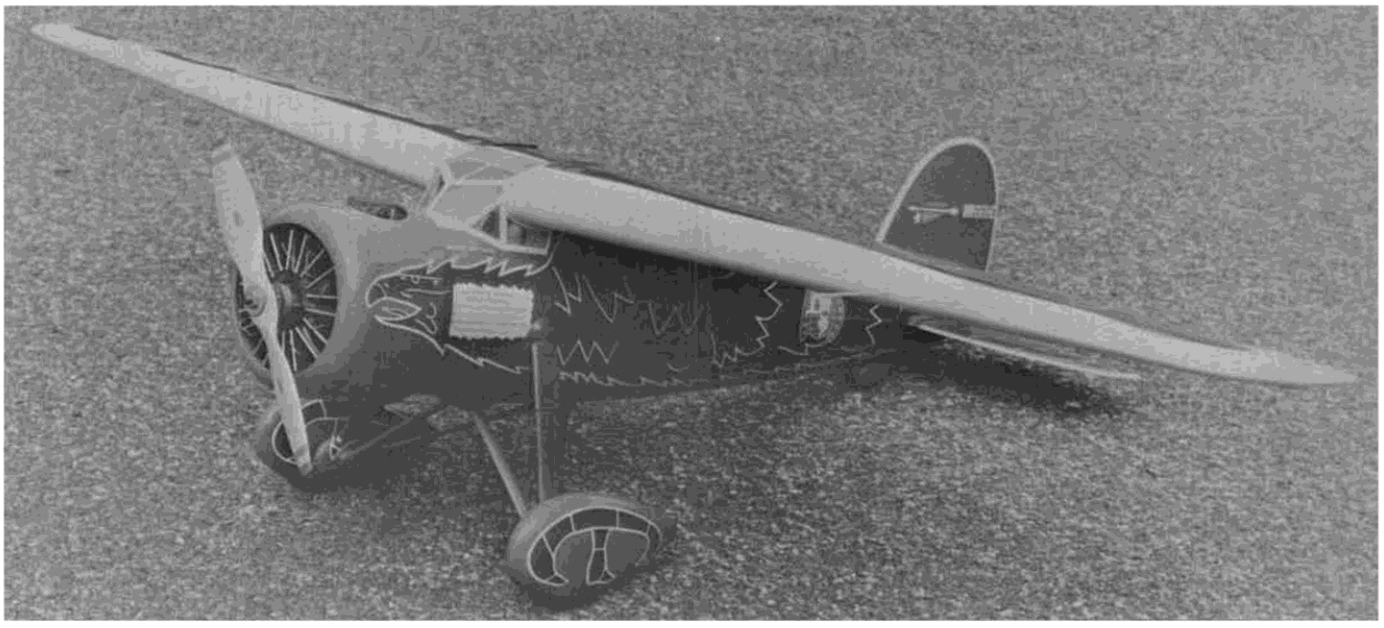


PHOTOS BY
JERRY MARKS

LOCKHEED VEGA

By WALT MUSCIANO . . . A famous modeler reproduces a famous aircraft. Next month, we'll present Walt's fascinating story and photos about Mattern and his Vega, plus more about all of the record setting "Wooden Wonders" built by Lockheed.

●JIMMIE MATTERN'S LOCKHEED VEGA is probably the most beautiful airplane ever conceived. When the dramatic red eagle paint job was applied to the classically simple and timeless lines of the Lockheed Vega the result had to be enchanting, and it was. Mattern attempted a solo 'round-the-world flight in 1933 after he set several trans-Atlantic and inter-continental records during the previous summer. The Vega was the very first Lockheed design, and spawned a bevy of "Wooden Wonders," including the Sirius and Orion. The story of Jimmie Mattern with his Vega plus the other "Wooden Wonders" will appear in next month's issue of Model Builder, and include important photographs for the dedicated scale model builder.

OUR MODEL is scaled to 1-1/4 inch to the foot, which gives it a wing area of about 435 square inches. Power can be in the .35/.40 cu. in. displacement engine range. In view of the fact that the full size Lockheed Vega was not fitted with flaps or slots or retractable landing gear, this model won't be criticized for not having these items. Four channels, operating elevators, rudder, ailerons, and engine speed, are all that is needed to cover all possible operations for this beauty. The construction is very straightforward and conventional, with planked fuselage and sheet covered wing and tail; using balsa, plywood and hardwood materials. Of course foam and other materials can be substituted as desired.

One feature is a bit unorthodox on this model and that is the method of wing attachment. The forward section of the wing in way of the pilot's cabin is cut away because the cabin is part of the fuselage. The flat interface between wing and fuselage is ideal for the application of dowel pegs, however, we refused to mar the top of the wing with nylon screws. Instead, we chose to locate the mounting screws in the fuselage just beneath the wing. This necessitated the perfect mating of certain wing and fuselage components which had to be strong enough to hold the two units together. The two components are Rib No. 2 and fuselage wing support "O"; the latter forming a part of the fuselage structure, while the former slides down along the fuselage wing support inner surface. A nylon wing screw becomes a shear pin as it passes horizontally through both mounting members.

This is our third Mattern Vega. We fell in love with the plan when, as one of the winners of a 1939 scale model plane contest, the author attended a victory luncheon with the judges, which included record smashing Frank Hawks, Jack Knight, and other famous aviators. In addition to the author, one of the other winners was old timer R. C. pioneer Joe Raspante, who had entered a scale Mattern Vega. So enrapt with the beauty of Raspante's model was the author, that he

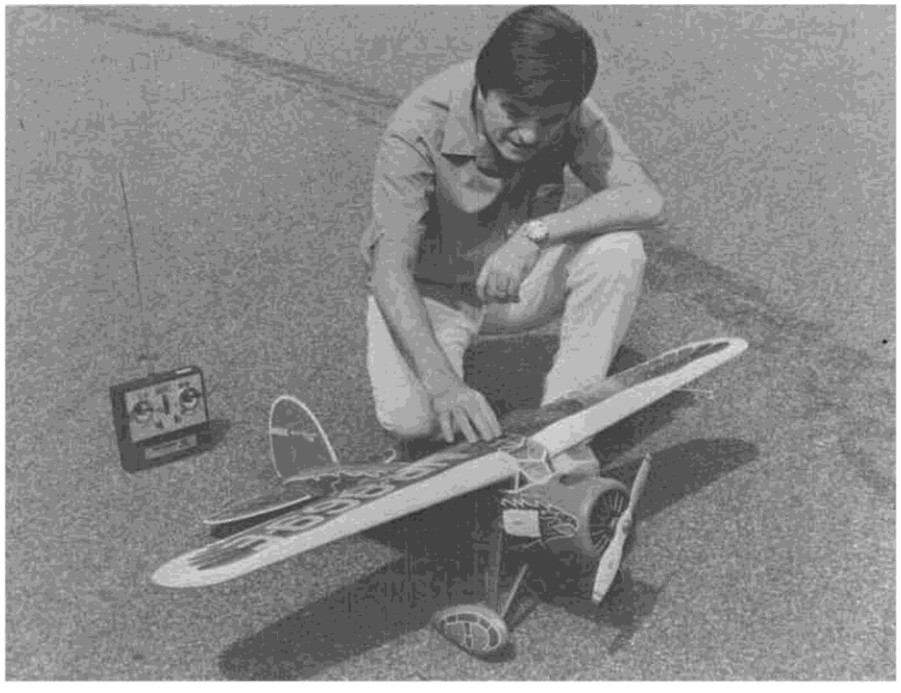
Walt justifiably admires his handiwork. Pattern on bottom side of wing and stab same as on top. Scale wheel pant blister strengthens joint to strut fairing.

Only one application of masking tape required for three-color paint scheme. Start with white base. Note raised fairing lines. Small lettering is rub-on type.

could hardly wait to get home and start building his own Mattern Vega! The second was built during the immediate post-WW-2 years. Don't let the paint job scare you off, because it is basically simple and only requires one careful application of masking tape. The results of a little patience are very rewarding.

The model should be kept as light as possible without sacrificing strength, therefore, lightening holes should be cut in the plywood as shown. In addition, it is recommended that the balsa sheet be gently sandpapered with a block to remove any non-structural nap and to thin the thickness somewhat prior to tracing and cutting the parts.

FUSELAGE is started by tracing and cutting to shape the keel pieces, plus bulkheads and formers. Notice that some balsa formers are to be cut in two pieces; divided on the vertical centerline. Don't neglect to cut the lightening holes and engine mount openings in the plywood. Be sure the mount spacing fits the engine you plan to use. Assemble the keel by placing the pieces directly over the plan to insure the proper shape when cemented to each other. Hold to the work table with straight pins. Cement the left halves of the divided formers to the keel. When thoroughly dry, lift the keel and former assembly from the table and cement the right side formers to the keel, as well as to the left side formers. Hold in place with pins until cement is dry. Cement the bulkheads and remaining formers to the keel and then re-cement all joints.



Walt opens sliding hatch on his Vega to turn on receiver switch in cockpit. Dummy radial engine is strength member of cowling, dressed up for appearance.

While this is drying, the landing gear struts can be bent to shape, following the plans. Cut holes in the keel for the wire struts. The struts are then loosely attached to the bulkheads with "J" bolts. Now, bind the three struts together with soft, thin, tinned wire similar to that used by florists. Solder the joints thoroughly, applying constant heat so the solder flows deep through the wire binding to the strut. Tighten the "J" bolts and smear with cement or epoxy to prevent loosening due to engine vibration. Note that the spreader strut is not attached to the bulkhead because it must be able to flex as part of the shock absorption arrangement.

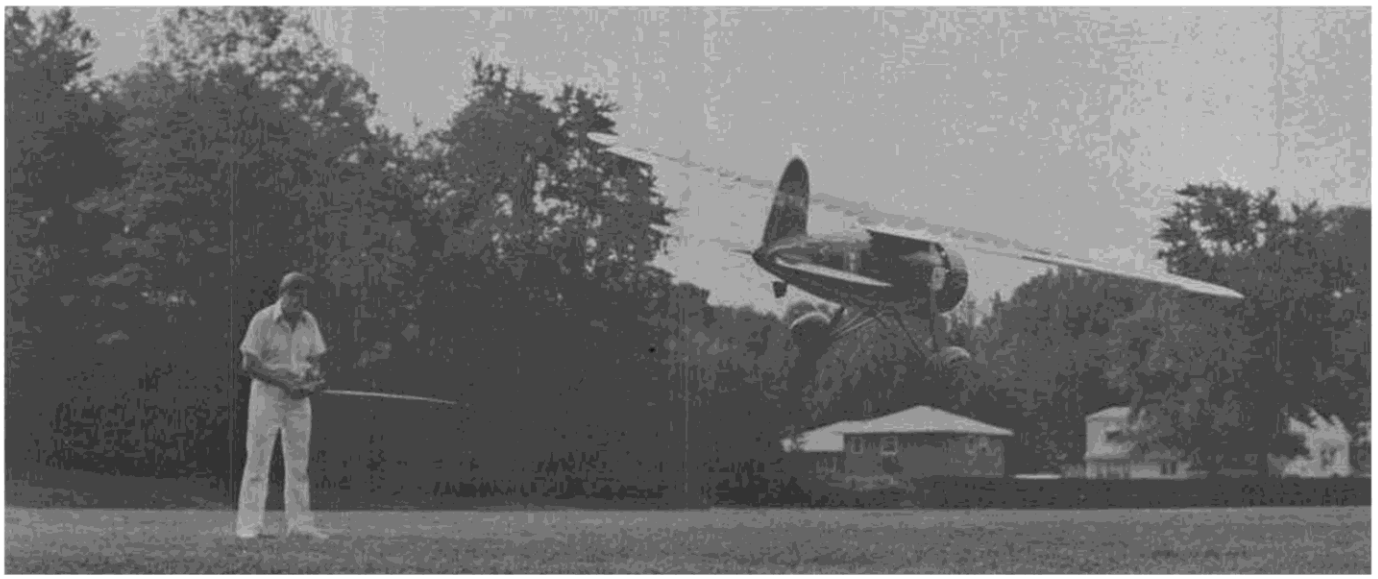
Engine mounts are now cut to proper length and epoxied into the bulkhead holes. A sheet of 1/16-inch plywood is screwed and epoxied atop the mounts and to the bulkheads. This serves the dual purpose of locking the mounts as well as functioning as the cockpit floor. Apply more epoxy to the mount installation.

Bulkhead "C" must be well epoxied to former "D" and the mounts.

Epoxy the plywood wing support, piece "O", into the slots in the bulkheads; egg-crate fashion. When the glue is dry, add more epoxy to this installation. Check the alignment very carefully.

Our model was fitted with a swiveling, but non-steerable tailwheel. The swivel feature makes ground handling a dream. Solder a washer to the brass tube as shown and then epoxy the tubing into the nylon bracket. Bend the lower part of the tailwheel wire strut and insert into the tube. Bend the upper portion and then bolt the bracket to the bulkhead. Do not install the wheel or fairing. Apply epoxy to the bracket bolts and nuts. At this time, it is advisable to install a few planking strips to give the fuselage some rigidity during the next operation. Apply three or four strips to the top, bottom, and sides of the fuselage near the centerline; cemented to each other as well as to the keel, bulkheads, and formers. Tail surfaces should be installed now, so put the fuselage aside while the tail is being fabricated.

TAIL SURFACES consist of a simple sheet balsa covered structure. The tips are soft balsa blocks because it is difficult to sheet cover the compound curves that the tips form. Don't forget to notch the spars for the ribs, and notice that the spars run the full span of the empennage, past the solid tips. These items simplify the assembly and improve strength. When the framework is complete and control horns have been firmly epoxied in place, the leading edges must be trimmed to follow the contour of the ribs. The full size Vega had no exposed control horns and we decided to duplicate this feature on our model. Sandpaper the entire structure with a block before adding the sheet covering. Re-cement the structure and then use plenty of the adhesive when applying the covering. Hold in place with straight pins until cement is dry. We ran the stabilizer and fin covering about 1/16 inch past the spar so this overhang covered the hinge space between the components to improve appearance and



Walt brings the Vega in close for photographer, Jerry Marks. Paved runway is a must for the heavily panted wheels. A quick removing type might be best if you have a grass flying field.

streamline the joint somewhat. Apply a 1/4-inch strip of 1/16-inch covering material to the tip of the spar to bring it to the same thickness as the covered assembly. Cut the soft tips to outline shape and cement them firmly to the spar and tip rib. When thoroughly dry, the tips are carved to shape to conform to the elliptical shape of the empennage. Sandpaper thoroughly, being certain that the tips fair into the curved area. Check with the tail sections when rounding off the leading edges. Slip the stabilizer into the slot in the keel and trim the keel and fuselage former, being certain that the stabilizer is at right angles to the keel. Hold in position with straight pins as necessary. The fin is then trial fitted to the fuselage top. Trim as needed and cement to the keel and planking strips. Be certain the fin is perfectly vertical; parallel to the keel and at right angles to the stabilizer.

CONTROL RODS should be located in the fuselage before it is planked. Bolt the engine to the mounts temporarily to determine the engine control rod run. Servo, batteries, and receiver mounts should now be fabricated and installed on the keel and/or bulkheads. Install the rods, being certain that the rudder and elevator are in neutral position. All radio equipment is accessible through the fuselage top when wing is removed.

FUSELAGE PLANKING should be completed now, unless the builder desires the fuel tank to be located within the fuselage instead of forward of the firewall. The latter is the preferred location as shown on the plans. Before the actual planking continues, add balsa sheet atop the fuselage to continue the line started by the plywood wing support, piece "O." The grain must run vertically for strength and to facilitate bending to the center as shown in the top view. Cement securely to the vertical sides of the formers and to the wing support. Planking continues by alternating side-to-side and top-to-bottom with each consecutive strip. Use plenty of cement when attaching the strips to the bulkheads and formers as well as to each other. Each strip must be bevelled and tapered to fit the adjoining planking strip. Check the fit before each strip is cemented in place. Do not try to develop the cockpit opening by attempting to cut the planking to exact size prior to cementing in place. Rather, cut the strips extra long in way of the cockpit and trim carefully only when all pieces are in place and cement is thoroughly dry.

The tail cone is laminated using soft 1/2-inch balsa. Be certain to cut the center piece as noted on the plans in order to have a pre-hollowed blank. A slight amount of further hollowing will be necessary to clear the elevator control horn and lighten the cone. Trial fit to fuselage and check the controls to be certain there is no interference with the elevator horn. Cement cone in place to the fuselage.

Carefully mark and cut out the cockpit opening. Sandpaper the fuselage until smooth. Wipe cement into any spaces between the planking strips with the fingers, for strength and appearance. If, when dry, any spaces remain, apply some fillet compound, also wiped deeply with the fingers. Sand again.

LANDING GEAR FAIRINGS are fabricated now. The balsa strut fairings must not touch the fuselage, in order to allow the landing gear to flex without breaking the fairings. The hard balsa fairings are cut to fit the wire struts in two halves; with a semi-circular groove cut into each half. Roughly cut the fairings to a streamline or teardrop section. The streamline wheel covers or pants are laminated with layers of sheet balsa of various thicknesses. The inner layers must be cut out to clear the wheels by at least 3/32 inch before the pieces are cemented together. When the cement is thoroughly dry, the wheel pants are carved and sandpapered to a streamline shape. Consult the drawings and photos for guidance. Carve and cement the fairing block to each wheel pant. Seal and paint the interior of each wheel cover. The wheels must be installed before the wheel covers are fixed in place. Solder brass washers or use commercial wheel retainers to keep the wheels centered on the axle.

The wheel covers are installed first becuase they cover so much of the wheel, the axle pierces the pant fairly high up the side. It will be necessary to cut a 1/8-inch slot in the side of each pant up to the point where the axle pierces. Save the material from the slot if possible. Trial fit the wheel covers and trim as necessary until the fit is perfect; then cement to the wire struts. Be certain the wheel can spin freely inside the pant. When thoroughly dry, cement the slot material back into the slot minus the 1/8 inch removed to allow for the wire axle. When this is dry the strut fairings are fitted and trimmed to meet the wheel covers. Fairings are then epoxied to the wire struts and the pants. Sandpaper the struts to a streamline shape when the glue is dry. Add the strut blister fairings to fuselage sides and bottom and then carefully bind the strut fairings to the wire struts. This can be done with strips of silk and cement or 3/4-ounce fiberglass cloth and resin. Run the strips from the struts onto the pan for a smooth contour and added strength. Apply several layers. It is important to realize that the strut fairings hold the wheel covers in place and generous fillets help.

WING CONSTRUCTION is the epitome of rugged simplicity with a single deep spar and heavy leading edge. Spar halves are cut to shape with rib slots as shown and epoxied between the plywood joiners. While this is drying, the ribs are cut to shape with spar slots. The balsa leading edge should then be notched for the ribs. Cement the ribs to the spar, egg-crate fashion, and add the leading edge to assist in the alignment. Ribs No. 2, 3 and 4 must be well epoxied to each other. The ribs at each station should be the same height as the spar, forming a rigid grid with the leading edge. Check the alignment carefully by sighting along the trailing edge of the ribs; from tip to root. Before continuing fur-

Continued on page 101

ther with the wing, it is important that the plywood wing mounting rib No. 2 alignment with fuselage wing mount piece "O" be checked with the nylon bolt in place. This is the last chance during the construction procedure to make corrections to the rib. Add the peg support spars No. 16 and the auxiliary spar to complete the basic structure. The wing mounting pegs are now cut to length from dowel. Drill 1/16-inch retaining dowels in the pegs. Before the aileron controls are installed, it is advisable to cover only the upper surface of the wing for added rigidity. Sandpaper the structure and re-cement all joints. Cement standard balsa sheets together to form the proper chord width. Apply plenty of cement on the ribs, spar, leading edge and auxiliary spars and press the covering in place. Note how the covering runs over the leading edge. Hold the covering in place with straight pins until cement is dry.

AILERON CONTROLS are started by constructing the ailerons with spar, ribs and balsa covering. Firmly epoxy the sheet aluminum control horn into each aileron as it is being assembled. Be sure to bend the horn and pass it through the rib for a firm installation. The full size Vega had no visible control horns, so we decided not to use commercial aileron control horns. We also prefer push rods instead of torque tubes. The horn must be located at the very bottom of the aileron, as the plans illustrate, in order to operate properly. A hole must be cut into the lower part of the auxiliary spar to allow for adequate clevis movement. Firmly epoxy the commercial hinges to the aileron upper covering and spar. When dry, glue the other end of the hinge to the wing upper covering and auxiliary spar.

The bellcranks are bolted to the plywood mounts which are cemented into the slots in the ribs and to the spar. Install the servo and run the control rods, with clevis ends, between the servo, bellcranks and control horns. Be certain the ailerons are level when the servo is in the neutral position and check the aileron operation.

WING COVERING is completed now. First trim the leading and trailing edge of the upper covering to follow the contour of the lower surface of the airfoil. This bevel will enable the lower covering to meet the upper covering at the trailing edge with greater cementing surface and an uninterrupted undercamber curve. It is important that some structure be added to the wing bottom in way of the aileron servo because the servo should remain uncovered and accessible. This structure will compensate for the opening in the covering. The lower covering is installed in the same manner as the upper covering, using plenty of cement and pins to hold in place. *(The pointed leading edge shown can cause stalling at low speeds, such as landing approaches. The equivalent of wing tip washout can be achieved by leaving the leading edge pointed at the root, then gradually increasing the radius to a full round at the tip, with careful application of a sanding block. wcn)*

WING TIPS are cut from soft balsa and laminated, cross-grained. Cement to the wing and let cement dry overnight, then carve and sandpaper to final shape, consulting the plans and photographs.

COWL can be constructed from balsa or layers of 6-ounce fiberglass cloth and resin or epoxy. The plans illustrate a balsa cowl which can be covered with light fiberglass cloth and resin if desired. Cut the dummy engine plywood disc to shape and sandpaper the cylinders; rounding off the corners. Each cylinder should be wrapped with thin non-plastic cord-type fish line to simulate the cylinder cooling fins. Wipe the fins with cement to hold the lines in place. Cut the balsa cowl ring to shape and assemble to form the circle. Sandpaper the inner circle carefully with the sandpaper wrapped around a one-inch dowel and then cement it to the dummy engine disc. While this is drying, the twelve 1/2-inch balsa cowl segments are cut to length. Notice the bevelled sides which enable the pieces to form the curvature as they are assembled. Because the cowl changes shape from a circular section at the front to an elliptical section at the rear, the bevels must change angle as shown on sections "A" and "B." In addition, the arrangement of the segments at the rear must form an ellipse into which bulkhead "C" can fit after the cowl is carved and hollowed as shown. The segments should be trial fitted as cutting and carving progresses; pinned to each other and to the dummy engine disc. When all fits well, the segments are cemented very firmly to each other and set aside to dry thoroughly. Using a sharp knife (X-Acto No. 26 blade) and an X-Acto gouge, carefully hollow the cowl as the plans illustrate. The cowl exterior should only be roughly carved oversized at this time. Use bulkhead "C" as a guide for hollowing at the rear of the cowl. The fact that the cowl is open at both ends simplifies the interior carving considerably. Continue fitting bulkhead "C" into the cowl and stop carving when the fit is neat but a bit snug. Apply several coats of sealer to the cowl interior and sandpaper lightly. Then epoxy the cowl to the dummy engine disc, being certain that the cylinders are properly oriented with the odd cylinder at the top. When the epoxy is thoroughly dry, install the cowl using wood screws through the dummy engine disc and into the engine mounts. Be certain to drill pilot holes so the screws don't split the mounts. Now, the cowl exterior can be completely carved and sandpapered to shape.

As an alternative, the cowl can be carved from a balsa block, however we found segments to be easier, faster, and cheaper than a block. Press fillet compound into any cracks between the cowl pieces and sandpaper smooth. Mark off the location of the side mounting bolts at the rear of the cowl and then remove the cowl. The .032 x 1/2 x 1 inch brass angle clips are cut out, drilled and bent to shape. Solder a nut to the inside of each clip as shown. Epoxy can be used as a substitute, but in this case it won't hold as well as the solder. Screw and epoxy the clips to bulkhead "C" and hold the cowl in place again with the forward screws into the mounts. Cut a recess into the side of the cowl to fit a 1/2 x 1/2 inch plywood reinforcement which is necessary to withstand the pressure of the bolt head. When the holes in the clip and cowl are in alignment the plywood is epoxied into the recess. Countersink the hole for the bolt head and sandpaper the insert flush with the cowl. Add fillet compound and sandpaper again to make the recessed plywood inconspicuous. This should result in a firm cowl attachment. Remove the cowl.

PRIMER-SEALER should be applied over the entire model exterior as well as the cowl interior, engine mounts and bulkhead "C" after the entire model is sandpapered smooth. Considerable strength can be gained and a grain sealing advantage attained by covering the entire model with a fabric and a sealing adhesive. Silk and sanding sealer; 3/4-oz. fiberglass cloth and resin; or even the old standby of silkspan and clear dope can be used. Once completely covered, the model should receive additional applications of the sealer with a careful sandpapering after each coat is thoroughly dry. Start with extra fine sandpaper and wind up the last few coats with 400 wet-or-dry sandpaper used wet. The quality of the finish depends upon the diligence of the model builder and the applications of primer-sealer to the model. The last few coats should be applied thinned with about ten percent thinner. We used silk and sanding sealer for lightness.

TAILWHEEL should be installed at this time and the pant fabricated as was the main wheel pant, except that only three layers of 1/4-inch balsa are required. The center layer should be cut out to clear the wheel before the pant is assembled over the installed wheel. Sandpaper and seal well.

FILLETS are made from fillet compound such as Sig Epoxolite or Duro Easy Does It. The wing requires no fillet, however the fin and stabilizer joints with the fuselage have fillets which should be added now. The edge of the fillets does not fair into the fuselage or tail surfaces. Instead, the edges should be raised off the surfaces about 1/32 inch. This accomplished by carefully applying several layers of paper masking tape along the outside of the fillet outline which is shown on the plans. This is best done by stacking layer upon layer of tape on a sheet of clean glass and then cutting a thin strip of tape with a sharp razor blade and a metal straightedge. Apply the tape to the fin, stabilizer and fuselage. This will act as a dam and gauge for the fillet compound which should be built up to the height of the tape at the edges. Care must be taken during sandpapering not to destroy the ledge. This can also be cleaned up with a sharp razor blade.

PAINTING Mattern's Vega is real fun, and requires more patience than skill. Be certain that all miscellaneous surface details such as fuel tank expansion trunk blisters and landing gear blister fairings are in place and sealed. Fill and sand any blemishes on the model and be sure the surface is as you want the finished product to appear, because the paint won't cover any imperfections on the surface.

Begin by painting the entire model white. Several applications will be re-

quired; thinning the last few coats with about ten percent thinner. Sandpaper lightly after the first few coats. White Vegas are beautiful, and you will be tempted to leave the model as is, but we must move onward to the next step; the application of the paper masking tape. Stick strips of tape on a clean glass pane and cut into thin strips from 1/16 to 3/32 inch wide. It will be necessary to mark the model here and there at key points as a guide for the tape application, and a China Marking Pencil is recommended for this purpose. The pencil is able to write on a glass-smooth surface without scratching the surface. Use the China Marking Pencil sparingly and lightly, because it could impair the adhesive qualities of the tape, and be sure to wipe off the pencil marks prior to painting the area. Apply the strips of tape to the fuselage, wing and tail; defining the eagle head and body feathers, wing outline and feathers plus registration number, and white border of the tail. The tape should be applied with the aim of isolating and protecting all white areas from the red and blue areas. It will be observed that the red and blue areas have no common border. They are always separated by white. Therefore, once all white areas are masked with tape, all that remains is to paint the red and blue areas very carefully. We used a brush to apply all color to the model. This color scheme doesn't lend itself to spray painting. When all tape is in place and in agreement with the plans and photographs, as well as the builder's aesthetic taste, the red and blue colors can be applied. Start painting, very carefully, along the edges of the masking tape, letting the color overlap onto the tape to be sure the paint covers up the taped line. *(The old trick of first applying clear to the tape edge prevents color from sneaking under the tape. wcn)* Gradually paint all spaces between the taped off areas and let dry thoroughly. Pay careful attention to which areas are red, blue, or white, because it is very easy, in the heat of excited enthusiasm, to apply several brush strokes in a white area before the error is discovered. Three or four coats should be applied. Let the paint dry thoroughly and then gently remove the tape. All surfaces can be carefully rubbed with compound and a very soft, clean flannel cloth to enhance the finish.

COCKPIT or pilot's cabin can be outfitted now. The interior can be painted gray or tan. The rudder pedals are bent from soft wire in a squared off "U" shape, 5/8 inch wide, and cemented to the bulkhead. The instrument panel can be assembled with commercial instruments on a black balsa panel, or the full size plan instrument panel can be cut from the plan and cemented to balsa sheet if desired. The throttle knob can be a cut-off hat pin or a map pin and cemented and pressed into the instrument panel. The knob is white. Seat is carved from 1/2-inch balsa; sanded; sealed and painted brown or pale blue and cemented to the bulkhead. Control stick is soft wire with a balsa or small fuel line grip. Fire extinguisher is cemented to the bulkhead. Pedals and stick are black.

CABIN ENCLOSURE can be constructed once the cockpit is complete. Begin by cutting the windshield to shape and bending where noted on the pattern drawing. Trial fit into place and trim and bend until the fit is good. If the fit is not perfect, don't hesitate to cut a new one. Cement in place to the fuselage and plywood piece "O." The windshield can be held firmly in place with strips of paper masking tape until the cement is thoroughly dry. While this is drying, cut out and install the cockpit side windows. These should be a snug fit and glued about half way through the plywood thickness. The cockpit overhead hatch on our model slides open over the wing and is optional. If this is not desired, the hatch can be cemented in place now and the framework added. This sliding hatch is very simple. The flat sheet plastic hatch is held in place by sheet aluminum guides. The guides are cut into 1/4-inch wide strips and bent 90 degrees to form 1/8 x 1/8 inch angles which are positioned on the fuselage and wing with one leg glued into a slit in the structure and the other leg extending toward the centerline of the plane about 1/32 inch above the surface. One section of the hatch guide is attached to the wing while the other section is attached to the top of piece "O" of the fuselage. Another piece of fabricated angle acts as a sliding hatch stop as well as the frame for the top of the windshield. The hatch stop and guide should meet with a neat joint and smoothly cemented. The sheet plastic hatch is inserted by bending it slightly to shorten its side to side dimension and letting it expand into the slot formed by the guide. The hatch must be a firm and tight fit to prevent it from opening during flight. The frame for the remainder of the windshield is made from 3/16-inch strips of aluminum bent to form an angle which should conform to angles of the windshield corners. Paint white and cement in place.

We installed the switch in the cockpit; a natural!

MISCELLANEOUS DETAILS such as pitot tube, venturi, and nose and tail markings are added now. The pitot airspeed indicator is bent from 1/16 inch wire, soldered and painted white. It is then cemented into a hole in the leading edge. The flight records on each side of the nose are made with Letraset rub-off lettering. The lettering is applied on a white solid color decal sheet which has been applied to the fuselage just below the cabin windows. The name "Jimmie Mattern" near the cockpit is applied with white Letraset rub-off lettering available at any good art supply counter. The registration letters on the rudder are cut from white solid color decals as is the Lockheed star insignia; the word Lockheed is white Letraset. The Letraset must be protected from the fuel, etc., with a coat of clear fuel proofer or similar liquid. The venturi is located on the right side of the fuselage in the center of the flight records, consisting of two scrap balsa cones joined tip-to-tip and painted white. This is held to the fuselage with a straight pin and cement. We painted our propeller silver gray with red, white, and blue tips to make it appear sort of scale-like. The back of the blades from the halfway mark to the tip are painted black. The dummy engine is dull black and the push rods can be black or aluminum.

Engine is bolted in place with slight down thrust, so slip washers under the lug rear holes.

FUEL TANK is held against the bulkhead "C" and the engine mounts with silicone glue and sealer and sheet brass straps. The silicone glue (G.E., Loctite, etc.) would probably have enough holding power without the straps, but we added 3/8-inch wide straps of shim brass around the tank; screwed to the bulkhead and the engine mounts for safety.

Cowl is held in place with two bolts and two screws. We remove the cowl to fill the tank.

FLYING the Vega is a pleasure; almost foolproof. It has plenty of zip with a .40 cu.in. engine swinging a 10 x 6 propeller, so there is no reason why a good .36 cu.in. engine can't be used. A very light model could even take a hot .29 cu.in. powerplant. Because of the wheel pants, we never fly from grassy areas and don't recommend it. A paved surface is ideal for takeoffs and landings.

Happy Flying!! ●