FLY RC PROJECT by Ron Faanes, Ph.D.

MY FIRST TIME ADVENTURE WITH Gas Power

Enjoy the scale sounds of the Maxford USA 20% Curtis JN-4 Jenny

This article contains some of the elements of a review but is really directed at those of us who are contemplating switching to gas. I have been in RC modeling, flying glow-power airplanes, for close to 40 years. Recently, I embarked on the new trend toward electric. Electric flight is great, no oil to clean up and nothing to drip on workshop carpets. However, there is no resonant sound from an internal combustion engine; which, for me, is an essential part of the hobby experience.

My fellow *Fly RC* guys, all members of the FLY RC club in Southbury, Connecticut; Gino Antonini, Aaron Ham, Kevin Siemonsen, Vinnie Krebs, Dave Baron and others have encouraged me to, "Go gas and you will never go back." Their input and guidance in this venture cannot go without recognition. With the rising cost of nitro fuel, I have made the change and this story is my venture into the world of gasoline power.

I have spent my entire life in lymphocyte biology research and am not accustomed to reading instructions. Instead, I approach problems with "what if?" questions. Here, I used a combination of approaches as the instructions are excellent. After two years of dis-

PHOTOS BY WALTER SIDAS

I chose the CCRRC engine which is part of the Maxford package. I dropped the engine off at BJ's Engine service, to bench run before mounting on the plane.

SPECS

PLANE: Curtiss JN-4 Jenny

MANUFACTURER: Maxford USA

DISTRIBUTOR: Maxford USA

TYPE: Vintage Biplane

FOR: Intermediate to advanced

WINGSPAN: 105 in.

WING AREA: 1760 sq. in.

WEIGHT: 22 lbs. 7 oz.

WING LOADING: 30.12 oz./sq. ft.

LENGTH: 78 in.

RADIO: 4-5 channels required; 8 channels as flown, flown with a Futaba 14MZ transmitter, 8CH FASST receiver, 5 Hitec 3152 digital servos for all flight control surfaces (2 for split elevator), 1 Futaba 3001 servo for throttle

ENGINE: CCRC GF50i

IGNITION SYSTEM: Auto Advanced DC-CDI (EMI Certified)

PROPELLER: 22x8 XOAR

TOP RPM: 6,700

IDLE: 1,300

FUEL: Gasoline/Oil mix 25:1 for break-in; 40:1 after 15 hr

IGNITION BATTERY: Sanyo 2700mAh NiMH 4.8v

ONBOARD BATTERY: Sanyo 2700mAh NiMH 4.8v

PRICE: Entire package without servos or receiver: $890 (delivered)

COMPONENTS NEEDED TO COMPLETE: Radio system

SUMMARY

This Jenny is easy to assemble with the directions and sports a nice design with detachable wing panels. Field assembly only takes a couple of minutes. It flies great and sounds very authentic in the air.

cussion with Richard Sang, President of Maxford RC, about their 105-inch Curtiss JN-4 Jenny, I took the plunge and purchased the kit and engine combination.

The Curtiss Jenny two-seat biplane was one of the most popular airplanes of all time. It was the first mass-produced airplane and was made in larger numbers than any other American airplane of its day. There are many still flying today and we get a very nostalgic feeling when one cruises by.

The Maxford USA 20% Jenny by Green Models is a big airplane shipped in two large boxes with everything inside wrapped and bagged. Upon opening the box you are immediately exposed to the beautiful yellow iron-on covering, beautifully painted molded cowl with exhaust stacks, functional vents and radiator. All decals are in place.

GAS CARE AND HANDLING

My knowledge with gasoline is limited to typical uses of gasoline. Gas has a higher vapor pressure than nitro fuel which means more fumes traveling through the air. These, if exposed to an ignition source, will generate a loud boom with a potentially serious fire. It follows that you must exercise a degree of care to avoid accumulation of fumes and sources of ignition such as sparks—the reason for the "No Smoking" signs at gas pumps. Also, gasoline, because of its composition, is a good solvent.

The Gem 2000 SuperRocker switch harness from Central hobbies (left) and RC-100X Electronic PWM Switch from RCATS.

Addressing the safety issue, I chose not to use classic on/off switches. Instead, I purchased enclosed aircraft switches from Central Hobby. To the second point on gas being a solvent, the fuel tubing must be Tygon and tank stoppers must be a gasoline-resistant variety which can be purchased from Sullivan products. There are several sizes of Tygon. Not knowing this, I bought the large bore for this project and it turned out to be a bad selection. Even with a tie-wrap or spring clip the large bore tubing does not stay attached to its respective fitting. I have since installed smaller bore blue Tygon which fits tightly.

Kevin Siemonsen published this in an article on "Fuel Tank Assembly and Mounting" in the April 2010 issue of *Fly RC*: "For glow engines, silicone fuel lines are used. Silicone lines are usually light blue in color and are opaque. Silicone fuel lines retain their flexibility regardless of age, are resilient to glow fuels, and will not swell over time. Silicone lines generally stay put on fittings or tubing without the need of a mechanical lock (zip tie, clips, or safety wire) until you remove it.

Gas engines require the use of Tygon fuel tubing. Tygon lines are usually a light shade of yellow and are transparent. Unlike silicone lines, Tygon lines are known to loosen up on fittings once filled with fuel. Tygon lines after time will age harden, losing flexibility. It is essential to mechanically lock Tygon lines onto fittings and tubing with a zip tie, clip, or safety wire. Dubro offers solder-on barbs (PN 813 and 814)."

The gas tank with custom fastener

I chose to experiment with making my own. I put several turns of fine copper wire around the brass tubing and clunk line; and soldered in place creating a ridge. The tubing was then slipped over the ridge.

The fuel reserve must be approved for gasoline. If you choose to use an electric fuel pump for fueling, it must be a spark-containing unit. For this first time, I chose to purchase a hand pump from MPI. My fuel container is a one-gallon, old fashioned plastic container I used for my landscaping tools. When using gas it is always a good idea to have a fire extinguisher close by. It is a club rule at the WRAM and FLYRC fields (and most AMA fields) that when you are using gas you need to have an extinguisher at your side.

An AMA requirement when using gas is an on-board kill switch. I set the Jenny up with an RCATS electronic kill switch which is controlled by the transmitter and turned on in the plane by an aircraft switch. This is a redundancy switch which is considered essential for a first-timer.

TIPS FOR SUCCESS

Follow the assembly procedure step by step. There are reasons that are not obvious when starting out. Once the center wing panel is attached, it is difficult to work around it in the cockpit for servo installation. The tail feathers are installed first in this case with 1/4-20 bolts to complete the assembly. To save weight in the tail I replaced the steel bolts with aluminum. The only gluing is for the point hinges for the control surfaces. The horizontal and vertical stabs are bolted on and can be just as easily undone for transportation.

The only fuse work necessary is the wing center section, motor mount, servo installation and the windshields. The rudder and elevator are preinstalled scale push-pull cable. It is a good idea once trim changes have been made to secure the clevises with ZAP. I chose to use a split elevator setup (not necessary). There are servo mounts in place for this setup. I like the security of one servo on each elevator for this size plane and the flexibility of independent trimming. Generally, you can maintain control to land if one side fails. The flying wires are designed for a scale appearance and take time to rig. You must follow the directions in order to get all the attachments correct. I left the wires to stretch, then retightened before I finally pinched the tube at the clevis to secure.

DIHEDRAL ALUMINUM WING BRACES

The wing panels are attached via two robust aluminum dihedral braces with a composite anti-rotation rod and four bolts to the fuse bottom. Dry lubricant is essential to sliding the tubes in place. I would like to see, if only for peace of mind, a positive connection on the top wing to the center panel to avoid a gap which could form during some maneuvers. I did a quick check for CG with the engine throttle servo in place. It needed nose weight so I decided to place the ignition and receiver battery on the engine box. Two boxes lined with Velcro were made and mounted; one on top and one on the side of the engine box.

Because the plane needed nose weight, the ignition and receiver battery (not visible) were mounted on the engine box.

ENGINE TIPS

I chose the CCRRC engine that is part of the package. I dropped it at BJ's Engine Service, to bench run before mounting on the plane. BJ had many useful comments upon opening the box; one of which was that it was

originally designed for gardening equipment. This is the reason for a spring-loaded throttle linkage to return the engine to idle when the throttle is released. If left in place, it would put a continuous drain on the servo and battery when the engine is at high throttle. This linkage was removed and replaced with an old nose gear steering arm. The choke is set up the same way. I chose to leave this in place to be sure the choke stays off when not in use. I ran a straight pushrod into the first cockpit to avoid punching a hole in the cowl for a choke extension.

BJ also mentioned it was good to put gas preservative in the gas to prevent gumming up the carb when the engine sits around in the hangar. Before taking the engine, BJ ran it for me. A Xoar 22x8 prop, well balanced from the factory, went right on the engine. The RPM at full throttle was 6700 and at idle 1100. For those pilots who do not have access to a local engine service like BJ, no worries. All engines sold by Maxford are test-started and adjusted at their facility in Paramount, California; so easy stating for the beginner should be no problem. Before you decide to modify the engine, be aware that your modification may void your engine warranty.

ENGINE INSTALLATION

The engine is mounted on an adjustable box configuration allowing a wide range of engine choices. One of my many quirks is that I don't like the look of holes in the cowl for mufflers, cylinder heads etc. The CCRRC comes with a muffler. When attached, the stacks point up and the engine hangs out the bottom. I reversed the muffler by cutting a port on the opposite side of the factory mount which allowed the engine to be mounted with little modification to the beautiful cowl. This modification resulted in the muffler being too high by about 1/4-inch near the propeller end. I ended up cutting an opening in the cowl which is right under the exhaust stacks. The small section that showed though was painted flat black with high temp grill paint; it looks like part of the exhaust system.

I mounted the throttle servo on the engine box rather than routing a cable through the fuse to the receiver. On the carburetor side I cut the intake flange off to fit under the cowl and prevent the intake from making a big hole in the cowl. My measurements indicated side vents on the cowl would be sufficient and functional for plenty of air to the carb.

There is ample room for the fuel tank under the front deck. As Kevin mentioned in his fuel tank article, this is not as critical as with glow engines due to the mechanical fuel pump designed into the engine.

FASST 2.4GHZ RECEIVER

The receiver was mounted on the back rest in the rear cockpit area to ensure that the FASST 2.4GHz antennae are at 90 degrees to each other. I wanted the receiver as far as possible from the engine and ignition systems to minimize any chance of interference or signal blanking. I used short pieces of latex tubing and Zap to maintain the orientation. Additionally, as the electronic DC-CDI ignition produces potentially lethal voltage, the lead to the spark plug was secured via tie-wraps to the mounting box to prevent the possibility of the throttle pushrod becoming a conductor. It is recommended the ignition module be mounted behind the firewall. The designed setup does not allow this so I mounted the module on the bottom of the engine box on vibration dampers.

CONCLUSION

I was amazed with all the screws and bolts and all the changes that occur in wood in the curing process that not one screw or bolt hole had to be altered. This shows the quality of the product. The beauty of this kit is that the flying wires are nonfunctional, allowing the wing panels to be easily removed for transport. Its flight stability is so solid that an intermediate pilot should have no fear and its scale appearance in flight is the added bonus. I am very pleased with this venture into gasoline power and have one of the new four stroke small bore engines on my birthday list. ✪

Links

BJ's Model Engine service, www.bj-model-engines.com, (203) 888-4819

Central Hobbies, www.centralhobbies.com, (800) 723-5937

Futaba, distributed exclusively by Great Planes Model Distributors, www.futaba-rc.com, (800) 682-8948

MaxAir Model Products, www.maxairrc.com, (902) 482-0791

RCAT Systems, www.rcatsystems.com, (408) 830-0745

Sullivan Products, www.sullivanproducts.com, (410) 732-3500

ZAP is manufactured by Pacer Technology, www.zapglue.com

For more information, please see our source guide on page 121.

AIRBORNE

The first flights were made with the cowl off to be sure everything remained connected. To get gas into the new engine took significant choking with a squirt of prime. Once the fuel was in the carb, the CCRC fired immediately. BJ's upfront work paid off with no pre-flight fiddling necessary. We took the first flight without the cowl.

Fly RC Chief Test Pilot, Dave Baron, arrived just in time to take the box off the well warmed up engine. The Jenny taxis like it is on rails. When ground handling and range check were complete; we were "pedal to the metal." The tailwheel lifted and the Jenny was airborne. Plenty of power—the ship easily cruises at one quarter throttle. The only trim needed was down elevator. After several touch-and-goes and checks for gremlins, none were found and we landed. The gremlins did show up though, once the cowling was attached.

With the cowl in place, the engine popped on restart but wouldn't fire. One of the team members took a close look and found the carburetor intake, although shortened as described above, did not match the vents and was flush against the cowl, in effect allowing no air for combustion. We cut the required opening to solve the problem. The test flights continued. There were no unpredictable stall or pitching problems. My brief stint with the controls before darkness reminded me of flying my original Sig Kadet some 40 years ago—the Jenny flight characteristics were that smooth! In preparation for the third flight I had forgotten to run the fuel line outside the cowl. While fixing this we evidently popped the spark plug cap off and could not start the engine. We removed the cowl, firmly attached the spark plug lead and the engine started on the first flip.

The three flights used less than 10 percent of the charge from the ignition battery, a Sanyo 4-cell 2700mAh MiMH. The similar radio battery was depleted by about 30 percent. Based on this, I do not plan to fly more than 6 flights before recharging the flight pack. The reason is simple. Big models demand a lot of power, and using digital servos increases the current draw.