AIR POWER

Automotive powerplants are now the main hope for the amateur aviation industry. **by Robert Cumberford**

Oshkosh, Wisconsin—

It may well be the world's biggest aviation event—more than 11,000 aircraft are parked here at Wittman Regional Airport during the last days of July and early August, more than any other country has in its entire civil fleet—but the Experimental Aircraft Association's annual fly-in and convention, now dubbed AirVenture Oshkosh, is a major automotive event as well.

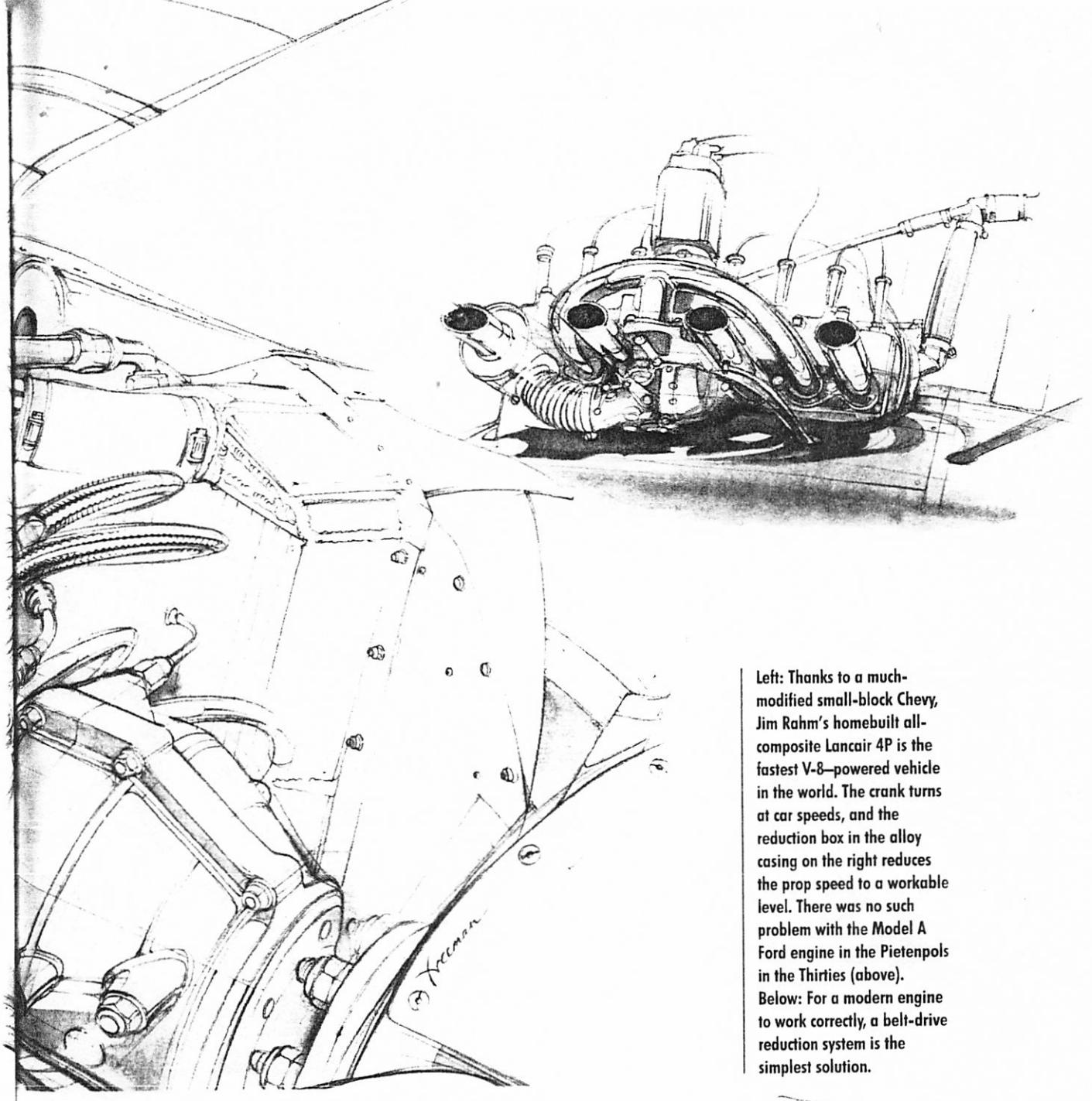
There is a strong and enduring link between aeronautical and automotive engineering, although that link has been attenuated in the past fifty years as gas turbine engines have taken over mainstream aeronautical activities, leaving piston engine airplanes with nothing but antiquated powerplants that have soared in price while offering little more performance or reliability than they had long, long ago.

Aviation is and always has been constrained by powerplants. Smithsonian Institution director Samuel Langley tried to get off the ground with elegant steam engines a hundred years ago, but they were always too heavy, and his later use of the even more elegant Manley gasoline engine did not help. The Wright brothers' success was in large part due to their having designed and built their own engine for the specific purpose of powering their Flyer. It worked, as every school kid knows (except those in Russia and France, where it is an article of faith that a Russian or a Frenchman was first to fly).

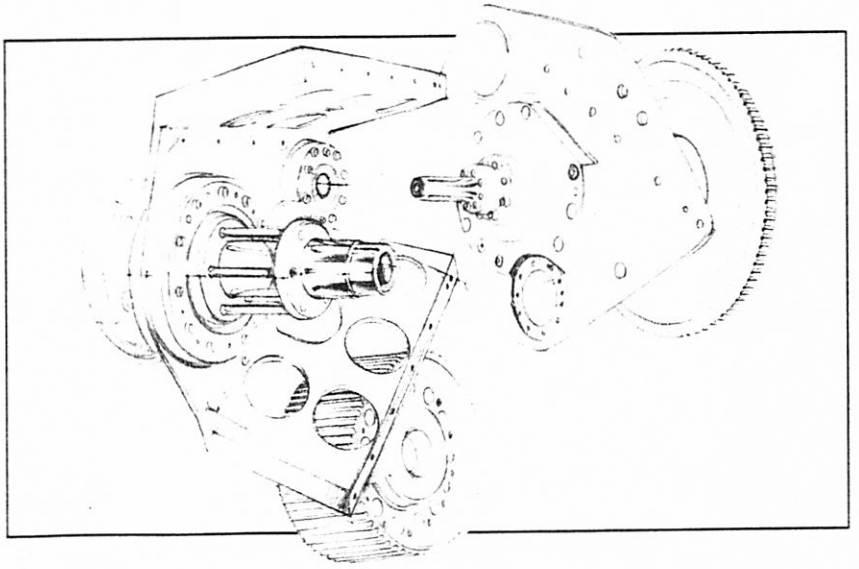
Today only two American firms make certified piston aircraft engines, Continental and Lycoming, both of which were longtime purveyors of automobile engines. Continental engines were last seen in Kaiser-Frazer cars in the Fifties, while Lycoming stopped car-engine production with the arrival of World War II, having built the mighty Duesenberg J straight eights and Cord 810-812 V-8s as part of E.L. Cord's Auburn-based automotive empire. Franklin also built aircraft and helicopter engines (one of which was adapted for the Tucker) long after it stopped making air-cooled cars, but a bankruptcy in the early Seventies saw its assets sold to Poland's PZL.

Amateur aircraft builders had a lot of

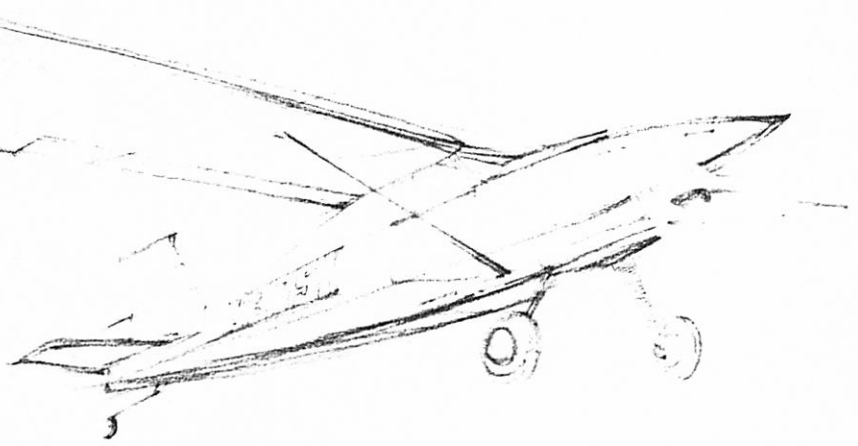
ILLUSTRATIONS BY BOB FREEMAN



Left: Thanks to a much-modified small-block Chevy, Jim Rahm's homebuilt all-composite Lancair 4P is the fastest V-8–powered vehicle in the world. The crank turns at car speeds, and the reduction box in the alloy casing on the right reduces the prop speed to a workable level. There was no such problem with the Model A Ford engine in the Pietenpols in the Thirties (above). Below: For a modern engine to work correctly, a belt-drive reduction system is the simplest solution.



military surplus engines to work with in the Fifties and Sixties. Lycoming 4.7-liter O-290 fours in new condition went for $125, and several popular airplanes, especially the Thorp T-18, were designed around it, but those days are long gone, and a new Lycoming producing the same power costs between $26,000 and $32,000, and sometimes more, depending on configuration. These engines are usually low-compression and carbureted, have simple combustion chambers that take into account nothing that has been learned in the past fifty years about increasing efficiency and reducing emissions, and are not even precisely made by car standards. So it is obvious that there are great incentives for amateur aircraft builders



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to see what can be done with modern automobile engines.

There is nothing new about this. In the Twenties, Bernard Pietenpol designed a simple parasol monoplane that used Ford car engines—first the 2.9-liter Model T unit, then the (relatively) lighter Model A's. At AirVenture '99, several A-powered Pietenpols were on hand, some built recently and at least one of the real thing from the Thirties. In 1937, Arrow Aircraft actually certified the flathead Ford V-8 and sold quite a few Arrow Sport two-seaters, one of which is on permanent display in San Francisco International Airport, along with its V-8 in a glass case. In the Thirties, the Waterman Aerobile had a Studebaker L-head six, and there were some Plymouth-powered aircraft as well.

In the Forties, Al Mooney certified his Mite with an overhead-cam 747-cc sheet-metal Crosley engine, but water-jacket corrosion problems prompted him to shift production to the Continental A-65 flat-four, and all aircraft in the field were retrofitted. That was the last commercial application of automobile engines in light aviation until Porsche made an ill-advised and famously unsuccessful attempt to put the 911 flat-six into aircraft in the Eighties. Geared down to keep the propeller speed at a workable level, the Porsche crankshaft turned at high speed and produced power approximately equal to a Lycoming, at a price even more astronomical. The one virtue of the Porsche package was single-lever power control, with electronics managing the propeller governor, the mixture control, and the throttle setting, something pilots must do for themselves with the antique engines offered on new airplanes.

Renault is back in the airplane business with the Morane diesel, which is said to be designed by the people behind the conquering Formula 1 V-10s, but visually it is a copy of American air-cooled aircraft engines, and its diesel technology is old hat, with neither direct injection instead of a prechamber nor common-rail electronic controls, et cetera. It has a promising future because all big airports have Jet A kerosene fuel, but not all of them can provide aviation or automotive gasoline. And it's quiet.

Actually, there are two car-based V-8s that are completely certified: the Canadian-built Orenda that began life long ago as a McLaren Can-Am Chevy but is now completely nonautomotive in content; and the twin-turbocharged Toyota based on the Lexus engine, which never made it to production because of its projected $100,000-plus cost. Even the 350-bhp TIO-540-AE2A Lycoming aerobatic engine sells for less, just $99,462. Just.

Aviation pioneer Steve Wittman's last Tailwind (above) had an inverted Oldsmobile alloy V-8 from the Sixties. The certified Canadian Orenda engine began life as a big-block Can-Am engine.