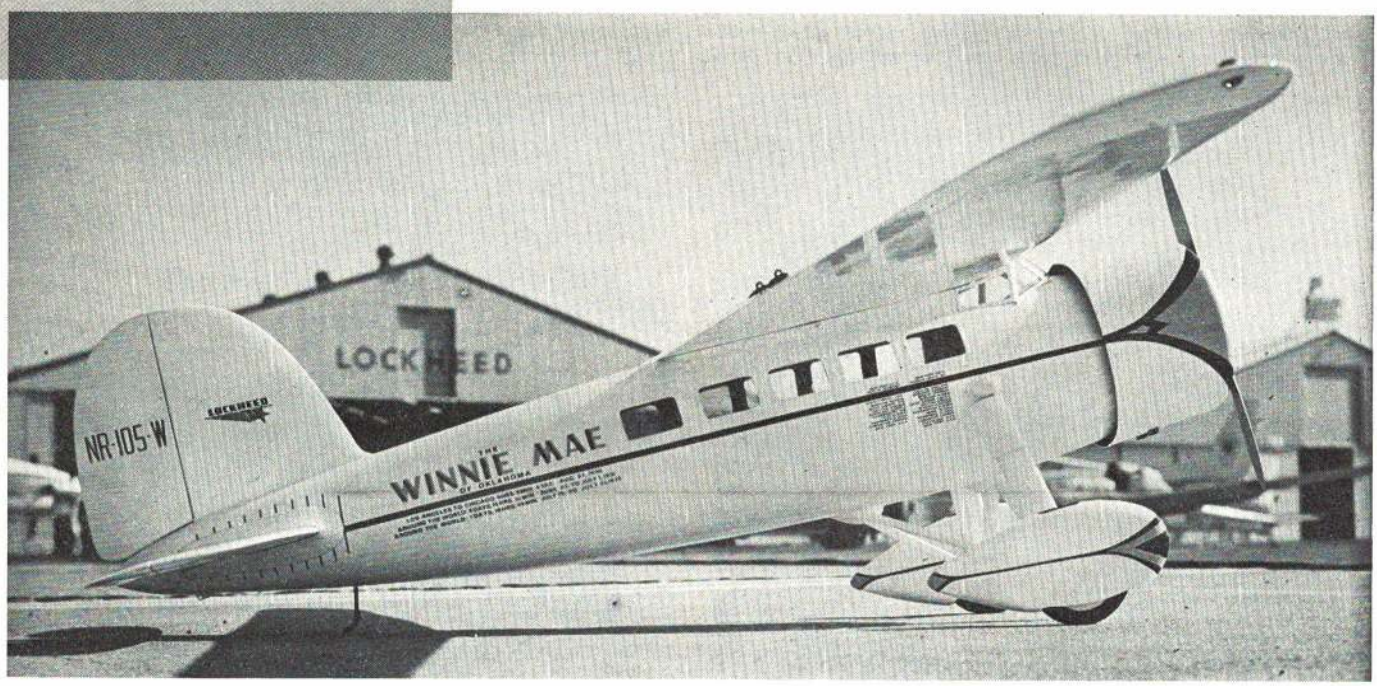
MODEL OF A GREAT VEGA

Winnie Mae

Text tells epic story of real plane which author has meticulously modeled for radio control. It is a realistic, smooth flyer with that three-inch thick lifting airfoil.



All photos by the author

There exists a real restored Vega which represents the Winnie Mae in a slightly different configuration from that seen in this model article. Model is true to scale in every shape and dimension. It flies with equal realism, requires coordinated aileron and rudder.

MONTY & PATRICIA GROVES

DURING the early Thirties, aviation stirred the American people with a frenzied enthusiasm never equalled since. The activities and names of pilots and aircraft were frequent headline news. Some of these names have endured; others quickly faded. But the most famous name of all came off an aircraft line as C/N-122. This prosaic Contractor's Number was assigned by Lockheed Aircraft Company to a Vega 5 B. Licensed NC-105-W and christened Winnie Mae, her distinctive paint scheme of gleaming white and two shades of blue soon gained world-wide recognition.

Purchased by millionaire Oklahoma oilman F. C. Hall and named for his daughter, Mrs. Winnie Mae Fain, this was the second Vega to carry the Winnie Mae name. The first, purchased in 1928, had been sold back to Lockheed. Her now unemployed pilot, Wiley Post, returned her to Burbank and there became a test pilot and general utilities man.

In June of 1930, Mr. Hall called his ex-personal pilot and wanted to repurchase the Winnie Mae. When told it had been renamed and resold, he promptly ordered a new Vega and rehired Wiley. Post put his working experience with Lockheed to good use. Hall had told him to get the best, and Post initiated changes and modifications on the new Winnie Mae. When they were completed, he resumed as Hall's personal pilot.

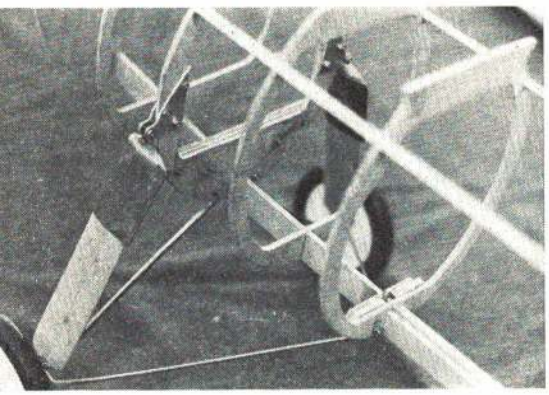
Post's old desire to make a record flight caused him to consider entering the 1930 National Air Races Los Angeles to Chicago non-stop derby for men. Mr. Hall agreed to enter the Winnie Mae. To put the ship in trim for maximum speeds, Lockheed set the wings at a lower angle of incidence, and a military-type supercharger (10:1 as opposed to 7:1 civilian) was installed on the P&W Wasp engine. To reduce the danger of nose over, four inches were taken off the tail skid. Additional tanks increased fuel capacity to over 500 gallons.

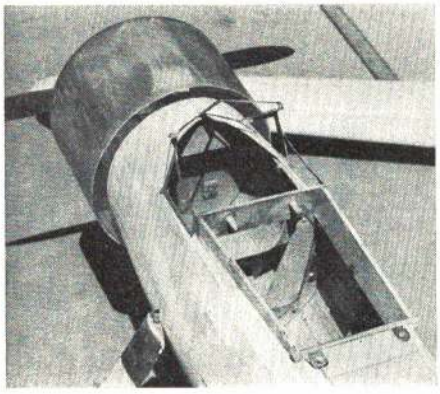
Using charts plotted by Harold Gatty, Post set out for Chicago in the modified Winnie Mae. He planned to extend the trip into a transcontinental dash, but compass failure intervened. However, he did make the 1760-mile Los Angeles to Chicago winning flight in a record 9 hours, 9 minutes, 4 seconds. Second place went to the first Winnie Mae piloted by Art Goebel.

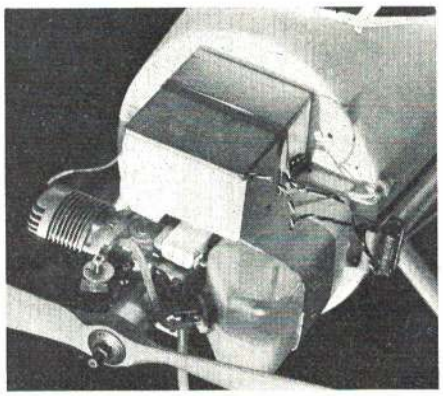
A record world flight then interested both Hall and Post. One of the main attractions at the 1930 Air Races had been the Graf Zeppelin, which had just completed a 21-day, 7-hour and 34-minute round-the-world tour. The popularity of the luxurious Graf Zeppelin was overshadowing the airplane. While airplanes had circumnavigated the earth, there had been mishaps and disasters. In 1930 the future of transoceanic flight looked brighter for dirigibles than for commercial airplanes. However, recent U. S. engine and aircraft development led Post and Hall to feel that America now could prove that, with good equipment and piloting, airplanes were a reliable method of commercial transportation. With Hall's approval, Post asked Harold Gatty to make the flight as navigator.

In January 1931, Wiley ferried the Winnie Mae back to Lockheed to be altered to fit the requirements presented by the unusual flight conditions. First, the engine was taken to Pratt & Whitney for a complete overhaul and re-installation of a military-type supercharger similar to that used the year before.

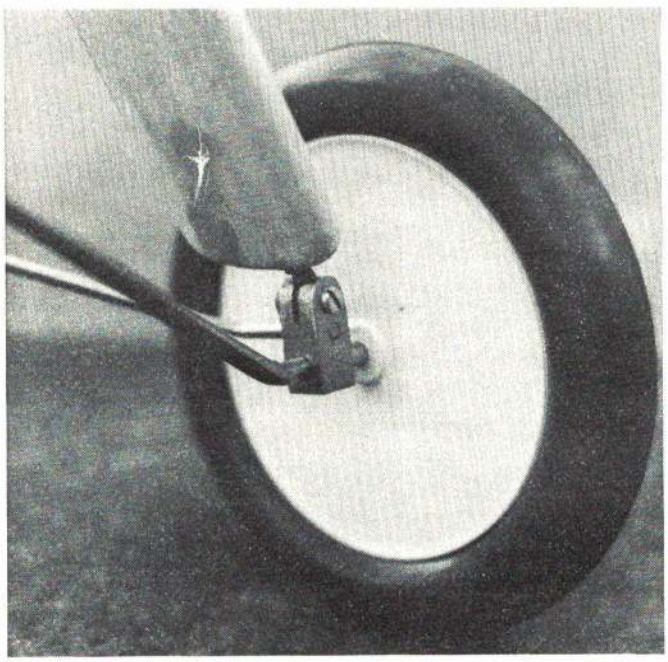
The wings were left at the same low angle of incidence set prior to the Los Angeles to Chicago race. The ship got a thorough going over. Wiley rearranged the in-

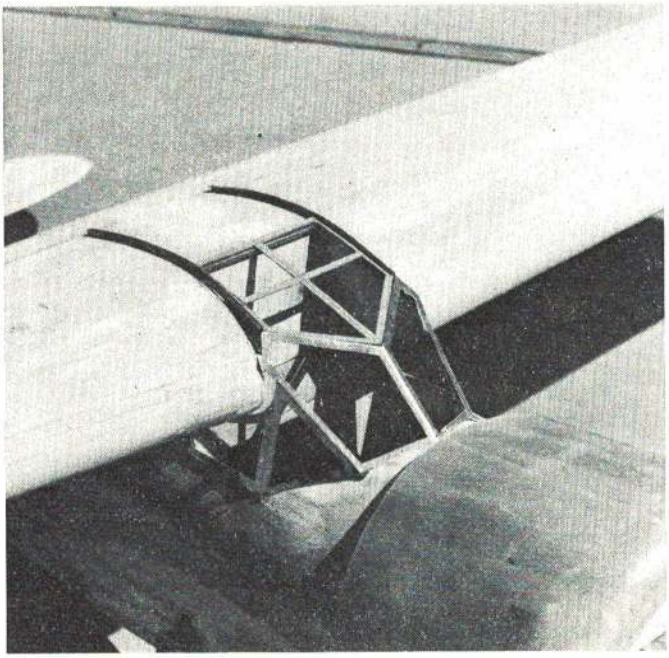






Construction details closely follow the real plane in several areas, notably landing gear mounting and shock-strut operation. In the wingless fuselage, note the dowels in the main bulkhead for front wing hold-down and the up-from-inside wing screw attachment. To mount the wing, one must get a hand through the door (it is functional) and manipulate the screwdriver. Williams scale wheels are used. Perhaps the most difficult part to make is the window frame — careful, patient cutting and bending are necessary. It is a one-piece part. Imagine the task of figuring out the flat pattern for it! Wings are easy, wire-cut foam core and 1/16″ balsa sheet.





strument panel for optimum efficiency and replaced the pilot's seat with a large easy chair for greater comfort and to prevent stiffness during the long flight.

To concentrate the fuel load over the plane's CG, navigator Gatty's two companions for the world trip were to be a pair of giant gas cans! To aid in takeoffs and landings, his accommodations were rather mobile — a folding table and a chair that could be slid back and forth to shift weight as required. Two hatches were cut in the fuselage — one for celestial navigation, the other to calculate drift.

Post and Gatty flew into Roosevelt Field, Long Island, on May 23rd, to begin the trip. Bad weather delayed them. Finally, at dawn, June 23, the Winnie Mae headed east — an attitude she was to maintain for the next 8 days, 15 hours and 51 minutes. She landed back at Roosevelt Field on July 1st. Covering 15,477 miles in only 13 stops, a bedraggled Post and Gatty alighted from the Winnie Mae. The nation went wild.

Later, because of the development of the automatic pilot by Sperry Gyroscope, Post felt he could make an even faster global journey alone. Hall provided the financial backing. On July 15, 1933, Post and the Winnie Mae once more headed east from Floyd Bennett Field. The first stop was Berlin, Germany — and a new speed record. Continuing, they passed over a frustrated Jimmie Mattern, downed near Anadyr, Russia, in an attempt to break the Post/Gatty record. On the evening of July 22nd, the Winnie Mae, beating her previous record, pulled up in front of a vast waiting crowd.

Crossing Russia's Ural Mountains at 21,000 feet intensified Post's idea that the stratosphere was where speed was to be gained. He began to experiment with high altitude flight. Subsidized now by Frank Phillips of Phillips Petroleum, Wiley wanted to make one more attempt at a transcontinental record. Fitted with droppable landing gear and a Bendix supercharger, the Winnie Mae was again altered to suit high altitude.

On March 16, 1935, Post, dressed in a specially-built high altitude suit, left Los Angeles for New York. Forced down in Cleveland by oxygen failure, he nevertheless broke the overland record to Cleveland. Using the high altitude jet streams to advantage, he was able to maintain an average speed of 253 mph and at times hit 340 mph.

Today, the Winnie Mae, in her final high-altitude configuration, is on display at the National Air Museum, Washington, D. C., where she's been since 1935.

Construction

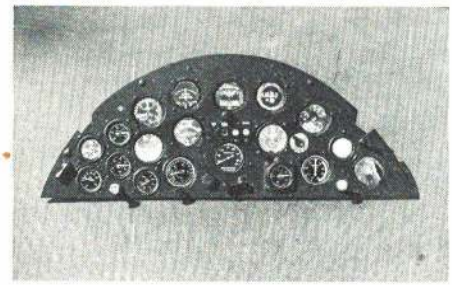
General: This configuration of the Winnie Mae is based on her appearance after conversion to a 5C following an accident. Everything aft of the CG should be as light as possible. About a pound of ballast had to be added directly under the engine to bring the CG within the limits marked on the plans. A Supertigre 71 with a Perry carburetor was used but a good 60 would be adequate.

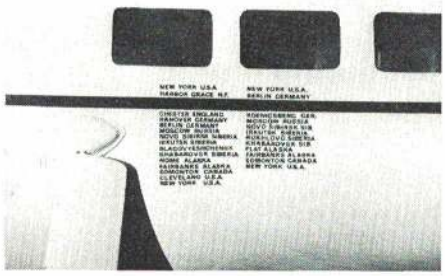
Some of the building techniques may be questioned, but decisions were based strictly on keeping to scale. Photography was used to gather data, to help scale up factory drawings, to produce an almost scale instrument panel, to check appearance during construction, and to make a movie record of the test flight for performance analysis.

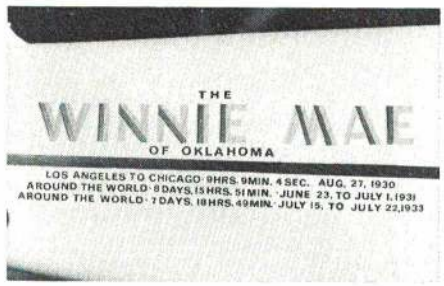
Wing: Foam planked with 1/16″ sheeting was used. The locations of scale ribs and spars are indicated for building it up. The root rib is a Clark Y 18 and, to finish lofting, an imaginary rib positioned at the tip is a Clark Y 9.47.

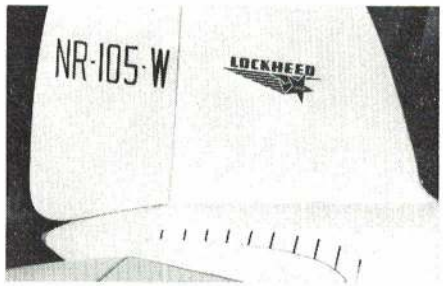
A box structure in the center is used to connect the two foam cores and provide an attach point to the fuselage. Build this, using W2, W3 and two 1/8″ root ribs notched together. Slot the cores, using white or Titebond glue to secure them to the short spars.

The wing is straight on top at the main spar line and is easily checked when attaching the cores. After the cores are glued to









Instrument panel is made by reproducing a photo of real plane's panel to model size, cutting out each instrument, and locating it in glass-faced bezels. Model's panel shown. Another outstanding feature of the model is the extensive lettering. Most of it is done with press-on type. Words "Winnie Mae" are free-handed and in two colors. If anyone develops a fiberglass fuselage Vega, please tell AAM. Many great Lockheed planes used this basic fuselage shape. We will pass on the word about availability.

the box structure, they are sheeted, using contact cement. The leading edge is sheeted with 1/16" balsa, wetted on one side and rolled over the leading edge.

After the sheeting is complete, a standard 1/4" trailing edge is cut to taper (see plans), glued to the trailing edge and sanded to match the existing airfoil. Wing tips are hollow balsa glued to a 1/16" root rib.

Cut out and prepare ailerons using the conventional bellcrank arrangement. The plywood aileron horn is somewhat of a departure in that it doesn't extend below the wing (scale!). This provides considerable throw for lateral control. Install the wire pushrods.

W2 and W3 butt-fit directly down upon the main fuselage formers F3 and F5. W1, the front attach point, attaches behind W2 and should be well-epoxied. A small wood screw or two here won't hurt. With W1 wing tips and ailerons finished, set aside until later.

Fuselage and Empennage: Without a concrete mold to form the fuselage halves, as was done in the original, planking over a preformed skeleton was used. Cut the formers from 3/16" plywood, using great care since the slightest variation can produce strange non-scale contours. Assemble the formers onto the top and bottom keels to check the shape. Use small C-clamps to hold this together while the only two longerons are fitted near the top of the fuselage.

Take the 1/4 x 1/8" longerons and, starting in the front, clamp them in the position as shown. Mark the positions taken on the formers as they are shaped toward the tail. Once satisfied, remove and notch the formers to match.

When getting ready to glue the formers, keels and longerons together, take care F3 and F5 are exactly spaced to match W2 and W3 on the wing. *Do not glue* the lower sandwich of F3. That is done in the next step — the installation of the landing gear. Use Titebond to assemble all formers to keels. Do not glue F11 yet. Check for trueness.

Form the 3/16" main landing gear wire and cut out F3A and F3B which hold it in place. Using epoxy, position the main landing gear wire behind F3 and sandwiched between F3A. (I used several No. 4 bolts, but they may not be necessary.)

Make sure that there is no toe-in. F11 still is not glued. Form the 1/8" rear strut wire to fit over the keel just in front of F5, extending straight toward the axles on the main landing gear wire. Bind with wire and solder as shown below F5.

Construct the two small landing gear blocks which tie the entire assembly together. These are easily made with a hacksaw, drill and file. Position and soft solder the blocks onto the 3/16" wire, then make the final bend in the 1/8" rear strut wires. When the 1/8" rear strut wire is properly positioned, soft solder them into place. Be sure there is no toe-in on the main axles.

Set this aside and work on the tail skid. Install the strong backs as shown on F9. Install the doublers between F9 and F10 so that the 3/16" wire skid can be placed through the 3/16" hole just drilled.

Prepare a hardwood block, drill and install the skid wire, using 3/16" wheel collars to retain in place. Epoxy and screw this hardwood block to F9. Remove the wire skid and solder together the scale "shoe" on the end of the skid. (A tail wheel would improve ground handling, if desired, but a rudder linkage must be devised. The Winnie Mae had a tail skid. No planking is done yet.

Using No. 4 bolts, install the two metal (aluminum) main shock absorber attach points, positioning them as indicated. Set this aside and construct the complete empennage. Install hinges and plank. The control surfaces hinge similar to those on the deBolt Sonic Cruiser. Install the constructed empennage after removing F11, which is not yet glued.

Align and square the horizontal stabilizer to the vertical fin and glue directly to F10. Now glue in the F11 to hold in everything. To check alignment, lay a straightedge on top of F3 in the front and sight and/or measure to assure correct position. Titebond again. Zero incidence is required on the elevator, so check this against the flat bottom on the wing.

There is just enough room in or near the tail cone to connect the Nyrod pushrods to the rudder and elevator horns. The two Nyrods start just in front and through F3 where the rudder and elevator servos will go. The pushrods run down and along the keel beneath floor level until they get to the rear where they jog up a bit to connect to the rudder and elevator.

At this point, rough in the servos and check the empennage throw. Plus or minus 5/8" on the elevator and all the rudder available

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Start of first flight. It flew best with a hand-carved 18-4 prop. No trim changes were needed, takeoff and landing are dicey.

Winnie Mae

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(±1") is just about right. Put keepers on the Kwik-links, because once the assembly is enclosed, it's difficult to get to.

Decide which engine is to be used and select its mount. A radial mount to match the engine is best, whether it be a Tatone, HP, or solid oak rails and box. Install securely with No. 4 bolts and blind nuts through the ¼" firewall. To keep the weight up front, I used a side mount. Between F3 and F5 install two vertical 3/16" ply stiffeners.

Place the constructed wing on the fuselage skeleton so that W2 mates with F3 and W1 fits snugly behind F3. Check for squareness with stab and fuselage. Drill through both F3 and W1 with a ¼" drill and install the front wing plugs, using a rounded ¼" hardwood dowel. Epoxy them well into F3.

For the rear mount I used two Tatone wing holddowns but only one is required; this would make installing the wing much easier. Take two Tatone wing holddowns and open one of them up with a drill so that the ¼"-28 nylon bolt passes through with ease. Locate and install on W3 the one with the threads. Place the wing in the front wing plugs and locate the threadless holddown on F5 to match.

Now to plank! Switch to Ambroid and buy plenty of ⅛" balsa. Strip it to about ¾" wide pieces. Collect approximately 10,000 construction T pins. Have a drink. Get rid of the cat 'n' the kids, and go into isolation.

Be sure to plank on both sides, top and bottom simultaneously. This prevents any twists in the fuse. Rig a jig, if possible, but keep it straight! That fuse measures about 27" around and it'll take a while. Don't rush it. Ambroid is recommended because it sands easier than Titebond. A solid block can be used up around the firewall, if desired, but I planked it. The wing can now be set (but not bolted since there's no way to get to it) on the top of the fuselage.

Cowling: The cowling technique is a matter of preference. I built mine from fiberglass by turning a cylindrical wooden plug with a 1" radius on the front to the dimensions as shown. Then, with a glass cloth lay-up, I made a mold over this plug. Then cowling and replacements can be laid up as required. An aluminum pot the right shape could be used; or a cowling spun to fit. Be sure the cowl is cylindrical. When mounted, it remains round in the front and becomes elliptical in the rear.

Make four cowling mounts and epoxy them to the inside of the cowl so that the cowl is square with the fuselage. In addition to the epoxy, put a layer of glass cloth over each of the four mounts as added collision insurance.

Mount the cowling to the firewall using No. 4's and blind nuts. This is taken on and off several times, so get it on right and provide clear access to the mounting screw heads. Check for adequate and even propeller clearance around the cowl.

Landing Gear and Pants: Construct the two shock absorbers which tie into the fuse at F3 on the metal fittings. The upper part is formed with brass sheet and soldered at the trailing edge. The hardwood lower portion is shaped to the desired streamlined design and made to slide-fit into the brass portion. A hardwood plug is carved to fit the upper brass portion.

Four of Sig's No. 4 spade bolts are needed. Solder brass tubes onto two of the spade bolts to the length shown. Drill the hardwood lower portion to accept a suitable size coil compression spring. Drill the upper wooden plug to accept the spade bolt with the brass tube attached.

Epoxy this assembly into place using the hardwood strut as an alignment aid. After it's set, drop the coil spring into the hole in the hardwood, and try it out. About five pounds of force to compress the spring is correct. Drill and place the remaining spade bolts into the bottom of the hardwood. Both of the spade bolts are aligned so they'll fit the slots in the metal fittings top and bottom. Use No. 4 bolts to mount both top and bottom.

The pants are made in a conventional manner. I used 1/16" ply with a layer of glass cloth for additional strength for the outside plates and ¼" soft balsa for the core. Shape and sand as shown.

Prepare a brass fitting which attaches to the same small mild steel block that attaches the shock absorber strut. Install the 5" Williams Brothers wheels, avoiding toe-in. Grind down a 3/16" wheel collar to fit inside the pant to hold on the wheels.

Windshield: To cut the pattern shown, use .03 aluminum cut and bent to fit. Eventually, it's held in place by straight pins and can be removed. Make the final fit by checking it with the wing installed. Then mount the windshield to the fuselage.

The sliding top door is made from 1/32" ply. The "glass" is 1/32" butyrate contact cemented to the underside. Butyrate is also used on the soft aluminum for the windshield. Don't install the "glass" until after painting is finished.

Fairings and Lights: Four types of fairings are used: soft balsa, formed plastic, hardwood and paper, each in its place. For the fairings around the landing gear wire, use milled, simulated steel, wooden I-beams available to model railroaders. They have a 3/16" web, and two of these epoxied around the wire with the addition of 3/16" balsa on the front and back slots will streamline it to shape. Using ⅛" I-beams, make rear landing gear struts in the same manner.

The wing and taillight covers, the small streamlined fairings on the side covering the shock absorber attach points and those on the wheel pants were preformed using 1/16" plexiglass heated and pulled over balsa forms. This gives the appearance of stamped metal. Trim by sanding. Paint these fairings separately and attach last.

Scale Details: A two-inch-to-the-foot Vega is a dream scale airplane to build. There were so many famous Vegas during the Golden Age of Aviation that the possibilities for scale ships are staggering.

Rivets, when they appear, are lightly sprinkled on the cowl, pants, tail cone fairings and struts. Lay out the rivet pattern (lightly penciled) making sure the lines are straight and the rivets evenly spaced. Then use a glue gun with Titebond to put on the rivets just prior to the final finish coat. This retains the well-defined heads.

For the instrument panel I used photos of the instruments on the Winnie Mae's panel. By blowing up negatives to scale size, cutouts from the print could be fitted neatly into I M Products' bezels that had been recessed in a thin brass sheet. Panel knobs, cranks, primers and other protrusions were made from soldered brass tube, thin sheet metal, rivets and other oddments. The assembly was spray-painted flat black before the cutout photos were contact cemented in.

After the first two coats of Hobbypoxy have been applied, cut out the door and windows. The door is cut out of the fuselage, hinges put on, and a latch installed. The window frames are made from stiff, hard-finished business cards glued around the openings. Clear butyrate windows can be installed with either one-minute epoxy or contact-cemented after the plane is painted.

Color and Markings: After the normal amount of DAP filling, sanding and re-DAPing, paint the entire airframe Hobbypoxy white (H-10). The light blue on the cowl, pants and the words "Winnie Mae" are Hobbypoxy H-26 with 10% white added. To get good sharp edges, use vinyl tape for masking. To paint the dark blue on top of the wing and to do the dark striping on the fuselage, use Pactra Aero Gloss Corsair Blue. Putting the paints on in this sequence prevents masking pull-up.

The NR-105-W on top and bottom of the wing were done with a desperation technique — contact shelf-paper stencils! Lay the numbers out on the contact paper and cut them out with a new X-acto blade. Use the large sheet as a mask to spray the blue numbers on the bottom of the wing. Use the separate cutouts as masking when painting the large blue outline on the top of the wing.

Make another set of two contact paper stencils for WINNIE MAE on the side. Spray the words with light blue Hobbypoxy and then stripe trim with dark blue dope.

For all that eye-killing lettering on the side, I used Letraset press-on letters — Folio Bold for all lettering, 24 pt type for "THE" and "OF OKLAHOMA," 18 pt for Post's record achievements and 12 pt for the listing of stops on the two round-the-world trips. After the letters are on, give the entire airplane two light spray coats of satin Varathane spray. It puts an excellent protective coat over the letters and dope and it gives the desired flat eggshell finish.

Engine, Radio, Etc.: Since I used a side-mounted engine with the new Pylon Brand SS-10 tank mounted just opposite the cylinder, a special padded box was mounted to the top of the engine mount for the battery pack. (Get that weight forward and observe the CG limits.)

Fashion a glow plug "extension cord" by attaching a wheel collar to the glow plug with a wire attached to the setscrew. The ground wire is secured under one of the engine mounting bolts. Bring these two out to a two-pin plug which attaches to the fuse just under the cowling, but still accessible. Place the switch along side on a small bracket. Everything remains hidden.

Rudder and elevator servos fit between F2 and F3, and the throttle servo and receiver go into the space between F2 and the firewall, F1. The antenna runs forward through the firewall and coils inside the cowling until ready to fly. Then it's stretched out and fastened to the left horizontal stabilizer. All my radio gear switches, etc., were hidden, but there's plenty of room for the builder to suit himself.

Flying: Jim Sunday became my Eddie Belande, because I was too emotionally involved to test fly the model. We started with a 14-6 prop. After a few taxi trials he attempted an ease-the-throttle-forward type takeoff, only to have the ship nose over because of toe-in. Then, after my jacket fell into the running prop, we had to switch to one of Bill Cooksey's 18-4 props.

Finally Jim poured on the coal and held lots of right rudder to compensate for the "P" effect. The Winnie Mae rolled about 12 feet and then lifted off for a total run of 20 yards.

The 18-4 prop on the Supertigre had no problem lifting that 15-lb. beauty under the 82" Clark Y 18. Once airborne, she was straight and true and quite fast. Flying is scale and requires coordinated turns using rudder with ailerons.

With that thick 3" wing, the Winnie Mae is not in a class with stunt aircraft, but does have adequate speed to perform rolls (more barrel than aileron) and loops. It would probably spin (to scale, of course), but since it was the first flight, Jim didn't try it.

He made several low passes so that pictures could be taken before he made the approach. With throttle back the ship came straight down the pike with no tendency to wallow or search. The ship touched down on two wheels, bounced a quarter to half an inch and settled in. Just beautiful.

Keep that stick back to hold the tail down. And remember, she's a tail dragger, so on takeoff or landing, fly it!