sheeting.

Lay down the remaining side and trial-fit the completed first side with the projecting firewall and former, then glue it into place. Make sure that the formers have reached rock bottom. Check alignment repeatedly with a small triangle.

Rest the partial fuselage on its bottom. Both sides must be flush to the board and the sides at right angles to the bench. When dry, test-pull the fuselage together at the aft end to insure that it will join accurately from end-to-end.

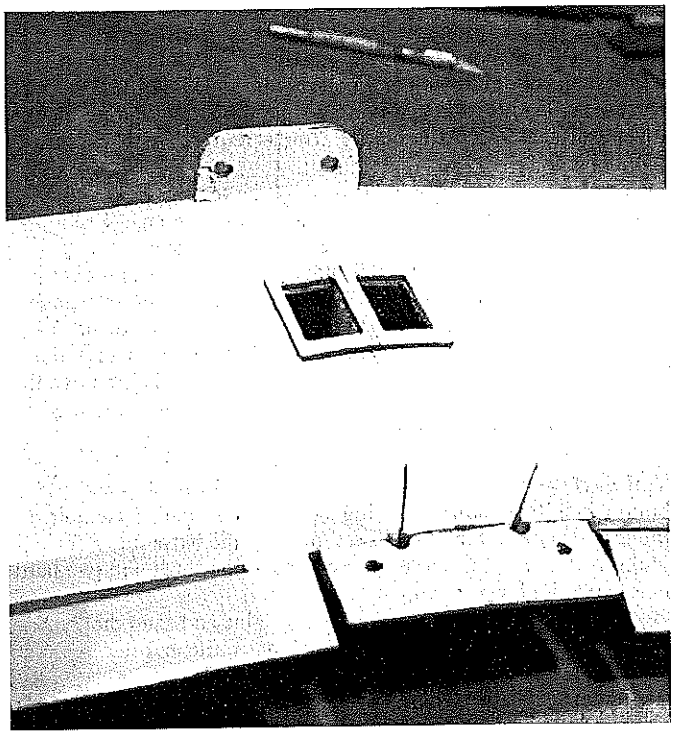
Invert the fuselage and glue the landing gear plate in place. This member will serve as a fixture to hold the structure true. Weigh it down to ensure a good, tight glue joint.

Locate the two ¼ squares that extend from the top of the inner doubler, between C and E, then install the plywood hold-down plate (do not drill holes yet). This ensures that the fuselage will not distort when the rear end is joined.

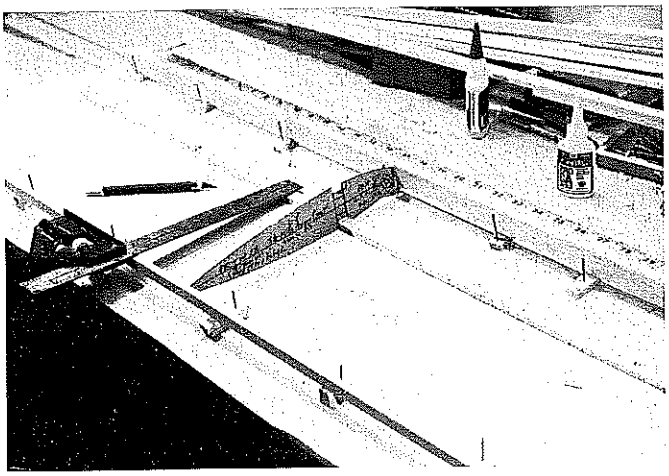
Before joining the sides at the rear, use pins and/or appropriate clamps to trial-fit the fin-post joint. Place the fuselage over the top view plan and adjust until the joint is precisely on the centerline and vertical to the board. Flow in some thin CyA and back up with thicker CyA as needed.

Former DD is located in the lower fuselage, immediately aft of the landing gear platform. The forward cross-ship servo support rail glues to its rear face.

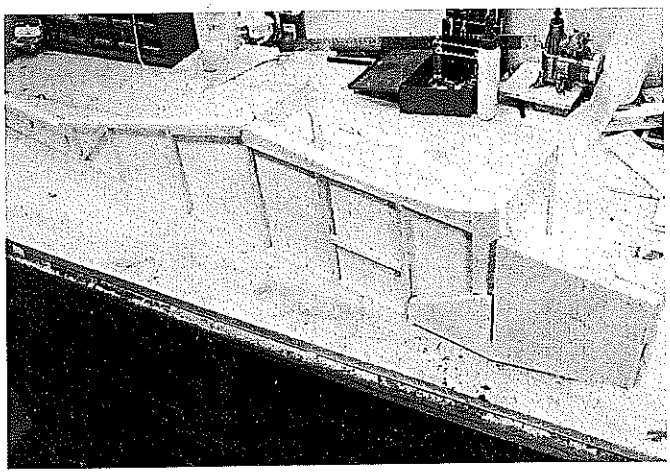
Glue top and bottom fuselage cross pieces in place, beginning at station F and working aft. F is full-width. Cut pairs of crosspieces top and bottom to identical fits. Former G will



Aileron and servo installations—note "grabber." Servos permit flaperons if functions are available on your transmitter.



Wing construction requires jacking up the leading and trailing edges; otherwise wing is straightforward.



Two sides temporarily pinned together to check outlines, and here to show a finished inside.

establish the top view curvature of the longerons. Locate the ¼ sheet plate shown on the top view aft of the stabilizer leading edge; it is for fin support.

Trial-fit and epoxy the firewall in place, confirming the built-in downthrust and right thrust angles. Use masking tape and/or modeling clamps or rubber bands to apply mild pressure while the glue is setting.

Before finishing the fuselage, take advantage of its openness to trial-mount the engine, install the tank mount platform and the tank, and the servo assembly, complete with all pushrods, throttle cable, and internal antenna tube.

The inside of the nose has additional ¼ x ½ supports for the firewall, and corner pieces to fill out the nose for later shaping. Cut to profile, then laminate sheet pieces that epoxy to the front of the firewall and form the cowling. Use 3/32 balsa spacers temporarily CyAed to the spinner backplate to attach the nose ring.

Install the engine and the backplate. Build the cowl to the nose ring, then remove the backplate later. Fit and install the sheeting for the top and bottom of the tank compartment.

Grain of the aft top and bottom fuselage sheeting runs lengthwise. Butt-join necessary sheeting to attain the proper width then cut out the top and bottom blanks leaving ¼ excess at each side. Sand the top and bottom smooth with a sanding block. Install the sheeting. After curing, trim as required, and sand flush with a block.

The tank inspection hatch is detailed on the top view and cross section. Mate the tail wheel plate to the fuselage. Use a lightweight tail wheel assembly. Mount with screws.

Rough-shape the nose with sandpaper. Drill nose and tank compartment drain holes. Protect firewall and tank compartment against leakage. Use epoxy if possible, slightly thinned and brushed on. Protect the bolt holes with petroleum jelly on bolt threads and tabs of masking tape over the bolt heads. Remove the bolts before the epoxy cures. Provide for mounting of radio gear, switch, engine, muffler, needle valve, etc.

Tail Surfaces: Butt-join pieces of 1/16 sheet for the top and bottom stabilizer skins, allowing ¼ inch all around. Assemble the framework on top of one skin, pinning the balsa down for gluing. Note the slots cut in the center section sheet and two hard balsa spar doublers for fin posts.

When the glue has cured, remove all pins and sand the exposed framework with a large block until true and flat. Remove the assembly from the board, apply glue on the framework, then press down over the second skin. If you are concerned about working fast, use yellow glue to attach this skin and pin the whole assembly to the bench. When dry, block-sand the stabilizer assembly.

To begin elevator construction, pin the completed stabilizer over a strip of waxed paper and bend the paper upward and over the rear spar. Assemble both elevator blanks and the dowel joiner pinned in contact with the stabilizer. Use epoxy for the dowel joints. After curing, use a wide sanding block to shape the top surface (only) to the profile shown. Cut slots as required.

Note that the fin spar extends downward to the bottom of the fuselage through the built-in notch. Block-sand smooth and round the leading edges. Taper the rudder as shown.

Wing: Select straight and straight-grained balsa for the spars. Full-length spars are medium weight; short doubler spars are hard. Leading edge is medium/soft, aileron spar medium. Rib stock will vary rib-to-rib; use harder ribs for inboard locations. The 3/32 sheet skinning must be light, but not mushy or brittle. Use more-pliable pieces for the most forward (LE) position.

Make templates for ribs A, B-K, and L. Transfer outlines to sheet balsa and cut out (cut rib A same as B-K for now, but mark out for later cuts). Lightly sand the rib edges. Stack-fit ribs on a piece of spar wood (top and bottom) and trim all length variations to match at LE and TE.

Laminate the short doubler spars (out to rib E) to the full-length spars. Make two sets—one set for the right panel and one for the left. Cut the aileron spar to length and taper depth from ribs K to L.

Place the wing plan over a true building surface and cover with waxed paper. Use a metal straightedge to check all aspects

Jackpot

Wingspan: 68 inches

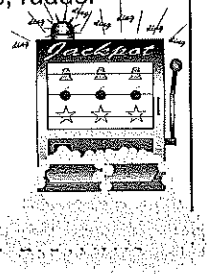
Engine: K&B .45 Sportster

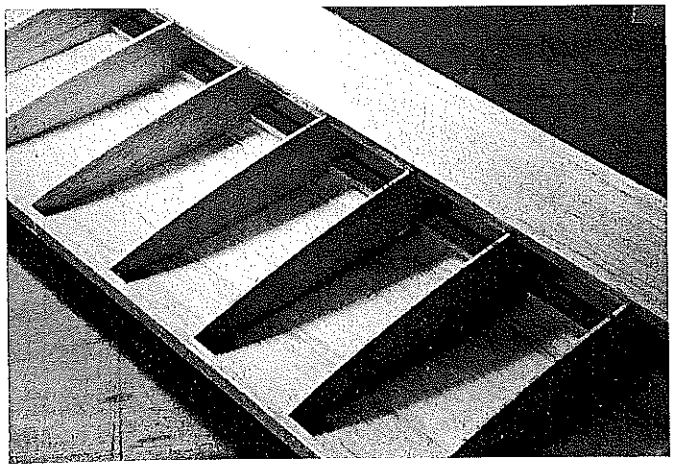
Functions: Throttle, elevator, ailerons, rudder

Flying Weight: 7 pounds, 5 ounces

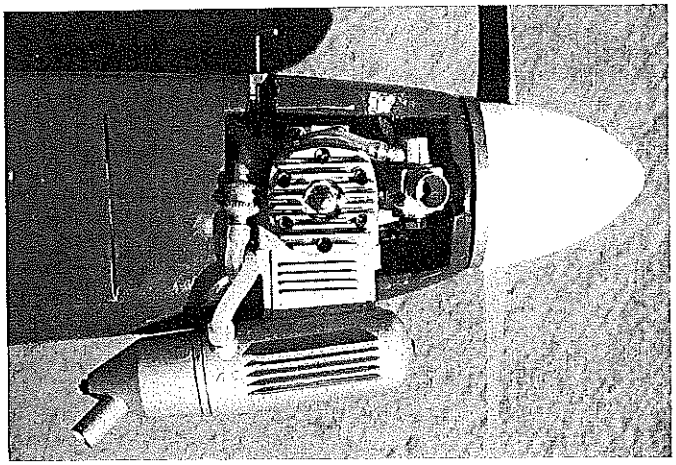
Construction: Built-up

Covering/Finish: Coverite



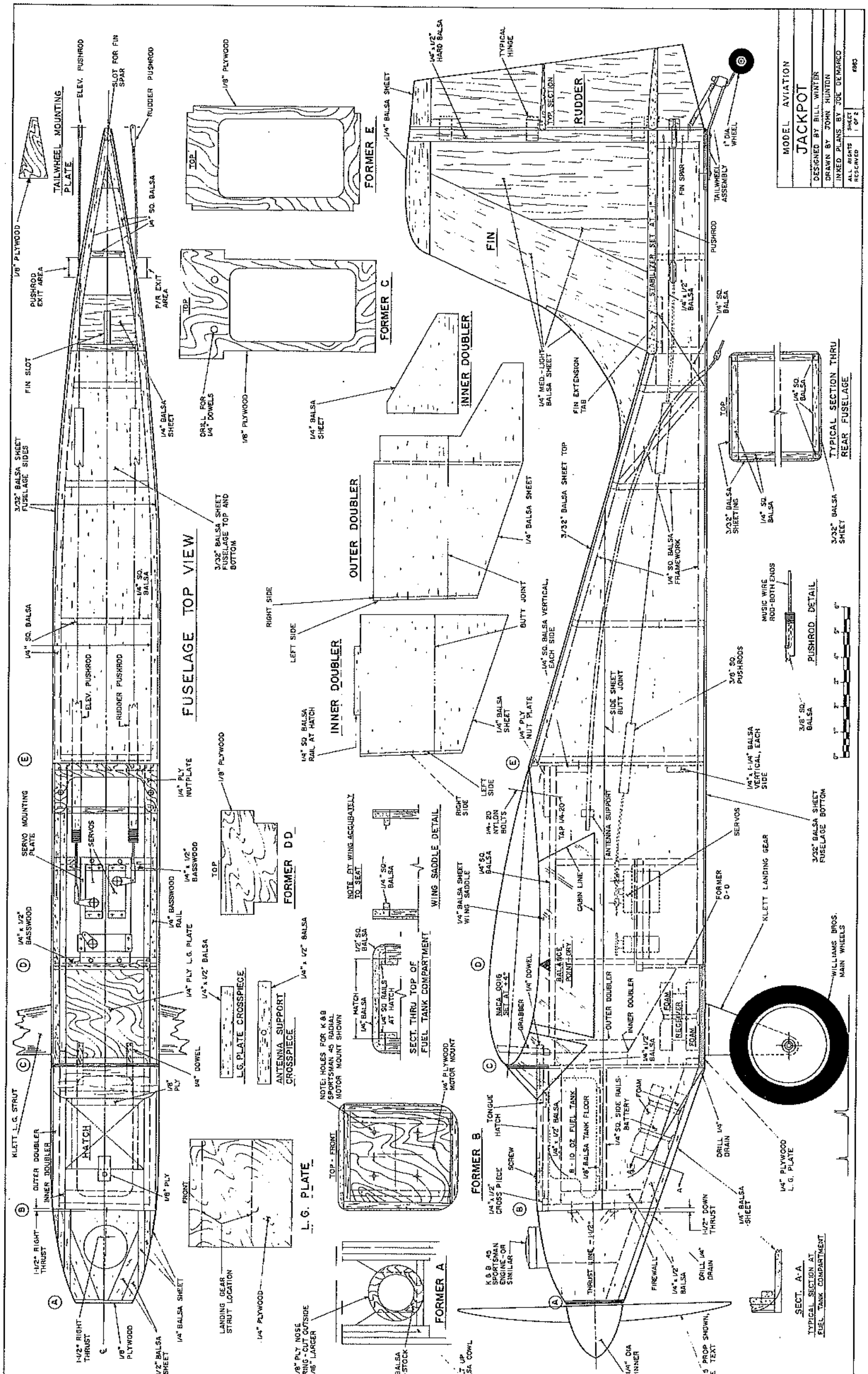


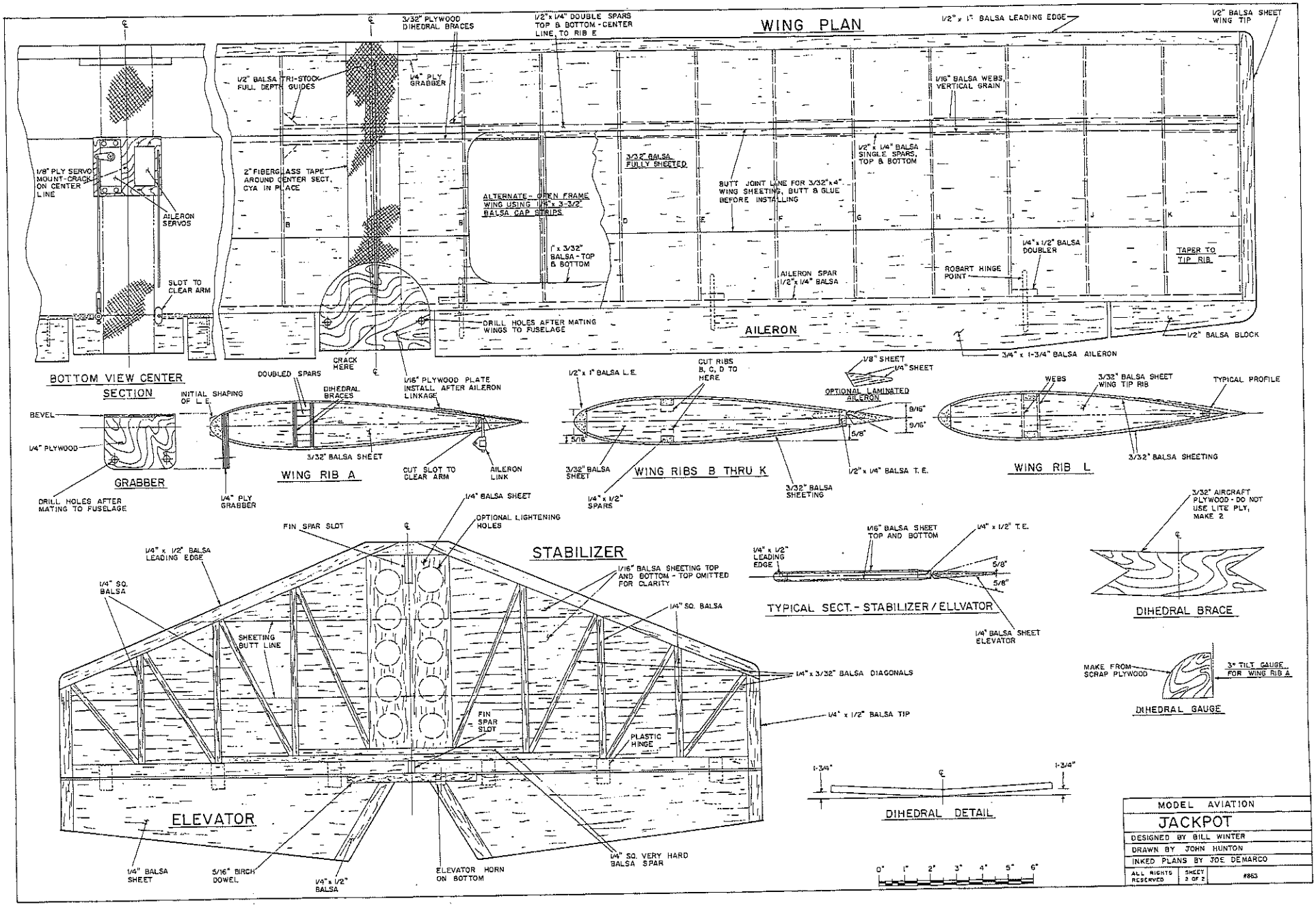
Wing shown is built-up with full sheet covering. Proper selection of balsa is critical for proper total weight.



Engine used on prototype is K&B .45, which is ample, economical, reliable power. Some nose weight may be needed.

Full-Size Plans Available—see page 181





of the spar layup while pinning down the bottom spar. Add 5/16 spacers (approximately four places) to support the leading edge and pin down using ribs slipped onto the spar to position it properly. Install the aileron spar similarly on 5/8 in. jacks. Note joiner and grabber "guides" (1/2 triangle stock).

Glue to ribs A and B where indicated, allowing exactly 1/8 spacing for the joiners and 1/4 for the grabber (both slipped into place after completion of the wing panels). Install all ribs. The center rib is tilted for dihedral.

Dry fit the top spar. Press down on top of the spar with a straightedge to avoid surface undulation, then glue. Install the 1/16 balsa spar webs with the grain vertical. Install doublers at hinge points. True the panel with a sanding block.

Slope the top of the aileron spar but leave the leading edge square for now. (If you prefer not to sheet-skin the full wing surface, run a 1 x 3/32 piece along the aileron spar, then sheet the D-tube front portion as usual. Add center section sheeting to rib C and 1/4 x 3/32 capstrips to the remaining ribs. Invert the wing panel, pin down, and apply sheet to the bottom.

For fully sheeted wings, note that the surface of each wing panel is composed of three four-inch sheets. Trim the leading edge sheet to run from the leading edge to the middle of the spar. Install by applying yellow glue to the ribs, then butt the sheet to the leading edge, pin in place, and glue with CyA. Pull the sheet down over the ribs to the spar, pin, and glue. Check that the sheet is down tight to the leading edge of the ribs.

Butt-join two sheets for the rear portion of the wing flat on the bench with CyA and pre-sand the joint. Run a bead of yellow glue along all ribs and the aileron spar. Install the rear sheet assembly by pinning at the spar, pulling down over the ribs and pinning at the aileron spar. Sheet the other side similarly with the panel pinned down.

Mark the leading edge for initial trimming with a razor plane. Sand the

flats true, then begin the shaping process with a sanding board with fine sandpaper. Add the wingtip block, trailing edge parts, and sand everything to final shape. Go over each wing panel with fine paper on a block for final smoothing.

Cut the joiners, and cut the root rib as required for the joiners. Trial-assemble the wing panels with the joiners before gluing anything. Touch-up root rib faces with a sanding block to get a good, tight fit. Prop up each panel the indicated distance from the board for the required dihedral. Check that neither sweep-forward nor sweep-back are present and that the joiners seat properly. If minor imperfections in the centerline joint occur, they can be filled later.

Disassemble the panels, apply epoxy to the joiners, slide in and out a few times to spread the epoxy, apply epoxy to the facing ribs, then set the assembly up again with dihedral blocks under each tip. Check that panels are fully closed, and hold together tightly with pins and/or tape strips. When set, fill any crevices, then apply two-inch medium/light fiberglass strip over the center section seam, top and bottom.

Cut out the grabber (do not drill grabber holes yet) and install it. Install the aileron actuation assembly, noting that the hingeline is near the top surface. Apply a drop of oil to the wire in each sheath. Cut the wing as required to accept the actuator and cut the bottom surfaces to allow for the arm to swing fully. Cut the 1/16 plywood top plate, crack along its center, then install, being careful not to get glue on the aileron actuator.

Seat the wing to the fuselage by running masking tape chordwise where it meets the fuselage. Coat the tape with lipstick. Mount the wing to the fuselage and press down. Remove the wing and remove material where red. Repeat until a solid seat is obtained.

Remove the masking tape, mark precise center points on the wing and fuselage, mate the wing checking from

tips to tail for squareness, and tape or tack-glue in place. Drill 3/16 through the wing (perpendicular to the wing surface) into the hold-down plate for the rear hold-down screws. Enlarge the holes in the wing to ¼ inch.

Tap the hold-down block ¼-20 and install the nylon wing screws. Drill ¼ through the forward cabin former into the grabber. Remove the wing and complete the fuselage cabin area. Epoxy the ¼ dowels into the fuselage. Cut the ailerons from thick sheet (or laminate them). Prepare hinge slots and drill true holes for the aileron actuator.

Covering: The design was based on film covering—no cloths, dope, or paint. All hinges are installed after covering. Coverite's BalsaRite provides good adhesion of the film. Apply thinned on large balsa surfaces and at full strength on curved areas.

Sand all surfaces with fine paper on a block. Round off the fuselage as shown, but leave cross-section square at the wing trailing edge, stabilizer mount, and landing gear block.

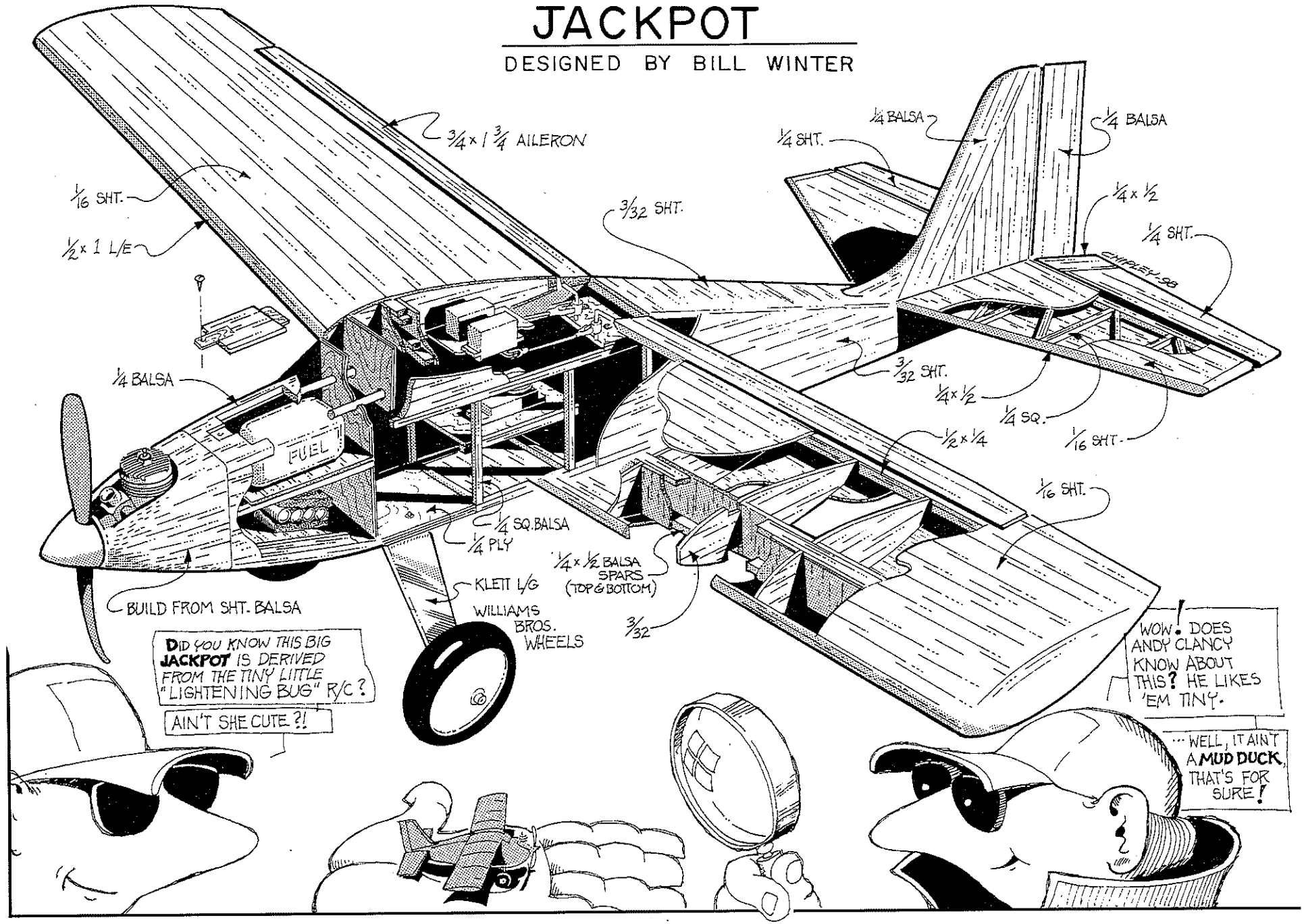
Final assembly: Cut away covering underneath the stabilizer, staying within outlines of the fuselage. Cut a ¼ wide strip from the top of the stabilizer on the centerline. Mount the wing for good reference.

Sit the fuselage on the bench and shim it until the wingtips are level. Dry mount the stab and fin. View along the fuselage and wing to check for perfect alignment. Shim, trim, sand, and adjust to level with the wing as required. Measure from each stab tip to a common reference on the fuselage to align in plan. Use yellow glue to mount the stabilizer, rechecking alignment. Adjust the front fin hole for accurate fin alignment if necessary. Use a triangle to set the fin vertical to the stabilizer and glue in place.

The elevators are installed before the rudder. Install the elevator and rudder horns. Trial fit all surfaces before gluing hinges. Install hinges into main

JACKPOT

DESIGNED BY BILL WINTER



surfaces first then work control surfaces into place. Check for full free movement and trim anywhere necessary.

Install rudder and elevator linkage, the tailwheel, and its linkage. Install ailerons one at a time. Epoxy aileron actuator arms, then hinges, using slow-curing epoxy. Install the engine, hook up fuel lines and throttle linkage. Install aileron linkage, landing gear, and wheels.

Install the RC system in foam. Check operation of all control surfaces for free movement and proper angular displacement.

Test Flying: Since the K&B Sportsters have good torque, we used a 12 x 5 plastic prop. If you usually use a 10 x 6 on your engine, try an 11 x 5 wood or plastic. In certain configurations an inch more diameter and/or one inch less pitch develops ideal thrust to match airplane speed and drag.

If your Center of Gravity (CG) is not right-on, correct with ballast in the nose. With the lighter engines, the need for ballast is anticipated. Allowance has been made for the heavier four-stroke or larger-displacement substitutions.

Taxi-test the model to get used to its tail-dragger personality. Become familiar with throttle variations and engine reliability. Use up elevator to keep the tail down initially and avoid noseover (provides good contact for the steerable tailwheel). Make a number of progressively faster simulated runs, into the wind, to feel rudder corrections needed for tracking swings.

For the first takeoff, apply power smoothly to full to get rolling. As you accelerate, the tail will come up on its own. Sudden power applications can cause noseover. If the tail lifts abruptly, there will be a pronounced swing to the left.

Never yank the airplane off the ground. Ideally, you should be able to hold some up elevator briefly, until the airplane is obviously tracking well on the early rollout. If it breaks ground on its own, but too early, quickly neutralize elevator and let flying speed build up.

While the turn qualities of Jackpot are excellent, flying benefits from coordinated rudder in turns, and this can be accomplished easily by using CAR (Coupled Aileron and Rudder). Set the CAR at about 50% capacity.

The dual aileron servos allow for flaperons, but if you use that function, set up CAR for 100% rudder because of loss of aileron effectiveness in flap down mode. If you have this function, you can feel out elevator trim mixing with flaperon deployment.

Use mainly rudder for directional control well past liftoff and climb gently away. Get to a good height, then check all trims. You will find that this model has exceptional "rock solid" stability and that power transitions require little or no trim. For landing, rely mostly on rudder for directional control (rudder control is best at low speeds). Use a slight flare at touchdown and stay on the rudder. Do not flare high.

This model will surprise you with its trainer-like stability and its extended maneuvering envelope. Have fun. ✈

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