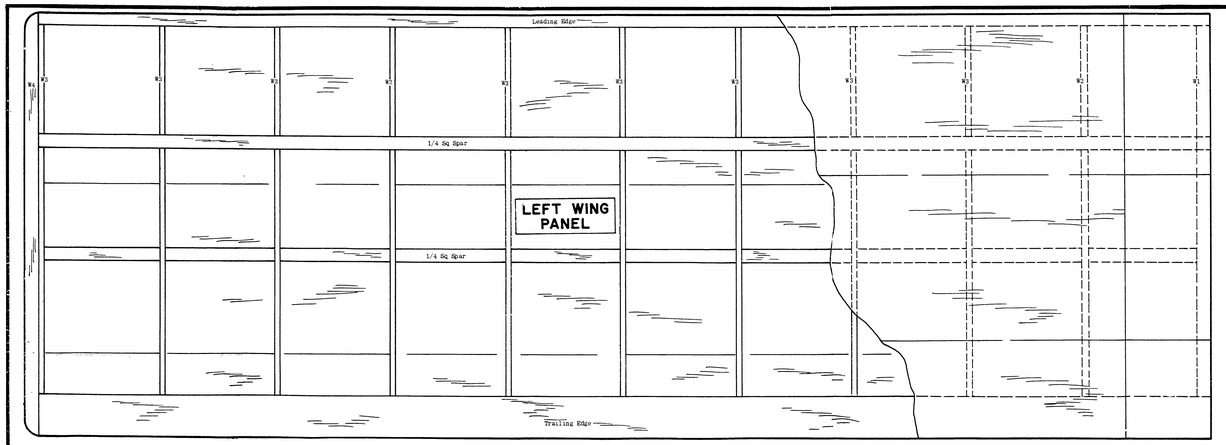
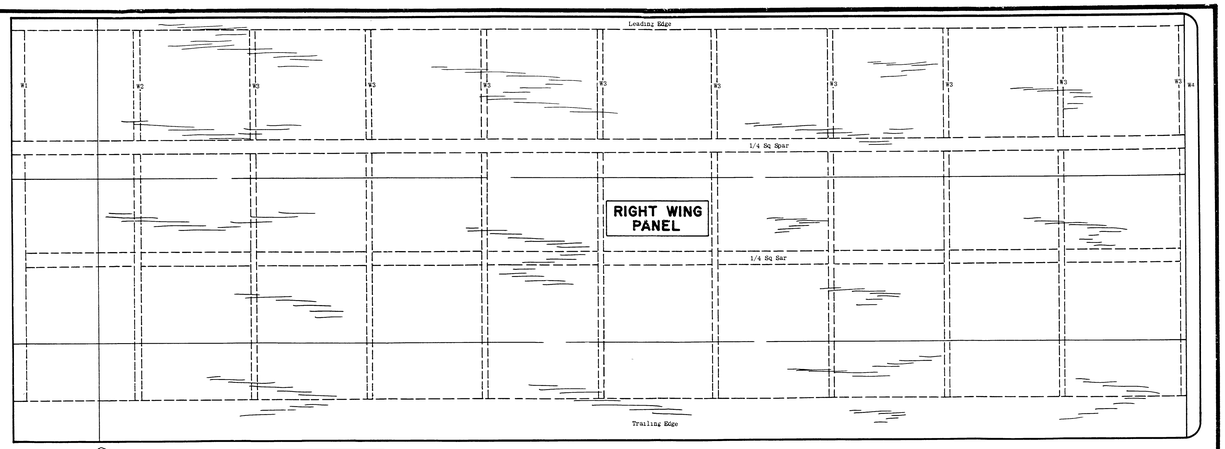
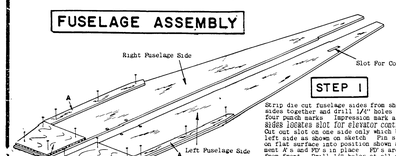


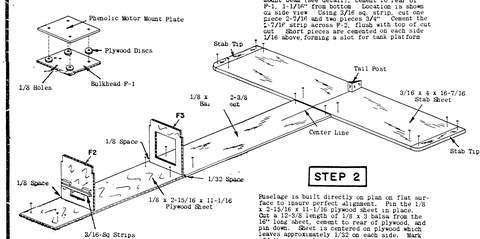


FUSELAGE ASSEMBLY



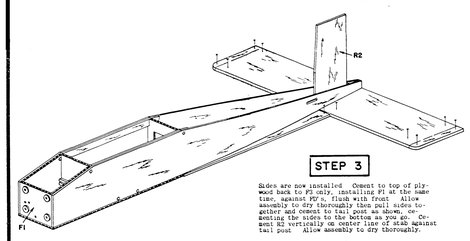
STEP 1

Strip die cut fuselage sides from sheet, place sides together and drill 1/8" holes at the four punch marks. Impression mark at rear of RIGHT SIDE is SLOT FOR ELEVATOR control rod. Cut out slot on one side only which becomes the right side. Separate sides and lay down on flat surface into position shown and cement A's and FD's in place. FD's are 1/8 from front. Drill 1/8 holes at all punch marks in plywood bulkhead F-1. Drill 1/8 holes at punch marks in the four die cut plywood discs and cement to F-1 as shown in sketch. Center phenolic motor mount plate on F-1 and drill the four corner holes. Prepare tank-mount by cutting two pieces of scrap to fit F-1, 1-7/16" from bottom, position as shown on side view. Using 3/16 sq. strip, cut one piece 2-5/16 and two pieces 3/4". Cement the 2-7/16" strip across F-2, flush with top of cut out. Short pieces are cemented on each side 7/16 above, forming a slot for tank platform.



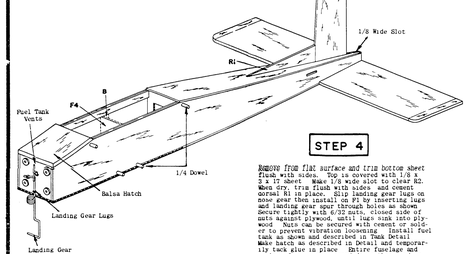
STEP 2

Fuselage is built directly on plan on flat surface to insure perfect alignment. Pin the 1/8 x 2-15/16 x 11-1/16" plywood sheet F1 - F2 - Tail Post - Stab Sheet assembly built from the 16" long sheet, cement to rear of plywood, and pin down. Sheet is centered on plywood which leaves approximately 1/32 on each side. Mark off the center line at rear of sheet. Mark off the center line on the 3/16 x 4 x 16-7/16 stab sheet then cement it to the rear of 1/8 sheet as shown, lining up the center lines. Mark off the center line and cement the die cut stab tips in place on either side. Cement plywood bulkheads F2 and F3 in place, centering on plywood, which leaves 1/8 on each side. Cement tail post to rear of stab being certain it is centered over mark.



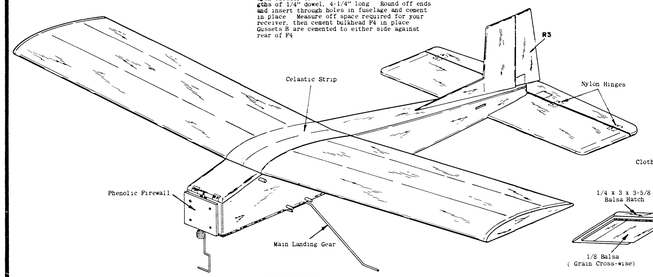
STEP 3

Sides are now installed. Cement to top of plywood back to F1 only, installing F1 at the same time, against FD's, flush with front. Allow assembly to dry thoroughly then pull sides together and cement to tail post as shown, cementing the tail gussets in place as well. Cement F2 and F3 in place, centering on center line of stab against tail post. Allow assembly to dry thoroughly.



STEP 4

Remove from flat surface and trim bottom sheet flush with sides. Top is covered with 1/8 x 3 x 12-3/8 balsa sheet, sanded to shape R2. Sand to trim flush with sides and add cement dorsal R1 in place. Slip landing gear lugs on nose gear then install on F1 by inserting lugs and landing gear spar through holes as shown. Secure tightly with 6/32 nuts, closed side of nuts against plywood, until lugs sink into plywood. Nuts can be secured with cement or solder to prevent vibration loosening. Install fuel tank and mount as shown in Detail Sketch. Make hatch as described in Detail and temporarily tack glue in place. Entire fuselage and tail surfaces are now sanded smooth, rounding off all corners as shown in Final Assembly Sketch and photo. Cut hatch loose and install with cloth hinges as described in Detail Note. Prepare rudder and elevator and install with nylon hinges as described in their respective notes and shown installed in Final Assembly Sketch. Fuselage and tail may now be covered with silkspan or tissue. Cut 1/4 x 1/4 x 3" balsa dowel, 1/4" dowel, 4-1/4" long. Round off ends and insert through holes in fuselage and cement in place. Measure off space required for your receiver, then cement bulkhead F4 in place. Gussets B are cemented to either side against rear of F4.



STEP 5

Royal Coachman is now painted the color scheme of your choice. Don't forget to paint the phenolic engine firewall. Coachman in photo is painted red, white and blue. Engine is mounted directly in position shown in photographs for expert flyers or beginners. The Cox .09, Os Max .10 or similar size engine should be used. For the experienced or expert flyer an Os Max .15 or similar size engine is recommended. Engines similar to OS Max can be mounted directly to phenolic firewall as shown in Detail. Otherwise, the use of a Tatone engine mount or similar type, not supplied, must be used. In this case the engine mount is attached to the firewall. Phenolic firewall with engine attached is mounted to F1 using 4 40 bolts. Rubber vibration absorbing washers provided in kit are placed between firewall and F1. Dial nuts with cement to prevent loosening. Rubber washers, propel engine thrust adjustment by merely tightening the bolts thus compressing washers. Three degrees downthrust and two degrees right thrust are recommended. Cut thrust angle templets from plan to check angles. Complete landing gear as described in Detail Note then lash in place with rubber bands. Install 2-1/2" diameter wheels on main gear and 1" diameter wheels on nose gear. Coachman is designed for 4 to 6 channel operation. Servos are mounted in cabin section behind bulkhead F4. Elevator pushrod comes through slot made in left side fuselage just forward of F4. Rudder pushrod comes through slot made in left side out. Standard sheet and strip sizes have been used, and all accessory items are readily available. Silk covering is optional — it depends on whether you habitually land on the strip or in the trees. The prototype was completely silk covered although it is not at all necessary. (I keep telling myself it was only to find out how much weight it would add!).

Construction

The majority of construction articles advise the builder to begin with the wing. This is done for two reasons —first most modelers dislike building wings; secondly open structure, silk covered wings take time for the dope to completely cure. Since this is all sheet and nothing has to cure, we'll start with the fuselage.

The method of building the fuselage was "borrowed" from Phil Kraft. Phil uses this quick-build idea on a design of his we have dubbed the 'Nasti-Stik.' First, cut a piece of ⅛" plywood 2¾" wide by 10⅞" long and secure it to your building surface. Butt glue to the end of this a 2⅝" wide piece of ⅛" balsa sheet, 12½" long, using white glue. This forms the fuselage bottom. Now cut a plank of 4" wide, 3/16" sheet to the length shown on the plans for the stabilizer and cap the ends with two pieces of ⅜" wide, 3/16" strip stock, 4" long. Mark a center line on this piece and glue it at right angles to the other two. You now have the fuselage bottom and stab completed. Draw a center line down the entire conglomeration.

Cut two fuselage sides from hard ⅛" x 4" wide stock. Glue the vertical grained ⅜" doublers in place in the nose section with contact cement. Add the ⅛" x ⅛" x 7" wing rests. (We use white glue for plywood to balsa joints, Hobbypoxy glue for fuselage and high-stress joints, and Tescon "A" for the balance. And if you think the latter fast drying cement is for repairs only, give it a try — you'll be surprised!) Now cut out the three main bulkheads, mark off their location on the fuselage bottom, glue in place (with the exception of the firewall) and hold securely with masking tape until dry. Check with a triangle to make sure they are exactly vertical. Now glue the fuselage sides in place, both to the formers, and to the fuselage bottom, but only as far back as the last former. Again, hold in place with masking tape. When this assembly is dry pull the tail section together at the center line (yeah . . . that's why the center line!), insert a piece of ⅛" wide tapered trailing edge stock for a tail post, and glue together, gluing the sides to the bottom as you go. Add the ⅛" ply firewall with Hobbypoxy epoxy glue. While this is drying, cut out the fin and glue in place on top of the stab. Take a piece of 3" wide, ⅛" sheet, cut a slot in it for the fin, and glue in place on top of the sides. Be sure to apply glue liberally around the fin at the slotted area. Your fuselage is now completed except for the hatch cover. Fibreglass the nose area and sand well.

Add the elevator (cut from tapered 4-40 bolts and thus compressing the washers. Three degrees of down and two degrees of right thrust proved adequate.

A dmoco two ounce clank tank fits the fuel and battery compartment quite well. Drill a hole in the plywood fuselage bottom for the overflow vent and one in the hatch for the filler tube. A short length of copper tubing soldered to the filler vent tube will facilitate fueling. Five 600 mah nicad pencells were used as a battery pack and fit quite nicely under the fuel tank.

If you use two Annco servos, mount them upright to the plywood fuselage bottom with 3-48 bolts and blind mounting nuts. 1/16" wire and ¼" square balsa pushrods were used along with DuBro Kwik Links and DuBro keepers.

Wheels are 2½" DuBro with a 2¼" Air Span nose wheel. Adjust for negative rake by bending the main gear closer together . . . a most scientific method to compensate for any design or building errors.

The fuselage is done — and if it took you over one good evening's work, you "musta did it backwards."

The wing is of all sheet construction. Begin by gluing two sheets of 3/32" balsa together — one sheet 6" wide and the other 11½" wide. Or, if you prefer, one 4" sheet and one 7½" sheet. Use Ken Willard's method — that is, make sure the sheets match, add strips of masking tape to one side, add glue to the seam line, lay flat on the work table, wipe off excess glue, then add strips of tape to the second side. Set aside to dry. Make two panels, 20½" long, in this fashion. Make the two top panels about ½" wider, or 6", to allow for the curvature of the airfoil. Mark off the position of the ribs on each panel. Cut the ribs from 3/32" sheet. The two center section ribs are from ¼" sprayed on two coats of AeroGloss white, then laid out several strips of 2" wide masking tape on a glass table top, 2" divisions were marked off with a ruler, then cut with a triangle. The resulting 2" squares of masking tape were applied to the wing and tail. Clear butyrate was used to seal the edges, then AeroGloss Stearman red was sprayed over the entire wing. When removed, you have a rather bright checkered paint job.

And that's all there is to the construction. We cut out all the parts and made ourselves a do-it-yourself kit on Saturday evening, then put the Royal Coachman together on Sunday evening. All up weight should be about 2½ pounds.

Our prototype balanced slightly aft of the point shown on the plans. With the Annco servos we added three dead pencells to the battery compartment for ballast. With the light additional weight of the Royal MK multi servos, two of these were removed. If you have built the Royal Coachman according to plans, you will have no difficulty with initial flights. Use a 7/4 prop on the Cox .09 and an 8/4 on the .15. If your landing gear tracks straight and true, the Coachman will lift off with a slight tap of elevator in about fifty feet. As mentioned earlier in the article, flying this model with an .09 is simplicity itself — it is docile, yet will perform simple, basic maneuvers with six channel gear — an excellent trainer and sport ship for the Sunday flier.

But add a .15 and you've got a fast moving ship that's quite a handful. We hope you like ease of construction and the many hours of flying pleasure you'll get from the Royal Coachman. Drop us a line about yours.

END

DON DEWEY AND ROYAL COACHMAN

READ ARTICLE REPRINTED FROM R/C MODELER

by DON DEWEY

There are several ways to discourage a beginner in this hobby and sport — one is to start him out with a ship that takes forever to build, the second is to provide him with a radio system that either takes a decade of tinkering to keep in working condition long enough to get to the field, or contains so many potential control functions that he is tempted to build General Frank Savage's 'Picadilly Lilly' as his first project.

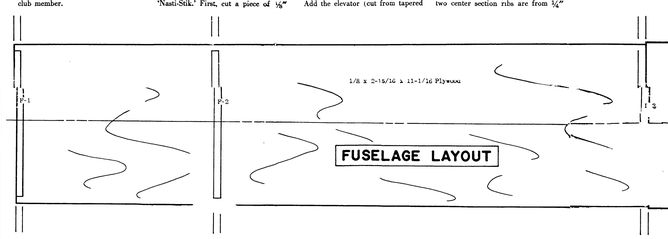
It has long been this writer's opinion that the ideal combination for the newcomer to R/C would be a ship that could be built in one weekend at a minimum of expense, that would be inherently much stronger than the average model, and that would utilize a maximum of six channels of control. The Royal Coachman is all of these things — a model that can be completed (less paint) in two evenings, is rugged enough to withstand the initial pilot errors, and designed for rudder and elevator control (motor is optional — we didn't use it) with a six channel reed rig. The author has long felt that the six channel rig offers the beginner the most for the money and will give him many, many months of flying pleasure with maximum performance and reliability. Our prototype utilized the new Controlaire 6 which can be purchased for $100 and will last until you are ready for the additional controls offered by a ten channel rig or one of the new proportional systems. We purposely designed this model to accommodate two Annco, or Royal servos — both were utilized in the prototype. A Cox Medallion .09 was used for power and subsequent flight tests proved the Royal Coachman to be an outstanding multi trainer that can be handled by the tyro with an absolute minimum of dual instruction from a more experienced club member.

And then we removed the .09 and installed an O.S. Max .15 . . . the 41" span ship was now about as docile as a Mc 199! If you're a beginner, stick to the .09. It you've past the shaking, quaking stage, dust off the .15 — whatever your choice, you'll find the Royal Coachman offers more flying pleasure with less hassle than any ship you've built.

Design Notes

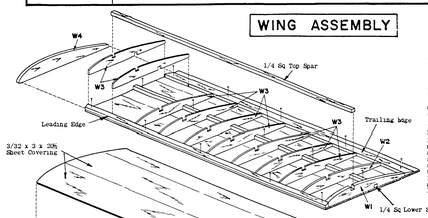
The Royal Coachman is no raving beauty — it wasn't intended to be. Rather, it was conceived as a fast-building, functional, and serviceable design that could withstand much more abuse than the average multi ship. The design formula itself was taken directly from 'R/C Design Made Easy' by Chuck Cunningham in the March 1965 issue of RCM. Having selected a 41" span with a 7½" chord, which gave us the desired 5.5:1 aspect ratio, we arrived at the airfoil configuration in a most scientific manner — we hunted through a stack of old model magazines until we found one that was the right size! A Cox Medallion .09 was selected for its availability, cost, and dependability.

Insofar as the construction goes, the Royal Coachman is all-sheet through-



FUSELAGE LAYOUT

WING ASSEMBLY

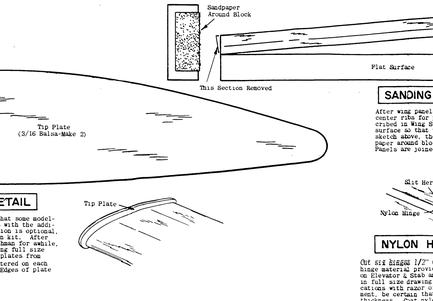


STEP 1

Wing is built on flat surface directly on plan to prevent warps. Sketch shows right hand wing panel. Using full size drawing, mark off rib locations on leading and trailing edges. Entire wing is sheet covered. Bottom covering requires 3/32 x 3 x 20-3/4. Top and one rear piece is 3/32 x 2 x 20-1/2. Pin pieces directly to plan and cement together. Be certain to line up the front and center of sheeting with front and center of wing plan. Cement and pin leading edge in place. Cement end ribs W1 and W3 in place, followed by trailing edge. Cement 1/4 sq. lower spar in place then add remainder of ribs as shown. Tip rib W4 is cemented in place after top sheet covering is on. Use pins to keep trailing edge pinned down and against rear of ribs. Spars are also cemented in and cement top 1/4 sq. ends into rib notches. Opposite wing is assembled in same manner. Panels are allowed to dry thoroughly on flat surface. Top skins, installed in next step, are now cemented together in same manner as bottom skins and allowed to dry on flat surface.

STEP 2

Remove pins and trim sheet flush with trailing edge. Top skins are now cemented in place. Use cloths soaked with water to make for easy bending. Working a section at a time, soak dry, apply cement to entire frame, then pin top skin in place. Pin panels down on flat surface while they are drying so that they stay absolutely flat and do not develop any warps. When panels are absolutely dry, trim sheet at trailing edge, then sand angle in center rib for dihedral as shown in Detail Note. Apply a light coat of cement to center rib and allow to dry (this is known as pre-gluing which insures maximum joint strength). Apply a heavy coat of cement and assemble panels, holding up tips 3" as shown for proper dihedral angle. Other panel is pinned or weighted down to flat surface. Allow assembly to dry thoroughly then sand entire wing, using medium and then fine sand paper, blending leading and trailing edges as shown. Sheet covering is reduced to about 1/16 thick when sanding is completed. Apply two coats of clear dope to wing, allowing it to dry between coats then sand smooth. Celastic strip provided in kit is now applied around center joint as shown in Detail Sketch. Begin at center, pull tight as you shoot it with dope and as it becomes soft and pliable, wrap completely around top and bottom of wing (in one continuous length), joining at trailing edge. Press Celastic to wing surface with fingers, working out any bubbles or wrinkles. Allow to dry thoroughly, then trim and sand smooth.

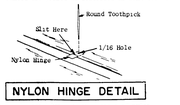


TIP PLATE DETAIL

Designer, Don Dewey, advises that some modelers have reported good results with the addition of tip plates. Installation is optional, and material is not provided in kit. After you have flown your Royal Coachman for awhile, you may wish to try them. Using full size template on plan, cut two tip plates from 3/16 balsa and cement them centered on each wing tip as shown in sketch. Edges of plate should be slightly rounded.

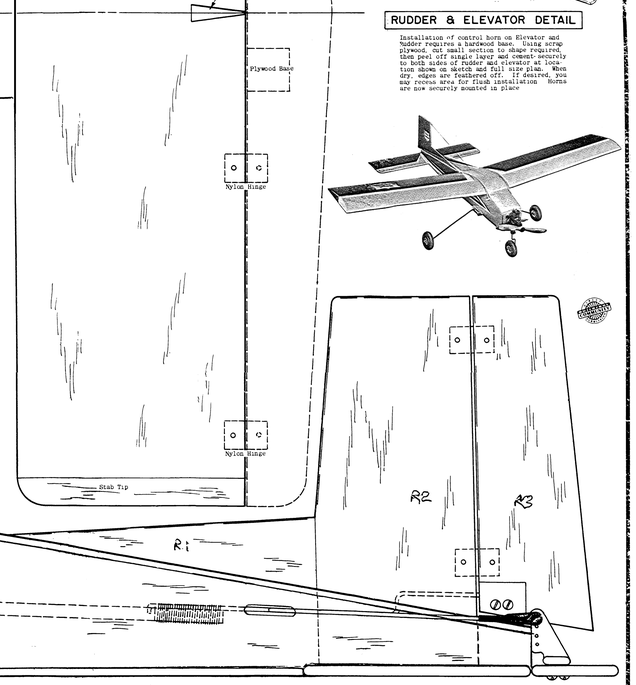
SANDING FOR DIHEDRAL

After wing panels have been completed, bevel center ribs for proper dihedral angle as described in Wing Step 2. Set wing panel on flat surface so that tip is 1 3/4 high as shown in sketch above, then sand center rib using sand paper around block as shown in sketch above. Panels are joined as described in Wing Step 2



NYLON HINGE DETAIL

Cut six hinges 1/2" wide from strip of nylon hinge material provided. Mark hinge locations on Elevator & Stab and Rudder & Fin as shown in full size drawing. Make slits in hinge line with sharp knife. For proper alignment, be certain that slit is in center of thickness. Coat nylon hinge with epoxy cement then insert into slit, while holding slit slightly open with knife blade. Round off front of Elevator and Rudder slightly, then assemble, leaving about 1/32 space between. Drill a 1/16 hole completely through wood hinge as shown and then insert and cement round toothpicks into the holes. Toothpicks are trimmed flush when dry.



FUEL TANK INSTALLATION

It is recommended that a plastic fuel tank such as the Dmoco 2 ounce Clunk tank or similar type (not supplied) be installed. Prepare 1/16 x 2-7/16 x 5-1/16 plywood tank-mount by cutting notches in sides and drilling 1/8 hole at location shown in full size layout. Cut two lengths of 2/16 sq. strip, bevel one side as shown and cement in place to top of tank-mount. Drill 1/8 hole and cut notch in 1/4 x 5/16 x 2-7/16 hardwood plate as shown and cement to front and rear of bulkhead F1 as described in Fuselage Step 1. Tank mount and entire compartment between F-1 and F-2 should receive three coats of clear dope. After batteries are installed in compartment below mount, tank is placed between strips and secured with rubber bands, passing through notches on sides. Insert rear of tank between 3/16 sq. strips on F-2 and secure front to beam across rear of F-1 with 4/40 x 1/2 machine screw.

RUDDER & ELEVATOR DETAIL

Installation of control horn on Elevator and Rudder requires a hardwood base. Using scrap plywood, cut small section to shape required, then peel off single layer and cement securely to underside of control surface in location shown on sketch and full size plan. When dry, edges are feathered off. If desired, you may recess area for flush installation. Horns are now securely mounted in place.

HATCH DETAIL

Cut a section of 1/8 balsa to 2-7/16 x 3-7/16 to fit in area between F-1 and F-2. Cement to this a 1/4 x 3 balsa hatch cover as shown. Round off front and sides of hatch and temporarily tack glue in place as described in Step 5. After fuselage has been sanded, remove and then install with cloth tape hinges equally spaced as shown. Cut four 1" length of cloth tape for hinges. First hinge is cemented to top of hatch and to inside of bulkhead. Second hinge is cemented to hatch cover and to inside of bulkhead F-2. Next two hinges are cemented to either side of hatch cover and to bulkhead. Hatch is used for access to fuel tank and batteries. It is held in place with rubber bands stretched over fuselage dowels.

LANDING GEAR DETAIL

Main landing gear is completed by installing 5/32 x 4" length of wire to front of U-bend as shown. Wrap carefully with soft copper wire as shown, then solder securely. Be certain soldering iron heats joint thoroughly so that solder flows completely into and around joint. Landing gear is now installed on fuselage, lashing in place with rubber bands, as described in Step 4.

ENGINE THRUST DETAIL

Angles above may be used to check engine thrust as described in Step 5 and Pre-Flight Flight Check instructions.

ENGINE INSTALLATION

Sketch above shows how OS Max .15 is mounted directly to Phenolic firewall by replacing the four crank case bolts with 3/48 bolts. Rubber washers are installed between mount and firewall. Then it is suggested that a Tatone or similar type radial mount (not supplied in kit) be bolted to the phenolic firewall, and the engine installed on mount. Be certain rubber washers are installed between phenolic motor mount and F-1 for thrust adjustment as described in Step 5.

PRE FLIGHT & FLIGHT CHECK

Warps in wing or tail may seriously impair performance or even crash. Check carefully and remove warps by holding over steam from a boiling kettle, then counter warping and hold until cool. Warps may also be removed by applying an additional coat of dope and twisting in opposite direction, holding until absolutely dry. DO NOT FLY MODEL UNLESS IT BALANCES EXACTLY AS SHOWN ON THE SIDE VIEW. If necessary, shift components or add weight. Balancing should be done with empty fuel tank. Push model on flat surface to be sure wheels are in line for proper tracking. Adjust rudder and elevator linkage accordingly. Check radio with engine operating in both high and low speeds. Check before each flight. Under power, with all controls in neutral position, model should fly in straight line. If model turns to one side, it can be corrected by adjusting rudder or increasing side thrust away from turn. Before each flight check that wing and landing gear are secure. And in position for your first flight, we humbly see flight of your Royal Coachman will be appreciated. Direct your letters to Sterling Models, Phila. Penna 19141. Attn: Eng. Dept. Good Luck and Happy Landings!"

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