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The Pitts Model 12 Comes of Age

The Kimballs, Jim the elder and Kevin the son, are interesting folks. Working out of their private grass strip in Zellwood, Florida, they have carved something of a special niche for themselves within the world of antique aviation. Now, with the Pitts Model 12, known by some as the Macho Stinker, they are in the process of whittling an equally impressive, and typically unique, niche in the world of homebuilding.

As the purveyors of kits and components for Curtis Pitts' most recent biplane design, the hairy chested, round-motored Model 12, they have applied their deep knowledge of round motored biplanes to their version of a sorta-antique for the homebuilder. Of course, being a Pitts, it's an antique with spunk.

Before Curtis was even close to finishing the Macho Stinker back in 1996, Kevin and Jim were standing on his doorstep looking over his shoulder. They were looking for something new to add to their repertoire and the Model 12 tickled their fancy. They came away with a set of plans and started building at the same time as Curtis and his Biplane Mafia.

The Kimballs were not strangers to biplanes. In fact, in the years since Jim bailed out of the electronics wholesale business in an effort to save both his health and his sanity, biplanes have been central to their lives. Running an electronics company with 200 employees and an eccentric owner had taken its toll and Jim simply walked out the door and decided it was time to do something else with his life. However, to keep himself busy while he was picking a direction, he purchased a basement full of parts which were purported to be a

Staggerwing, when assembled, and began working on what is widely regarded to be one of the most labor intensive airplanes in the world to restore. The result was that he didn't have to pick a direction for his life. The direction came looking for him in the form of antique airplanes. He was good at what he did and he loved it.



Having finished and sold the Staggerwing, he purchased a Stearman and began restoring it with the goal of selling it for a profit. That was the last airplane he had to purchase. From that point on people were banging on his door seeking his skills to be applied to their aircraft. That single Stearman was the first of 25 Stearman, 6 Staggerwings and everything in-between. In total, since they moved to Zellwood in 1982, they have restored over 80 antique airplanes, Cub to Staggerwing and all of those which have been entered in judging have won awards. The SM8 Stinson they built to be an award winner cleaned up at Sun n Fun the only year SnF had a trophy for overall winner.

Kevin, who is 32 years old with two tykes of his own, was a tyke himself when he started helping his dad. "We have pictures of me rib stitching when I was eight years old." By the time he graduated high school and was ready to go off to the University of Central Florida to study engineering, he had built, rebuilt or designed practically every part on an airplane. This put him in a different category than the rest of his mechanical engineering class. "It was really frustrating because the professors would constantly be designing things that couldn't be built. To them a bolt was a bolt, there were no different types or sizes, or they'd come up with an assembly on paper in which aluminum was welded to steel. They just didn't get it."

One of the reasons the Kimballs decided to take on the Model 12 project was creativity and pure practicality. "We were tired of building things that had to look and be built like something else. Our first serious homebuilding activity was building the Model Z Gee Bee, but even there we had to conform to older practices in many areas just as with the antiques. In some of the antiques we'd have to bolt a seat to a 1/4" plywood floor, really stupid, but that's the way it had originally been done, so..."

As the Model 12 at Curtis' was coming along, the Kimballs began negotiating to buy the rights to the design to incorporate it into their business. What they didn't know, and Curtis had forgotten, was that there was a clause in the contract under which which he had sold the earlier Model 11 Super Stinker rights that gave that purchaser first right of refusal on all further Pitts designs. They exercised their option and the Kimballs found

themselves looking for another way into the homebuilt biplane market. However, when they then negotiated to become the parts supplier in support of the individual who was selling the plans, they found themselves scratch building Model 12 parts anyway.



As soon as the original Model 12 was flying, Ben Morphew, a long time homebuilder and G-junkie from Dallas, journeyed down to Homestead to fly it. On his way back home he called the Kimballs to get them started on building a Model 12 airframe for him. He, however, had some changes he wanted made. Morphew's input, coupled with several items which surfaced once the prototype was flying (e.g. the original motor mount had to be 11 inches longer than calculated for CG purposes), set in motion a subtle redesign (with Curtis' blessing every step of the way) that resulted in the Model 12 which the Kimballs offer in kit and pre-finished component form. It should be noted that there are actually two versions of the airplane now: The original, as shown on the plans and the Kimball version for which plans are not available. However, Kevin and Jim make components for both versions and, where possible, make their parts so they'll fit on the original design.

Morphew, being a long time aerobatic pilot who, among other things, owned the original Super Stinker before selling it to Aviat, wanted an airplane that more closely fit his personal definition of what a sport biplane should be. Where Curtis had designed the airplane to be "...an old man's airplane", as he put it, something which was much tamer than Pitts usually are, Ben wanted to put some of the well known Pitts hot-sauce back into the design. Among the changes he wanted were shorter wings and longer ailerons for more roll rate. He also wanted the canopy modified, something which the Kimballs already had underway.



Left to right, Ben Morphew, Kevin Kimball, Steve Wolf and Jim Kimball.

Changes from the original include clipping a foot from each wing and maintaining the same number of ribs so they were moved closer together. The I-struts were relocated to balance inboard/outboard bending moments. The ailerons were extended clear to the tips and run in one bay closer to the fuselage. This produced a 22 foot span (an S-2 Pitts is 20 feet and a Skybolt 24). At the same time, they took most of the dihedral out of the lower wings leaving only about half a degree and that was mostly to avoid the "droopy" look zero dihedral wings tend to have. As they proceeded with the redesign, Curtis urged them to design metal ailerons as they'd

be lighter and easier to mass produce than the wooden ones on the original airplane. The kits include these metal ailerons although the plans show wooden ones.

To get the C.G. problem worked out and shorten the motor mount, the Kimballs did some redesign of the fuselage which included relocating the pilot/passenger, in relation to the wings. The net result was that the engine came back and the tail came forward making the airplane 10" inches shorter. Kevin re-calculated the tail volumes and increased the size of the rudder to give the same amount of authority the original had.

The canopy on the original airplane was actually an afterthought as the Macho Stinker was supposed to be an open cockpit airplane until it was within several months of flying. At that point the sheet metal was already finished, so the canopy wound up sitting on top of the sheet metal combing and used a locking and sliding mechanism even Curtis wasn't satisfied with. Also, with the sheet metal combing up so high, the cockpit had a definite gopher hole feel and visibility suffered. On the Kimball version, the sheet metal combing is eliminated and the canopy comes clear down to the longerons, ala Christen Eagle. It is bonded to a 4130 frame and includes a separate windshield for a couple of reasons. "We wanted the windshield so in case you ever lost a canopy, the windshield would still be there deflecting wind. Also, without the windshield, the canopy only has to come back four inches to clear the wing before opening."

The canopy also has an intermediate locking position so the airplane can be taxied with it partially open. Taxing a bubble cockpit airplane of any kind on a warm, sunny day (the kind we all like to fly on) with a canopy that can't be opened is too much torture for most people.



By the time the Kimballs began working with the Vedenyev M-14P radial engine from Russia, most of its quirks had been encountered by the aviation movement, but not all of them had been worked out. The difficulties with the engine center on three things: first, the fact the rocker boxes aren't drained puts a lot of oil into the bottom cylinders which promotes hydraulic locks on starting. You have to be really careful you clear the induction tubes and cylinders. Second, the starting system is pneumatic which requires a constant supply of high pressure air. Third, the engine fittings are either metric or just flat weird so hooking it up to SAE or AN fittings required a lot of conversion gymnastics for those putting the engine in a non-Russian airframe. A number of homebuilders have faced and conquered these problems and Kimballs tossed their accumulated knowledge into the pot and brought all the fixes together under one roof. Now, anyone seeking to hang one of these engines on a homebuilt (they've actually put one on a UPF WACO), only has to make one phone call to solve all their problems.

The Kimballs interconnect all of the rocker arms and drain the induction tubes into a common drain. Then they have a gear pump that in 30 seconds after shut down scavenges the sump completely drying it out and pumping that oil into the oil tank. The oil tank has a shutoff valve that stops oil from gravity feeding into the sump which eliminates the problem of oil pooling on the back of the bottom pistons and seeping past what they say are weak oil rings to flood the lower cylinders. To eliminate the fear of cranking the engine with the oil turned off, the shut-off valve has a micro-switch that disables the starting circuit until the valve is turned on and oil starts into the sump. The Kimballs have been using a similar system on antiques, especially those with Wright engines, for years.

The air start system depends on a smallish bottle pressurized to 800-900 PSI which works through a distributor to pump air into cylinders in sequence. The Kimballs have a complete starting system kit mounted on a single firewall panel that the builder just takes out of the box, bolts to the firewall and hooks up. The scavenger hunt to find the right parts has been eliminated. One thing the Kimballs don't use, which Curtis did, is a shut off on the air tank. That's the only way to guarantee it won't bleed down and they say a shut off valve is probably in their future.

As for the hardware to mate the engine to "normal" hoses, electrics, etc., they've worked with a number of folks and come up with a complete fitting kit that makes it hook up like it was a Lycoming.



When the airplane made its public debut at Sun 'n Fun the super slick cowling on the Kimballs airplane drew more than its share of comments. "The problem with making the cowl is that the firewall is a really weird shape, so the cowling can't be round and fit. We did a CAD-CAM model of the cowling, blending it from a Twin-Beech sort of ellipse to the firewall in the computer. Then we generated individual cross sections at each station and a friend with a CNC cutter cut the cross sections out of foam. We stacked them up like a wedding cake and sanded them to shape. That went to our fiberglass guy who made a mold for us. The final weight of the cowling is 24 pounds but we'll do it in carbon fiber, if someone wants it. That saves about 13 pounds but it runs about \$120 per pound saved."

The fire wall on both versions of the Model 12 are the same so they make the cowlings long enough that they'll fit the originals while those building the newer version have to whack a section off the back of the fiberglass unit. Kevin says they are planning on putting a foot square door on each side of the cowling to make maintenance easier.

The massive landing gear sports a unique streamlining technique: A custom extruded rubber fairing bonds to the rear of the gear leg and the brake lines run through holes in the extrusion.



The kit, in its complete form, has all the welded components finished and powder coated. There is no welding to be done. The ailerons are assembled and finished and instrument panels are ready to be punched for instruments. The turtle deck is completely pre-formed. The wings come as a wood kit with the spars finished and drilled but the ribs have to be assembled. The Kimballs have designed a cute rib assembly jig. The kit includes seven rib jigs that are 3/4" particle board with the outline of the rib routed deeply into the board. Holes are drilled in the bottom of the channel for each leg of the rib truss. When the jig is used, it is blocked up off the work bench by 1 by 2 scrap. Short pieces of wooden dowels (supplied) are inserted in the holes in the rib channels and the rib is then assembled. When the gussets (supplied pre-cut as is all the corner blocking) are in place, the jig is simply tapped down against the work bench and the dowels force the ribs out of the jig.

Many of the parts, wood and metal are laser cut with the raw edges of the metal that won't be welded dressed back to eliminate any hardening from the laser-cutting process. Even the plywood nose ribs are laser cut. The leading edges, by the way, are plywood and formed for the Kimballs by Steve Wolf.

As of this writing, they had delivered nine kits since the first of the year and had orders for 21. This doesn't include numerous parts kits they've produced for those who are scratch building from plans, which is another of the airplane's strong points. An individual doesn't need to pony up all the money for the kit because they can scratch build it a piece at a time. 'Have enough money for some steel tubing? Start building the elevators. The money can go in at the rate an individual wants. The engines, incidentally, are still reasonably plentiful and the prices have plateaued for the last couple of years at \$16,000 for a brand new one.

With all the formal stuff behind us, it's time to talk the important stuff: How does it fly?

When Steve Wolf and I got ready to saddle up (Steve is campaigning the airplane for the airshow season) we had a serious discussion about which seat I should sit in because he was worried about the air supply for starting. I didn't really care which seat I was in, having flown it from the rear in the past, so I scrambled up front making any starting problems Steve's fault. I didn't realize at the time what I was getting myself in for as the front seat is so wide and low it is really, as in REALLY, blind. Oh, well. Between that and a gusty, 90 degree crosswind it would be a test for both me and the machine.



The start went exactly as planned (I could've done that...maybe) in that the pneumatics kicked the engine into life in just a few blades. Ben had told me if it doesn't start on the first several revolutions, stop because something else is wrong. As soon as the engine was running, the engine-driven pump started replacing the air it had used starting.

I'm glad I had set in the back seat of the new airplane because the visibility back there is greatly improved from the original. In fact, it is no worse than most other taildraggers. Although the length and width of the nose gives the impression it's blinder, it's not. Up front, however, with the huge instrument panel (the cockpit is nearly two people wide) and low windshield with wide framing, I had to S-turn more deeply than usual to make sure we didn't taxi over a hangar or something of similar size. Fortunately, the Aviation Products steerable tailwheel made ground handling a breeze...even in the breeze.

Takeoff can only be described in two words...a blast! What an absolute kick in the shorts! It's not often I'm caught unawares by an airplane on takeoff, but this one did. I brought the power up smoothly working to keep the tiny wedge of runway I could see right where it was on the windshield frame. When the throttle was about 2/3rds of the way in, the prop went into governor range and the surge felt like I'd just slapped it into afterburner. I was congratulating myself on doing such a great job and had just started to pick the tail up when the airplane lost patience and leaped/clawed/bounded into the air. I was behind the airplane in no uncertain terms. Wow! I doubt if the process had taken more than 4-5 seconds. In less time than I could think about it, the airplane was rocketing through 300 feet and, between the hard crosswind and wrong-turning prop, I was clear over the right side of the runway.

I just let it find a groove to climb in and I guessed we were going up about 2,500 fpm. Then I looked at the airspeed. We were doing 130 mph! We blasted through pattern altitude less than halfway up the runway and doubled pattern altitude even as I turned out to find a legal piece of airspace in which to play.

Unfortunately, we had an unpredictable low cloud condition so, as we climbed on top, Steve and I both kept a nervous eye on where we thought the airport was. Getting lost in the local area is always embarrassing.

On takeoff we were showing about 33-34 inches of manifold pressure (it's mildly super charged, remember) which should have given us the full 360 horses. And it felt like it. Bringing the power back to what Steve said would give us a normal cruise at about 13-14 gallons an hour left the airspeed hanging at about 175 mph and it was truing much higher than that.

I wracked the wings back and forth feeling out the pressures and adverse yaw and found you could tell the difference in the wings from the original. It reacted to aileron input much more quickly and the roll rate was noticeably higher. Since Curtis had designed the airplane to be more gentlemanly than most of his designs, when he hinged the ailerons, he didn't go as far aft on the hinge point as his other symmetrical "Super Stinker" technology wings because he didn't want the ailerons that light. For that reason, hustling along at Bonanza speeds, the aileron pressures are higher than I wish they were, a thought echoed by Ben Morphew and a few others. Kevin has said he doesn't want to put spades on it, but Curtis reportedly told him he might as well give in and make the spades so he is the one making the money out of them rather than someone else.



Incidentally, saying the ailerons need to be lighter is a relative statement: Compared to most "normal" airplanes they are light enough, but then, this isn't a normal airplane is it? We're talking rock and roll here. Not foxtrots.

First an aileron roll. Then a positive-G 4-point. Then a slow roll. Then a regular four point. Then lay it on its back and let it groove into a hard left turn. Yeehah! Steve told me to loop it from level flight, so I pulled with my right hand and pushed with my left and a curious feeling coursed through the airframe and into my body: It was as if I was being pulled uphill by a tractor which had so much torque and brute force it didn't care that it was going up hill carrying a heavy load. It just kept on chugging and I could feel it pulling us up and over and hardly giving up any speed in

the process. It was as if I could feel the lift vector that was defying gravity shift slowly from the wings to the prop blades and back to the wings again.

And speaking of props. They are using the MT composite three blade prop and recommend either those or the similar Whirlwind rather than the original two blade units for a number of reasons. The original Russian props are time-limited and are getting harder to find at a decent price. Also by actual pull tests (a fishing scale between the tail and a stout hangar), the three-blade composites are putting out 25% more thrust. Right. As if the airplane needs more thrust. The Hoffman three blade is also a good and less expensive alternative.

We kept watching the cloud layer playing with the ground and decided it was a good idea to go back and shoot some landings. The bottom edge of the cloud layer was right at pattern altitude, so, as I came rocketing down hill, we had a real feeling of speed as we flashed down through the openings at 200 mph plus. At first I thought I was going to have trouble slowing it down, but bringing the power back and letting the prop flatten out practically throws you forward in your seat. Also, there were other airplanes in the pattern and about the only way I could keep track of them was to make sure I knew where one was and pull the airplane hard into a space behind him which I was positive no one else occupied. That slowed the airplane down too. Low visibility in a blind airplane and a crowded pattern really keeps your head on a swivel.

I had to make the first approach behind some yo-yo who was making a cross country out of his or her approach. I avoided centerline and kept the runway in sight by flying a steep angle to final from the left which let me see the runway and the traffic at the same time. I had no idea what the glide angle would be so I kept it intentionally high intending to slip down in the usual Pitts landing. This is what I did. Sorta, but between

unfamiliarity and the crosswind pushing us towards final, it wasn't very pretty. I wanted to hold 100 mph, but wasn't working too hard at it as I'd already seen that any time I wanted to kill speed, all I had to do was pull the power and hold the nose in a given position. The prop took care of the rest.

As the ground came up at me, I brought it around and lined it up with the runway and did something I tell my students never to do: I was staring at only one side of the runway. Usually I like to look at both sides to judge drift and alignment. This time, however, it took too long to glance from side to side, so I just snuggled up against what I could see of the left side of the runway and held that.

I was a little fast and the gusts were doing their best to push us off the runway, but the little airplane wouldn't let them. As with all Pitts designs, it's a terrific crosswind airplane.

I thought I had the three point attitude nailed, but I kissed off the ground with the mains giving us a nice little bounce. No big deal, just keep it straight and don't let it drift. Proing! It was back down again and it stuck this time. My feet kept waiting for something to happen, as it rolled out, but other than the occasional tap, it didn't need anything.

I knew a Cherokee had taken off just in front of us and I debated whether to make it a touch and go, knowing I'd catch up with him in a heart beat. but, I couldn't miss the opportunity to do another one. Power coming up, prop surging, we leap off and I make a slight right turn as soon as the gear clears looking for the Cherokee. I kept climbing and turning and finally located him about 100 feet off the right side of the runway where he'd let the wind push him. I just kept the nose and power up, whizzing up to pattern altitude and turning over him while he struggled through two hundred feet.

On this approach the wind was really working us but I was determined to do better. I didn't. I kissed it off the mains again and hung there for a second until it came back down. Same deal as last time as the airplane didn't do anything stupid. The conditions couldn't have been too much worse and I was doing much less than a sterling job but the airplane still behaved like a gentleman. A very macho gentleman.

Is this a hard airplane to fly? It's no cub, but other than the lower than normal visibility and higher than normal climb rate, it's much easier than any other Pitts to fly. In fact, I think I'd put it right in with the Skybolt in terms of being a terrific airplane that can be flown by most people. And then there's the other question about the prop turning the "wrong" way. Yes, I noticed it, but only if I thought about it. The rest of the time you just use which ever foot is needed to do what ever it is you're trying to do.

How do I feel about the airplane in general? Perhaps my wife and soul mate Marlene summed it up best when we were standing by the ramp waiting for the two Model 12's to arrive at Winter Haven. As they taxied up and the Vendenyev's were making that characteristic Bearcat rumble, she looked across the top of the car at me with big round eyes, grinned and said, "Now, that's where the word 'bitchin' came from."

Well put.