

# REPUBLIC P-43 "Lancer"

By Col. ART JOHNSON . . . Designer of our popular large-scale P-38 and P-40 models, comes up with still another. Predecessor to the famed P-47, the similarities are obvious. For Quadra or prop-drive power.

• "Farmingdale Tower . . . this is Republic Number One . . . landing instructions . . . over."

I am not sure that the pilot of the first P-43 used that call, but he might well have. The P-43 was the first Army Air Force fighter to come off the line after the Seversky company became Republic Aviation. Although it was the first of a long line of Republic fighter aircraft, it was destined to become the least known of any of the World War Two fighters. Two hundred and seventy eight P-43 and P-43A models were built by Republic before the fighter was replaced on the production line by the P-47 "Jug." If you were to run across the remains of one of these aircraft today, you would have one of those rarest of the rare finds. To my knowledge, not one P-43 survives. Not in a museum or even in a junk pile. Except, there is one reincarnation in miniature, and that is what this article is about.

So how come I decided to build a model of this most obscure WW-II fighter instead of another P-51 or Corsair? Well, I think you already know the answer to that one. Something different is always interesting, and how else can you get to talk to so many people while explaining that the bird you just brought to the field is not a P-35 or P-47? Contrary to popular belief, the P-43 did serve in combat in the Far East. The U.S. shipped 125 of the aircraft to the Chinese Air Force, and others were flown in that theatre by U.S. and RAAF pilots. Some day, an enterprising historian may dig out the facts on how it fared against the Japanese, but if any P-43 aces turn up, I suspect they will have names like Lee or Wong.

My personal involvement with the P-43 dates back to the summer of 1942, when I flew the P-43 and P-43A models at Foster Field, Texas, along with the P-36 and early P-40. This was where the Chinese pilots were checked out before

returning to China to fly the P-43 against the Japanese. All the production P-43s came off the lines in 1941, and in early 1942 they were the newest planes on the base. I remember the P-43 as faster than the early P-40, but with a higher wing loading and requiring a bit more attention to approach speeds. At the time of Pearl Harbor, the P-43 was the only single engine fighter of the AAF that could climb to high altitude. It had the same G.E. turbo as the later P-47, but it was working with the Pratt & Whitney 1200 hp R-1830 engine . . . same engine as used on the Navy F3F Wildcat. It was high altitude capability that induced the AAF to convert many of the P-43 fighters to high altitude recon aircraft. At altitude, they were as fast as the early Spitfires.

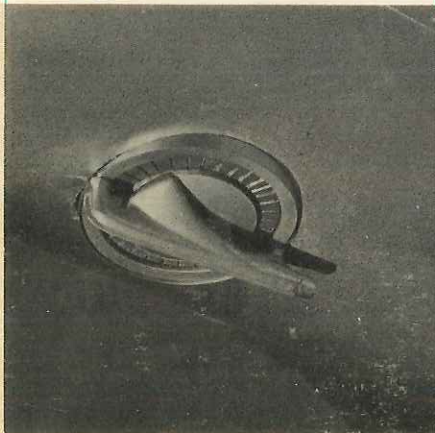
So nostalgia played a part in the decision to model the P-43, but I think the real challenge came from an urge to build a WW-II fighter that would fly well using one of the popular gasoline engines for power. I had been told that these engines were really useful only for the large light aircraft types, but I must admit that the few WW-II fighters I had seen built and flown with ignition engines were rather sorry performers. The reason for this poor performance seemed rather obvious, however, with builders falling victim to quarter-scale propaganda and trying to build all models to that size without having quarter-scale engines to match. A Piper Cub has a little more wingspan than a P-39. A nine-foot span model of the Piper Cub may fly well on a Quadra engine, but with the same engine, a nine-foot span P-39 would perform like a Cub, if it would fly at all. If you wonder why, just think of the P-39 performance with a 65 hp Continental in the (I started to say nose) back end (middle?). I doubt if the P-39 would taxi, much less fly.

Getting the model sized right for the

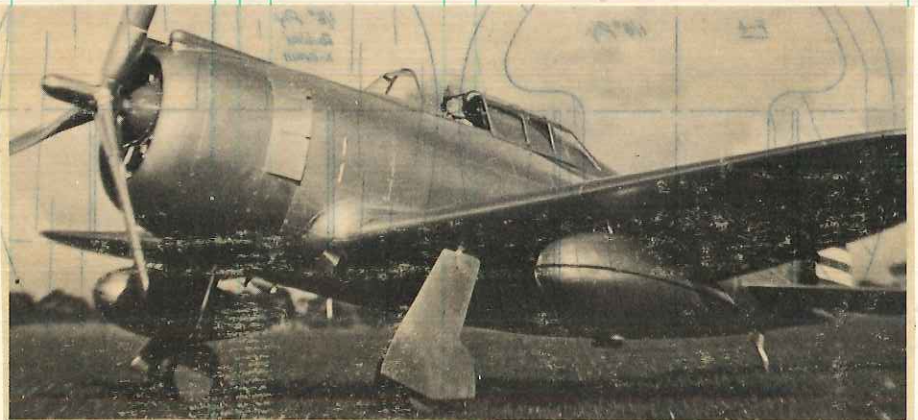
available power seemed the initial key to success, and I had already decided to go with the standard Quadra engine. There are more powerful engines around, but on a horsepower-per-pound and on a dollar-per-horsepower basis, the Quadra is second to none. The engine is larger and a little heavier than the largest glow engines, and these were the factors that made the P-43 look like an ideal choice for an ignition engine fighter. The short somewhat chubby P-43 looks a lot like it's follow-on, the P-47, but it was in fact a rather small fighter with a big engine up front. The nose moment is a lot shorter than the P-40 or the P-47, so the heavier engine is needed for balance. Better engine weight than lead weight.

The original P-43 had less wingspan and area than the P-40, so for the P-43 model, I thought I better go to a bit larger scale to handle the extra weight of the engine. Wingspan is one inch more than on my 90 glow powered P-40 model, with the scale going to 1 to 5.3, or a little less than 1/5th scale. At this scale, the Quadra engine is almost lost within the big cowl of the P-43 model. With these decisions out of the way, all I had to do was draw up the plans and build the model.

In going with the gasoline engine, I was not interested in just another "fun-fly Biggie." I wanted a competition quality model, and this meant good documentation and accurate scale. Considering the limited production and obscure history of the P-43, there is a surprising amount of information available on the aircraft. M.A.N. published William Nye's drawings of the P-43 many years ago. They are not bad on outline, but he shows a landing gear from a completely different aircraft. His fuselage outlines do not match any existing airplane. The book, *U.S. Fighters*, has a fair three-view, but a little off on proportions, and there are others in various



G.E. turbo-supercharger on P-43 gave it high altitude capability. Made of ply and balsa.



Drop tanks are early 75 gallon types. Ship weighs just 20 pounds, with Quadra engine. Model and original both flew from grass fields.



publications.

Photos are another story. I have dozens of photos of the P-43, some originals from 1942. Unfortunately, each is a single photo of one aircraft from one angle. Republic Aviation itself proved the saviour on this one. When the first P-43 rolled off the line, Republic had the PR photographers out in force. They shined up the first P-43 demonstrator and took dozens of photos on the ground and in the air, both in color and black and white. Every magazine article on the P-43 has used at least one of these photos, and Republic Number One was the obvious choice for duplication as a model. Not a gun equipped combat veteran, but a slick new sales model.

**CONSTRUCTION:** This was my first chain saw engined model, and I had read all of the articles on Giant Scale that told how you had to build these models using full scale construction techniques, etc., etc. This gave me a bit of a problem, as the P-43 was of all metal construction, right down to and including the control surfaces. I am not too good at extruding aluminum spars and have no experience in riveting aluminum sheets onto elevators so I decided to take the advice for what it was worth and build the model the way I have always built them, strong but light. Construction is typical all balsa and ply, with hardwood spars where I thought they would do the most good. I am inclined to make the center section out to the landing gear attachment points perhaps stronger than necessary but only because I hate to see the gear sticking up through the wing after a hard landing. I would rather fix the gear than build a new wing.

**WING:** I always build the wing first on a scratch project, because I have to have it done before I can make the fuselage fillets. The P-43 wing had the same NACA CYH airfoil as the P-35. This airfoil is flat over most of the bottom, curving up at the leading and trailing edges. It is a fairly high lift section so I decided to go with the scale airfoil on the model. It has worked out well, as the model came out a little heavier than I had anticipated (don't they all) and the high lift feature comes in handy. Trim changes with speed change are minor considering the flatter-than-usual bottom contour. Elliptical wings are more difficult to build with the correct washout than are straight wings. Take care to block the trailing edges so that both wings have the same 2 degrees washout at the tip. The ailerons and flaps are built into the wings and cut out after sheeting. This maintains the washout throughout the wing structure. Note that the rear spar notches are not shown on all the ribs. Working close to the tips, it is easier to notch these as you install the spars. You will find that as you install the bottom aileron spars, that the rib is cut all the way through. Build the top side up and sheet the top with 1/8 balsa before turning over. Finish the ailerons and flaps and install the linkage before sheeting the bottom center. The ply

center section braces go all the way through the wing and are installed after the wing panels are joined and before the bottom center is sheeted.

The gear doors are cut out of the wing after the bottom fuselage fairing is attached to the wing and faired in. The gear doors actually go into this faired part of the fuselage, and this is the best way to get the curved sections to match. The center section is covered with fiberglass wing tape on both sides for added strength. Two oz. cloth and resin is extended over the bottom gear well section to beef up this area.

Flaps are cut loose from the ribs, before covering and then repositioned to cover in place. Note that 1/64th ply is added over the balsa on the split type flap to prevent warping. Use epoxy glue for this job. All control surfaces were hinged using the new Du-Bro heavy-duty nylon hinges with the cotter pin type hinge wire. Four were used on each control surface. Ailerons are hinged at the top edge, flaps at the bottom edge. Not shown on the plans is a 1/2-inch dia. paper tube installed through the wing ribs to serve as a guide for replacement of the servo connecting wires. I chose to use a servo for each aileron, but the wing is not so large that a single servo bellcrank setup would not be almost as good. The ailerons are actually rather small for this size airplane.

If you are going to use a rack for bombs or tanks, install it before sheeting the wing bottom. I used a Vortac rack operated by a bellcrank, with Golden Rod connecting the servo. With the bellcrank setup there is nothing inhibiting the spring action of the rack, so installation of the external stores is eased and there is nothing pulling on the rack to cause premature release. The bellcrank is not attached to the rack but presses against the release only when the servo is hard over.

**FUSELAGE:** The P-43 was actually one of the cleanest designs produced during WW-II. There is not a flat spot on the entire fuselage. With nothing but compound curves, I decided to strip plank the entire fuselage with 1/8 sheet balsa... time consuming, but with cyanoacrylates, a lot faster than it used to be. The firewall is laminated from two pieces of 3/16 ply. The 1/8 light-ply crutch lines the first four formers up with the firewall, while the 1/4 square hardwood longerons hold the remaining formers until strip planks fix them in place. I kept the formers in line while strip planking by placing the firewall on the workbench and building the fuselage in a vertical position. A plumb bob from tail lined up reference marks on the formers to establish a perfect alignment until enough strip planks were on to keep the fuselage rigid. A little unorthodox, but it works.

The ply crutch is braced to the firewall with triangular strips and the space between the firewall and the former F-4 is filled with blocks cut from 1/2-inch sheet balsa. This balsa also absorbs

vibration from the firewall.

The duct that carries cooling air and the exhaust pipe from the engine is made from 3/32 balsa with exit openings on either side of the exhaust pipe fairing. The fuselage fairing attached to the wing is planked as part of the fuselage and separated later for installation. The balsa tail cone is hollowed and attached with silicon rubber after the controls are installed. This permits removal if necessary to adjust the internal rudder, elevator, and steering linkage.

A polyurethane mold was made to form the canopy. I used the mold first to make a frame using 2 oz. cloth and resin. The mold was then blued to a 2x4, clamped to a folding chair and the plastic heated in the kitchen oven after stapling to a plywood frame. Not exactly vacuum forming but the technique has been working for forty years and I always get a good one by at least the third try. The canopy is separated at the windshield line and the frame glued on after painting. The sliding track is made from model railroad type plastic material... a slotted square for the track and an I-beam piece glued to the canopy... so smooth you will need a locking latch. The guys who watched me fly the P-43 at the Scalemaster finals in California will also tell you that the canopy stays on better if you remember to use the lock!

The wing fairing is added to the fuselage after the wing is bolted in place. Cover the fillet area on the wing with Monokote to avoid sticking of the resin. The fillet is made from urethane foam, glass cloth, and microballoons in resin.

**COWL:** The cowl is a big one. I carved it from urethane foam after first gluing pieces of foam together with a ply ring in place at the firewall position. The ply stays in as part of the cowl and is used to hold the cowl to the firewall. Two 10/32 nylon bolts at the top left and bottom right of the ply ring hold the cowl to the firewall. These are installed with a small socket wrench through the front of the cowl. This system proved so simple and positive that I have routinely removed the prop and cowl after each flight to refuel the model. It takes less than a minute for each flight. The cowl is glassed with a layer of six ounce and a layer of two ounce cloth with resin. When hollowing the inside, leave some thickness towards the front edge and glass over this for added rigidity. The cowl flaps are cut and reglued in position after the cowl is finished. The dummy engine is fastened permanently to the cowl and removed with the cowl.

**TAIL SURFACES:** I knew that I had to keep the rear end of this bird light, as it has shorter moments than most WW-II aircraft. (There are some a lot worse, Typhoon for example.) Construction was standard all balsa with 1/16 sheet covering. All surfaces then covered with silkspan paper and nitrate dope. Not the most recent technique, but hard to beat for weight. I did solder up a heavy duty



elevator horn from 5/32 wire and brass (silver solder). This horn connects inside the fuselage to the fiberglass pushrod. I expected some additional vibration on the tail surfaces from the chain saw engine, but was pleasantly surprised to find even less than on my P-40 with the 90 glow engine.

**LANDING GEAR:** The retract gear on the P-43 is a modified version of the original design used on my P-40. It had to be compressed in height to fit into the thinner wing space. It does not have to rotate either. The P-43 flew with smooth tires and the five-inch Du-Bros with wheel covers are very realistic. By the time you read this, CB may have some that are even better. The homemade retracts have worked very well, but there are now a number of systems on the market that will carry a 20 pound model without problems. Just about any of them will fit.

I had already started to build the P-43 before I realized that the inner gear doors did not stay down when the gear was down as on the P-47. I did not pay much attention to those details when I was flying the original. It suddenly hit me that I was faced with a gear door actuation cycle that was to appear much later on the P-51 and F-82. In short, the doors are closed except when the gear is actually going up or down. I tried the Byron valve used for this operation on their P-51, but with the retracts slowed to scale operating speed, I could not get reliable operation without a three-position transmitter switch. I finally installed a Sonic cylinder drive for the doors, with a separate servo and valve. Air comes from the same supply as the main gear. Works fine as long as you remember where the transmitter switches are supposed to be.

The P-43 tail wheel did not retract inside the fuselage. On later production models, the tail wheel strut was moved back in flight about thirty degrees to reduce the drag of the extra long strut. (About the ugliest tailwheel setup I have ever seen on an airplane.) The long strut was added when pilots complained that the rudder was blanked out when the tail was low in the original configuration. The model also needs all the rudder you can get in any cross wind. A Sig nylon nose gear bracket holds the tail wheel strut nicely, with an internal steering arm connected to a Golden Rod push rod.

**FINISHING:** This is where things really got interesting on this model. The original was in factory-fresh natural aluminum, with only the basic AAF markings applied at the factory. Natural metal has always been a tough finish to make look right. This time I think I came as close as I am going to get, but not without a price.

First the model was glassed. Two ounce cloth on the fuselage and 3/4 ounce on the wing. (Tail was paper-dope) K&B resin squeegeed off and followed by auto primer. The entire

model was now given a spray coat of Hobby epoxy Silver. Panel lines laid with 1/64 tape and rivet detail added. Now the big decision. I had picked up a spray can of Dupli-color Aluminum at the local K-Mart store, and made some experiments. Sprayed on and buffed, it looked more like real metallic aluminum than anything I had seen. It actually looked better than the real aluminum tape I used for panels on the model. Suspecting that anything that went on that easy could not be all roses, I took some test panels out to the flying site and stuck them in the exhaust gas from different models. Gasoline exhaust did not seem too bad, but glow fuel proved an instant disaster. Please do not entertain any thoughts of using this paint on a glow fuel powered model. You will wind up with the worst mess you have ever seen the first time you run the engine.

Yes, I did paint the P-43 with this stuff. When buffed within a couple of days after painting, the finish looks just like metal. It also takes about thirty days for the enamel binder to dry hard enough to prevent pressure marks from the fingers, and even after that, perspiration from fingers will leave permanent marks. Right now it has a good set of prints on the vertical fin. They were put there by a lady photographer in California who just wanted to move the tail around for a better photo. Remove the prints with a little Dupont Prepsol? Forget it. It takes the paint off right down to the epoxy coat.

In summary, this paint provides a super looking metal finish, if you can look but don't touch. It actually gets better with time as it tarnishes a little. On the plus side, it is easy to touch it up with just a light spray from the can. If you use it, plan on doing just that at frequent intervals.

**RADIO:** An eight-channel J series Futaba is currently flying the P-43, and all eight channels are used for competition flights, where the tank or bomb drop feature is wanted. Four Futaba servos work the ailerons, throttle and rudder, while two Kraft and a Heathkit move the retract valves and the bomb racks. Ace Atlas servos handle the elevator and flaps. The Ace 1200 ma battery pack looked like a good idea, with nine servos including a couple of heavy duty types.

Although the J series Futaba was not designed with scale in mind, some features can be adapted to make scale operations easier. The inner gear door servo is connected to the flap position and actually operated by the flap elevator mixer switch. This switch is at the top of the transmitter, next to the retract switch, so the two functions can be operated together without problem. The spoiler switch is used for flaps, giving two fixed positions, half down and full down. This switch is also at the top in easy reach. Channel 8 for tank drop is the nasty where you have to let go of the stick to work it. Not good if you want to simulate a low level napalm run.

**ENGINE:** Although this was my first Quadra powered model, I had a lot of

advice from our local Quadra experts, Mario Yederlinic and Wayne Rippel. My only changes to the standard Quadra purchased from Balsa USA, were to add a spring-loaded choke and provide a direct throttle link to the servo, made from Du-Bro ball links and a bellcrank. This gives me a full range of throttle, including positive shut-off from the throttle servo. The scale exhaust extension is made from copper plumbing elbows and aluminum pipe. It is held in place with Hi-Temp Silicon Gasket material from G.E. The red stuff at your local hardware. After more than thirty flights, I still have not learned anything more about the Quadra engine. All I do is put a fifty-to-one mix in the tank and go fly. I start it with the Sullivan starter just like a glow engine. The choke is operated from inside the cockpit. Just hold it down until the engine fires and you are in business. I started flying with an 18x8 Dynamix prop, and so far, all flights except one have been made with the same prop. It turns 7400 on the ground.

**FLYING:** I checked the balance of the P-43 before installing the servos in the fuselage. It turned out a tad nose heavy, so I was able to move these servos farther back than I had originally guessed. The first flights were from a grass area at our local test field (Polo Grounds). The model turned out to be so easy to fly that I let a couple of our club members fly it on the third flight. No surprises, and it lands just like all the other Republic fighters that I have flown. Point at the runway, ease the stick back, and it squats and stays there. They did not call them lead sleds for nothing. I like flaps on a model so well that I have not even tried no-flap landings on any of my recent scale models. The split-flap on the P-43 adds just the right trim for landing.

I was shooting for something like 18 pounds all up weight, but the model, complete with drop tanks, finally came in at a hair over 20 pounds. This did not affect flight performance at all. The model can be horsed off in half the length of our 250-foot runway, although a longer takeoff looks more realistic. The Quadra hauls it at a good scale speed through loops, immelmans, or anything else you want to try. In other words, it turned out to be a gas engine powered fighter that flies like the original. Why not? The original also used a gas engine!

The P-43 model first flew between Christmas and New Years of 81-82. I took it to a couple of Biggie fun-flys before getting around to a contest. Last summer it was entered in three meets, where it did not do badly, with two firsts and then a third at the California Scalemasters finals. This may not be the ultimate P-43, but right now it may be the only P-43 in existence. This will change when you build yours. When you do, you will have a unique, classic early WW-II fighter that looks and sounds right in the air . . . and with the gas engine . . . you will have it in the air more than if powered with the usual engine.