Beech's bea

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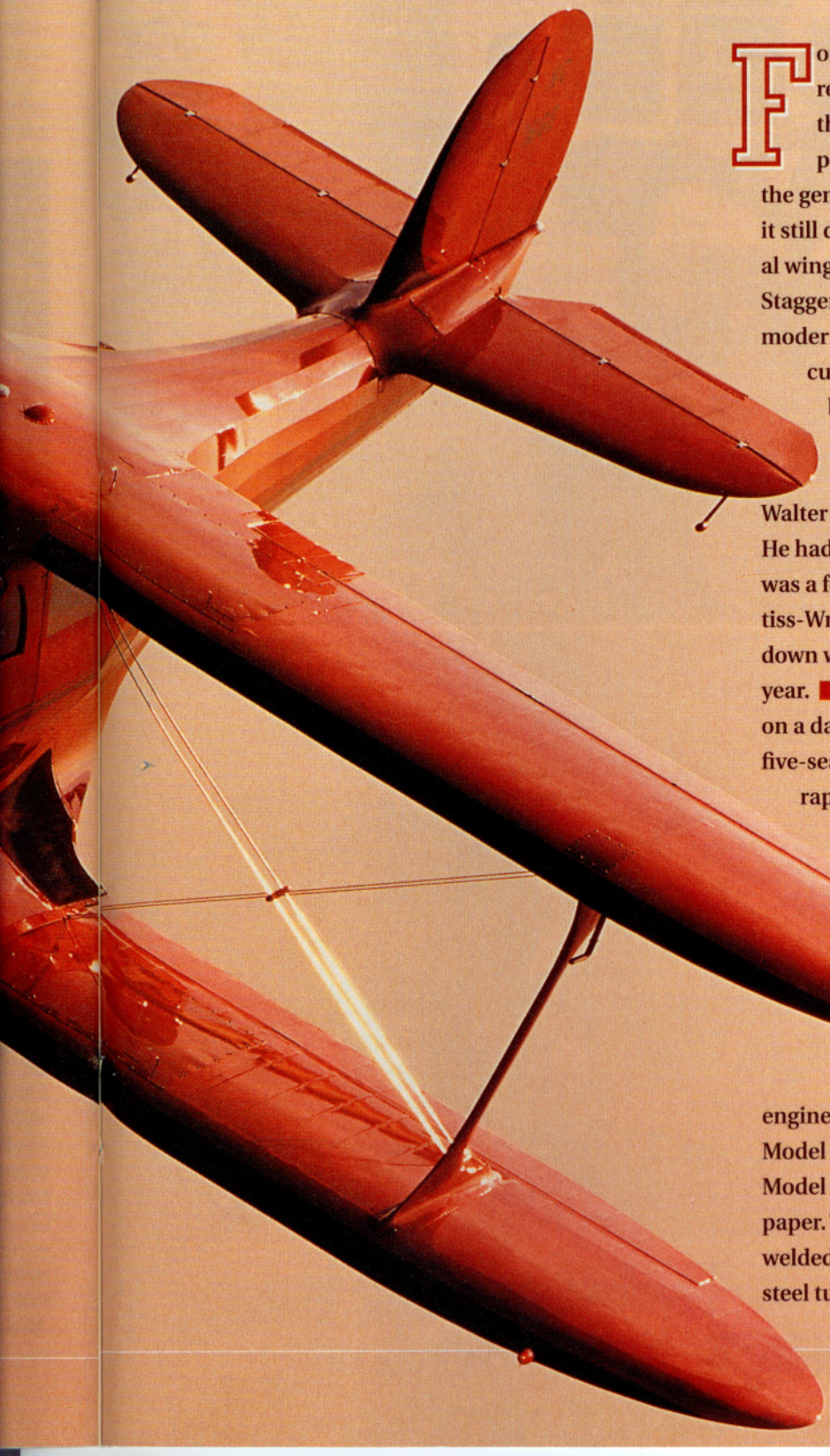
Staggerwings survive in style

BY THOMAS A. HORNE

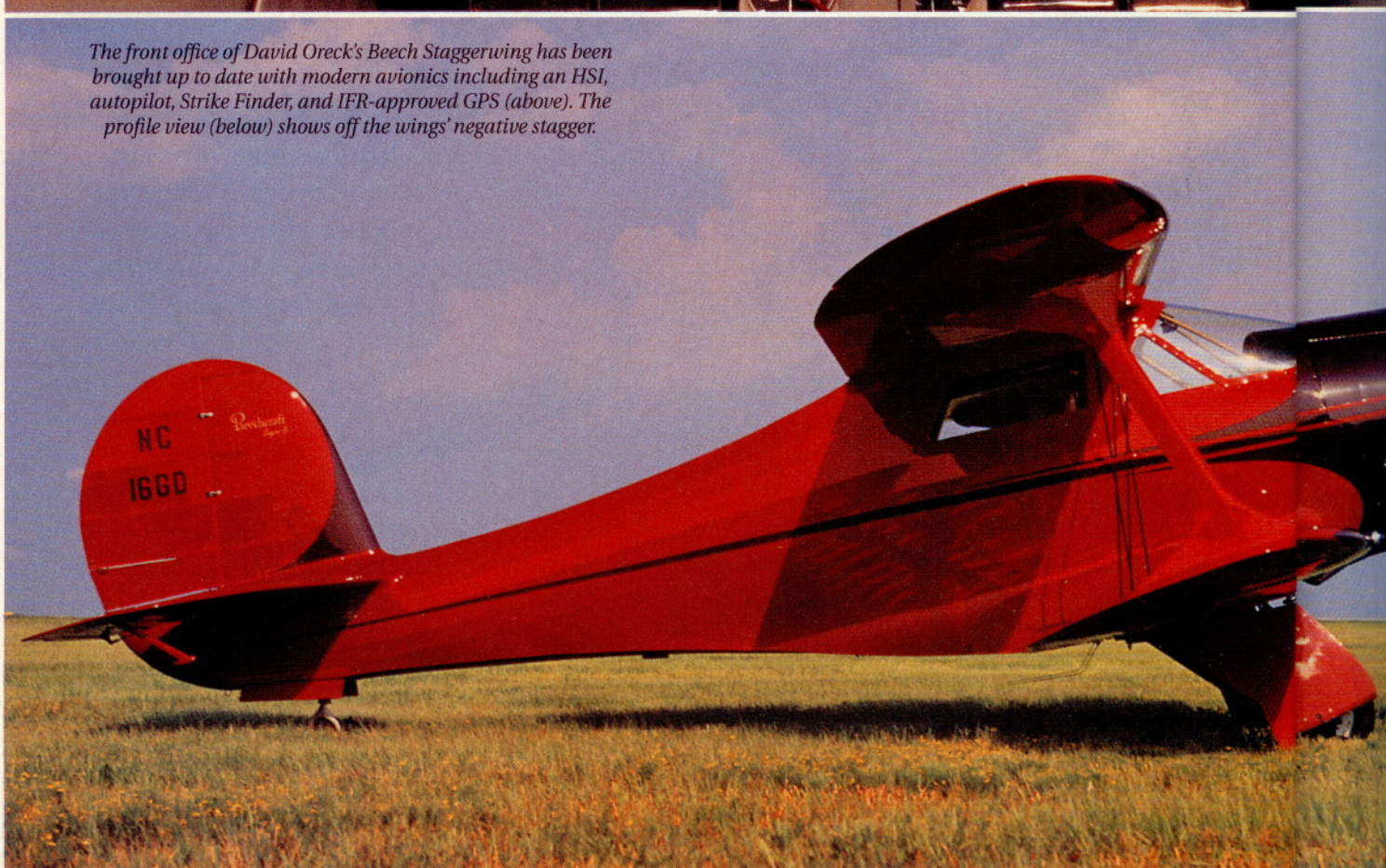


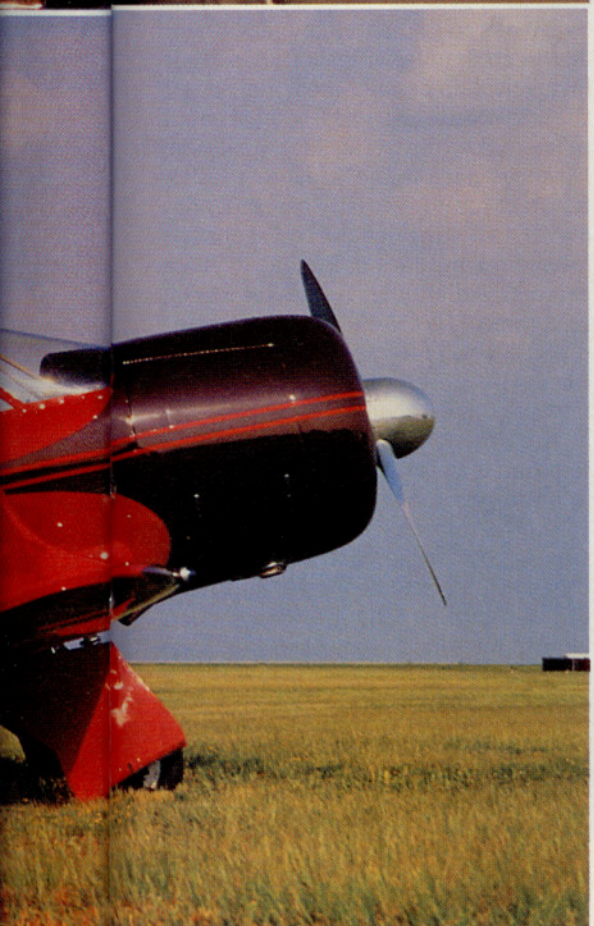
For most pilots, the Beechcraft Staggerwing reigns as the classic to beat all classics. Born in the depths of the Depression, this airplane set performance and style benchmarks that stood the general aviation world on its ear. For that matter, it still does. From its smooth, stately form and unusual wing design to its 200-mph-plus top speed, the Staggerwing is truly a unique blend of art deco and modern. It's a transitional airplane, perched on the cusp between the frail-looking, open-cockpit biplanes that came before it and the speedy, all-metal monocoque designs that were to follow.

The Staggerwing story began in 1932, when Walter H. Beech formed Beech Aircraft Corporation. He had worked with Swallow Aircraft Company, then was a founder of the Travel Air Aircraft Company. Curtiss-Wright bought Travel Air in 1929, but closed it down when the Depression hit hard the following year. Beech then formed his company and set out on a daring goal: to build a high-performance, four- to five-seat cabin biplane that would appeal to the rapidly dwindling ranks of the wealthy. Making it even more daring was Waco's then-dominance in the 125- to 250-horsepower single-engine, cabin biplane market. (Ironic note: Beech leased a closed Cessna plant for his first manufacturing site.) Ted Wells, a former Travel Air engineer, helped to put the Staggerwing, dubbed the Model 17 (the last of the earlier Travel Airs was the Model CW–16, hence the choice of model number), on paper. The design was fairly conventional, with a welded steel tube fuselage and wing spars made of steel tube trusses. Wooden stringers and wing ribs

PHOTOGRAPHY BY MIKE FIZER

The front office of David Oreck's Beech Staggerwing has been brought up to date with modern avionics including an HSI, autopilot, Strike Finder, and IFR-approved GPS (above). The profile view (below) shows off the wings' negative stagger.





were used, and the horizontal and vertical stabilizers were also made of wood; the movable tail surfaces were made of steel tubing.

The Staggerwing's fabric covering earned a reputation for very high quality and did a lot to establish the early foundations of Beech's reputation for top-notch finish and attention to detail. The airplane's plush interior was another attention-getter, complete with wood trim and crank-down cockpit side windows.

But the really big news about the Model 17 was its combination of features new to single-engine biplanes. First, of course, was the negative stagger of the wings (so called because the top wing was mounted aft of the lower wing). And although the company did its best to call the Model 17 the "negative stagger Beech," the public would have none of this. From day one, it was just plain "the Staggerwing."

There are a number of theories about why Beech chose the negative stagger. Some felt that it was designed to help improve stall characteristics, or to boost cockpit visibility. Others say that it was to accommodate the machinery associated with the airplane's retractable landing gear (another first in a GA biplane). If the upper wing were mounted in positive stagger, ahead of the lower wing, the gear would be too far aft to permit acceptable CG limits or ground-handling characteristics. The truth is probably a mixture of all of the above reasons.

Then there's the aesthetic appeal of the negative stagger—it promotes the image of speed. Other streamlined features also promised raciness: the full NACA cowling; the faired single-I wing struts (other biplanes of the day used more traditional N-struts); and, of course, those retractable gear.

Actually, the very first Staggerwings—Model 17Rs—came with fixed gear, which were buried deep within spats—massive main gear fairings. These early models had no flaps, and they used a split-rudder mechanism for extra drag during approach and landing. As for engines, the first three Staggerwing models came with either a 420-hp Wright R-975 (in the Model 17R), a 690-hp Wright R-1820 (the A17F), or a supercharged 710-hp Wright SR-1820 (the A17FS). The latter two airplanes could hit cruise speeds as high as 225 mph and had maximum gross weights of up to 6,000 pounds.

Though they caused a stir, only four of these early fixed-gear Staggerwings were sold between 1932 and 1934. With the 17R priced at $19,000—and the A models running between $24,500 and $30,000—the Staggerwings were too steep for the market.

A weight- and price-shedding program was instituted, and by 1935 Beech had rolled out the $8,000 B17L. With a shorter wingspan, a milder engine, and retractable gear, this proved to be the model that would kick off the Staggerwing's lengthy production run. A 225-hp Jacobs engine replaced the fire-breathing Wrights, and maximum cruise speed dropped to 162 mph. Customers didn't mind, however, and by 1936, 47 B17Ls had been sold.

A bewildering sequence of 15 engine options was offered in the models built over the next 13 years of Staggerwing production. These ranged from a 285-hp Jacobs to a 600-hp Pratt & Whitney. With the D models in 1937, flaps were added to the lower wing and ailerons were moved to the upper wing; a rudder trim tab was added; the fuselage was stretched 18 inches; the main gear was given better shock absorbers; toe brakes were made standard; and optional fuel tanks could boost fuel capacity as high as 174 gallons. Over the years, elevator balance horns were installed; horizontal stabilizers became fully cantilevered; and control yokes were changed from the original, single-throwover design to a twin-T or Y-bar dual control yoke setup. Improvements to the engine mounts, windshield, and tailwheel steering were instituted.

Civilians weren't the only ones drawn to the D17. Between 1937 and 1944, the U.S. Army bought 105 airplanes and the U.S. Navy anted up for another 320, making the military the Staggerwings' best customer. After all, Staggerwings were as fast—or faster—than many fighters of the late 1930s. Military models were used in utility or transport roles, and at times civilian Staggerwings were drafted into service from their owners. Some even served Allied foreign

Inside this prize-winning Staggerwing is a leather interior with room for five. A modified fuel system places the selectors on the center pedestal.

governments (mainly Great Britain) in either military or diplomatic missions.

Staggerwing production ended in 1949 with the G17S. This was powered by a 450-hp Pratt & Whitney R-985 engine, which yielded a maximum cruise speed of 201 mph. The maximum gross weight of these airplanes was 4,250 pounds—just 50 pounds more than the wartime D17—and 20 of these went out the door at $29,000 a pop.

With total sales of 781 airplanes, the Staggerwing had a wonderful production run. It survived the Depression, went to war with several nations, won gobs of air races, built a cult following, and was modified to accept everything from skis to floats. But with the introduction of the Model 35 Bonanza in 1947, Beech created its own competition. The V-tailed Bonanza looked more modern than the Staggerwing, went almost as fast, and was priced at $8,000. Suddenly, two wings, round engines, and tube-and-fabric construction didn't seem as appealing.

Thanks to dedicated owners, about 200 or so Staggerwings survive. Their loving owners pamper them and accept their thirst for oil and fuel as a small price to pay for flying such a classic. Devotees can join the Staggerwing Club (contact John L. Parish Sr. at 931/455-8463) and support the Staggerwing Musuem Foundation, Inc. (Post Office Box 550, Tullahoma, Tennessee 37388; telephone 931/455-1974), which maintains a Staggerwing and Beech 18 museum at the Tullahoma, Tennessee, airport. If you're drawn to Staggerwings—as most are—then the Staggerwing Museum is a great place to gawk.

Should you want a Staggerwing of your own, then expect to shell out a fair sum—up to and beyond $500,000 for a pristine, fully restored model. Restoring, or tending to, a Model 17 can eat you alive in parts and labor costs, but, hey, owning a fully restored Staggerwing makes you the center of attention at every airport you visit. This kind of admiration is priceless, but it's what comes with flying what must be America's snazziest biplane. □

Beech Staggerwing Model G17S
Price new: $29,000
Current market value: $500,000 plus

Specifications

Powerplant	450-hp Pratt & Whitney R-985, super charged
Propeller	2-blade Hamilton-Standard, constant speed, 99-in dia
Length	26 ft 9 in
Height	8 ft
Wingspan	32 ft
Wing area	296 sq ft
Wing loading	14.34 lb/sq ft
Power loading	9.44 lb/hp
Seats	5
Empty weight	2,800 lb
Maximum gross weight	4,250 lb
Useful load	1,450 lb
Fuel capacity, std	124 gal
Fuel capacity, w/opt tanks	170 gal
Oil capacity	6.5 gal

Performance

Takeoff distance, ground roll	620 ft
Takeoff distance over 50-ft obstacle	1,130 ft
Rate of climb, sea level	1,250 fpm
Maximum speed	212 mph @ 5,500 ft
Cruise speed/endurance/range w/45-min reserve, optional, 170-gal fuel tanks (fuel consumption)	
@ 75% power	201 mph/ 7.5 hr/1,200 sm
10,000 ft	(22 gph)
Service ceiling	20,000 ft
Landing distance over 50-ft obstacle	980 ft
Landing distance, ground roll	670 ft

Limiting and Recommended Airspeeds

V_{FE} (max flap extended)	115 mph
V_{LE} (max gear extended)	115 mph
V_{NO} (max structural cruising)	212 mph
V_{NE} (never exceed)	240 mph
V_{S1} (stall, clean)	64 mph
V_{SO} (stall, in landing configuration)	62 mph

All specifications are based on manufacturer's calculations. All performance figures are based on standard day, standard atmosphere, sea level, gross weight conditions unless otherwise noted.

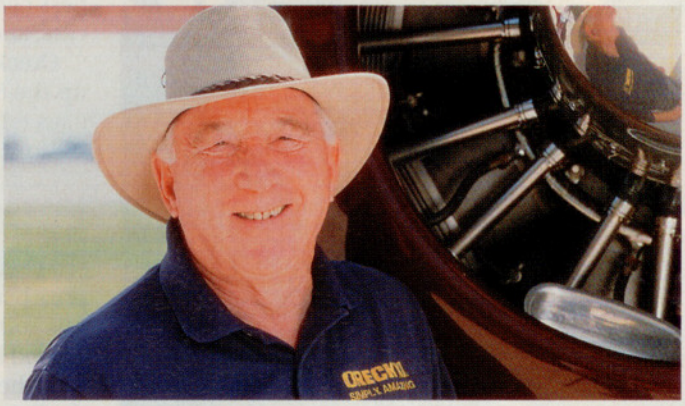
A super Super G

One man's superbly restored G17S

Tucked away in a hangar at New Orleans' Lakefront Airport is what must be one of the finest examples of a Staggerwing restoration. It's a two-tone, maroon Model G17S—NC-16GD—and it is in better-than-new condition. The airplane belongs to vacuum cleaner magnate David Oreck who, together with fellow pilot Frank Ryder, flies and fastidiously maintains this living museum piece. Ryder is also a sales manager and director of special events for Oreck's company, plus an accomplished airshow pilot in his own right. He flies at some 12 airshows a year in a highly modified Cyclone aerobatic monoplane, sponsored by the Oreck company. Ryder *is* the Oreck XL Flight Team.

Oreck's Staggerwing, photographs of which grace the pages of this article, began life as a 1944 D17S. Its logbooks indicate that it was then commissioned in the British Royal Navy, but little is known about the airplane's activities overseas. By the time the airplane left military service in 1947, it had flown a total of just 239 hours. From 1947 to 1956, the airplane flew 1,548 more hours and was used as an aerial-photo platform by a Des Moines-based company, Woltz Aerial Photography. A Louisiana buyer, who elected to remove the engine and take the airplane out of service, was the next to own it.

In 1965, Robert Dedek bought the airplane, then donated it to the Staggerwing Museum in Tullahoma, Tennessee. Noted designer, builder, and restoration specialist Jim Younkin of Springdale, Arkansas, acquired the by-then-dismantled airplane and set to work on a restoration program with a twist: He'd make over the basket-case D17S to look like a late-model G17S, and he would add modifications that would modernize the airplane. The twin fuel selectors, which originally were located on the cockpit's right sidewall panel, were moved to the center panel. The old landing gear drive system, which could take 40 seconds to cycle the gear up or down, was replaced with one capable of doing the job in six seconds. The old hand-operated, wobble-style fuel boost pump was replaced with electric pumps. The old electrical system was replaced; the instrument



David Oreck poses in front of his pride and joy (above). The Staggerwing's speed is the result of a super-clean design that includes fully enclosed landing gear (below). Even the tailwheel is hidden by a dedicated set of gear doors.

Runway performance is not a problem with 450 hp pulling the 4,200-pound Staggerwing (above). Oreck's G17S was converted from a basket-case D17S to an Oshkosh Grand Champion.

panel was brought up to date (complete with a Bendix/King KLN 90B GPS receiver and a Century 2000 autopilot); an oxygen system was installed; and a sleeker cowl and windshield design was installed.

In 1995, Gerard Dederich of Wadsworth, Illinois, bought the newly transformed G17S (then still in pieces) and went a step further. He commissioned restoration specialist Roy Redman of Faribault, Minnesota, to complete the interior and come up with a paint scheme. Nine months and 2,600 hours of labor later, the airplane was reassembled, recovered, refaired, renamed a "Super G," and rigged for flight. On May 28, 1996, the FAA issued an airworthiness certificate for the one-time basket case, and the phoenix rose.

Oreck, undaunted by price, snatched up the Staggerwing two years ago. He uses it for local flying, mainly just for the fun of it.

I was fortunate enough to meet up with Oreck and Ryder this past August, and fly N16GD. Right off the bat, let me say that I did not take off or land this prize bird. There was simply no way that I was going to risk the chance of a swerve, ground loop, or worse in an airplane that took the 1996 Grand Champion prize at the Experimental Aircraft Association's Fly-In and Convention in Oshkosh, and is, for all practical purposes, priceless.

I did just about everything else, though, and the experience was enlightening. You see the 1930s when you operate the engine, see the 1990s when you work the panel, and feel the blush of Depression-era luxury when you notice those little touches. Like those old Packard automobile cranks that lower and raise the cockpit side windows.

Starting the nine-cylinder R-985 calls for some fast hands. First you crack the throttle, hit the fuel boost pump, and watch the fuel pressure rise. Once the engine is primed, you turn off the pump and then hit the starter and spark boost (more on this shortly) buttons simultaneously. Now the engine starts spinning. After a few turns of the propeller, it's time to turn on the magnetos. Then comes *that sound:*

"Bloop...bloop...bloop, bloop, bloop ...brack-a-tack-a-tack-a..." and the engine is lit. It sounds like not all nine cylinders are firing. Maybe the engine might quit, I think, so I ask Ryder if I might add a little throttle to perk up the Pratt. No, comes the answer. Too much throttle would flood the cylinders, and an embarrassing—and costly—backfire

will surely follow. The supercharger seals could be torched, for example. So we wait for 10 minutes or so while the R-985 goes through its necessary warmup period.

Now, about the spark boost. This is a "shower of sparks," vibrator-type coil system that's used to make more and hotter sparks. Instead of one set of sparks firing at the correct ignition timing for a start, there's a multitude of sparks firing before, during, and after the normal starting crankshaft timing position. The vibrator intensifies the sparks by pulsing the current. It's a system we all take for granted on our more modern flat engines, but pre-1946 Staggerwings had to make do with magneto power alone for their starts. Redman added the spark-boost system during his restoration.

Taxiing is a real challenge in the Staggerwing because the nose is massive and sits so high off the tarmac. It's so nose-high that to enter the Staggerwing you have to haul yourself up the steep grade to the cockpit with the help of a hand strap. Constant S-turning is an absolute necessity to see around the huge blind spot directly in front of the pilots.

After lining up on the runway for takeoff, the tailwheel is locked with a locking lever beneath the pilot's subpanel. Apply power—not to exceed 36 inches of manifold pressure—wait a few seconds as speed builds, and the nose can be lowered for better visibility as you head for liftoff at 70 mph. The supercharger is gear-driven off an accessory pad and force feeds the induction system via an internal blower. At altitude, it guarantees the kind of power you need to achieve those 200-mph-plus cruise speeds, but preventing an overboost on takeoff is entirely up to you. There are no safety valves to dump excess manifold pressure.

Once off the ground, the Staggerwing flies like a Bonanza. Its ailerons are light and responsive, it's slippery, and it builds speed quickly if you aim the nose earthward. The fuel system is a bit wonky. There are six separate fuel tanks in 16GD (two in the upper wings, two in the lower wings, one in the forward fuselage, and one in the aft fuselage), and you can draw fuel from only one tank at a time. To make matters worse, you have to aim the left selector to the *Wing* position if you want to use fuel from the wing tanks, then use the right selector to select the exact wing tank you want to use. Because the top wing tanks are so hard for linemen to reach, most Staggerwing pilots leave them empty and use the rest. Oreck and Ryder have a special canted ladder that lets the airplane's upper wing tanks be filled without the danger of a lineman's leaning precariously forward. With a conventional ladder, a lineman could easily topple forward trying to reach back to the caps on the staggered wing.

Cruising over the Louisiana bayous, I amused myself with the thought that the Staggerwing looked like an antique on the outside, but handled very much like our photo platform—a 1984 Beech A36 Bonanza—that we were following in formation.

Landings were another matter. Ryder says that neophytes to the Staggerwing tend to make two typical mistakes. One is to wait too long to slow the airplane in preparation for landing. The other is to stab the brakes too soon after touchdown.

A Staggerwing wants to fly fast, and it can be quite a while before airspeed dissipates to the proper 80 mph for final approach. Extending the landing gear sure helps to slow the airplane, but you have to be under 115 mph to pop the rollers. Extending the flaps (Ryder calls them "the parachutes") can be a bad move because you can wind up too slow, and develop a high sink rate. At Lakefront and most other airports with longer runways, flaps simply aren't needed, Ryder points out.

Ryder rolls the Staggerwing on the runway in a studied manner. It's slowed to a hair above stall speed, but the tailwheel is held six inches or so off the runway. This way, he can easily see ahead, and he's slow enough that he can begin braking with confidence—all this in a crosswind.

Back at the hangar, Ryder cares for the R-985's—or any radial engine's, for that matter—habit of leaking oil. The Ham Standard is pulled into low rpm so as to dump the oil from its hub into the oil tank. Then the Pratt is idled at 1,000 rpm for one minute. This empties the engine oil sump. Now most of 16GD's oil is stashed away in its oil tank. However, after a day or so, gravity will send residual engine oil back to the sump. Eventually, the sump could fill and oil could overflow and run out the bottom cylinders, causing oil to pool on the floor. To prevent this from ever happening, Oreck installed a check valve in the sump's housing. A hose connected to a gallon can is clipped to it. If there's any sump overflow, it goes into the can. Result: a spotless hangar floor to match a spotless airplane. *—TAH*

Links to additional information about Staggerwings may be found on AOPA Online (www.aopa.org/pilot/links.shtml). E-mail the author at tom.horne@aopa.org