



# The AMA History Project Presents: Biography of RAY ARDEN

February 24, 1890 – October 1965



Compiled and Edited by JF (07/2004), Updated by JS (12/2005, 10/2007)

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*The following was taken from the Model Aviation Hall of Fame application submitted by Charlie Reich on February 24, 2004.*

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Thomas Ray Arden was born in New York on February 24, 1890, and destined to become a great inventor. He eventually designed a product that created a revolution in model aviation and propelled the industry forward in the 20<sup>th</sup> century and beyond... the **Glow Plug**.

Ray started as early as five years old building models of toy cars and boats. At age 11, in 1901, Ray built his first rubber-powered model airplane from plans found in the *St. Nicholas* magazine.

Ray attended Public School 63 in the Bronx. Ordinary as a student, Ray tarried three times in 8a and twice in 8b. That year was 1907, which was at the same time he became obsessed with an early model aircraft engine he observed at a sportsman show in Madison Square Garden. A.N. Herring, then a rival of the Wright's to be the first to fly, had on display a two-pound gas engine mounted in a miniature biplane. Until the doors were locked and the last of the stayers had left, Ray studied and gawked at this fascinating engine. Day after day Ray played hooky, spent all of his money on tickets, and oft-times sneaked in to stare at that motor. He even got to talk with Herring, informing him, "Someday I will make the smallest engine ever built."

After his encounter with Herring's small engine at Madison Square Garden, Ray, a 17-year old high school student, made his first gas engine... the hard way. Every day after school, Ray would dash home to his basement workshop. He made his own patterns, and even tried to forge his own crankshaft over the kitchen stove's fire. The cylinder was turned on a foot lathe from a twenty-pound chunk of cast iron. Finally, he had an engine that weighed only half as much as Herring's. Ray designed the vibrating spark coil and condenser, both of which weighed less than two ounces, a phenomenal development at the time.

Arden's engine had a jump-spark ignition with a characteristic high-speed miss. He licked this problem on his engine by glow-ignition. Unlike today's glow plug, this glow plug supplemented but did not replace the spark plug for smooth running. Special fuels were not to come until many years later. In 1908, Ray designed and flew a model biplane for this engine with a six-foot wingspan and twelve square feet of wing area. His model had upturned outer wing panels, much the same as modern dihedral models and turned in numerous flights from 100 yards to nearly a mile, depending on the amount of gas used.

In 1910, Ray designed a two-cylinder model engine weighing only fourteen ounces and after 25 years of experimentation got engine weight down to two ounces.

Glen Curtiss used the smaller, lighter Arden designed coils on his famous prop-driven “wind wagon” before he made his first flight.

After graduation Ray’s career blossomed as an inventor with somewhere between 300 and 400 inventions sold through the 1920s. In the 1930s, Ray formed a company called Ultrad Products to design and develop new products, primarily new toys in which Ray held a particular fascination. When a toy train manufacturer became interested in the possibilities of developing a miniature gas engine Ray was steered back to his natural field. A revolutionary valve-in-piston engine resulted and the Arden designed Mighty Atom .097-ignition engine was introduced in 1939.

After introduction of the first Mighty Atom, he continued to improve on the design and offered three additional progressively improved versions then called Super Atoms. A 1940s pre-production Atom surfaced in the early 1970s, found by a MECA collector, Jerry Graves. This 1939/40 Arden-designed Atom engine prototype featured an ‘Air-Throttle’ and radial mounting. Both features never showed up on the postwar 1946 Atom engine but did appear on the new 1946 Arden engines.

World War II started on December 7, 1941, putting a halt on most model businesses and developments until the final surrender on September 2, 1945. Thousands of troops started returning from war creating a pent-up demand for recreational items, and specifically model airplanes, engines and anything that flew. This aftermath also released all the previous items to the public that had been restricted by the government due to the war effort, and methanol became available as an alternative model fuel mix.

Ray immediately went to work to develop his revolutionary Arden .099 and .199 ignition engines, both of which were introduced early in 1946, manufactured by the Micro-Bilt Corporation in Danbury, Connecticut. The power and speed developed by these lightweight and extremely compact miniature engines proved to be an immediate success with the modelers.

Coinciding with his engine development Ray also developed and sampled over 500 exotic methanol based fuel blends. Ed Chamberlin, a friend of Ray’s and Ben Shereshaw, had also developed a new hot fuel that Ed called “Liquid Dynamite.” He furnished a sample to both Ray and Ben for testing.

Ed was visiting Ben’s Miniature Motors factory testing some of his new fuel with Ben Shereshaw on one of Ben’s Bantam .19 ignition engines. Ben shut off the ignition and, much to their amazement, the engine kept running. They manually shut the engine down and hurriedly removed the spark plug, only to find that the spark plug’s ground strap had broken off and the center electrode was still glowing red hot... Eureka! They knew an important discovery had been made. Ed excitedly called Ray Arden and informed him of their discovery.

Both Ben and Ray started experimenting with experimental glow plugs. Ben found that a small coil of Nichrome wire offered the best result but burned out too quickly. Ben informed Ray of

his problem with the burned out wire and they both continued to experiment with different metal elements for the coil to prevent premature burn out.

Ray finally developed a special two-piece Glow Plug with a replaceable element made of an alloy of platinum and iridium, which provided a superior catalyst for the methanol-based fuel and an element that did not burn out. Ray Arden's modern day Glow Plug was officially born.

Ray quickly introduced his second series of Arden engines, ceasing production on the clear plastic fuel tanks, which melted when using the hot new glow fuel. The 1947 engines offered the new, fuel impervious, black fuel tanks and the Arden engines were thereafter only offered in the ball-bearing version to take the additional stress and rpms created by the hot new glow fuel.

At the 1947 control line Junior Air Races in Cleveland, Ohio, rumors started circulating that a man was selling a new gadget out of the trunk of his car. Word was that he had this "Gold Plug," a replacement for our Champion Spark Plug and that we could throw away our coils, condensers, points, and batteries! Of course, it was Ray Arden with his new "Arden Glow Plug," and modeling was forever changed! Ray Arden formally introduced the plug a month later at the Nationals in Minneapolis.

In late 1947 or early 1948, Ray Arden transferred the rights on his glow plug design to Ben Shereshaw. Simultaneously Ben ceased production of his Bantam engine and sold the Bantam manufacturing rights, spare parts and tooling to the OK-Herkimer Company with an agreement from OK-Herkimer to manufacture a newly designed Glow Plug for them in his Miniature Motors plant under the OK-Herkimer brand name. The Miniature Motors plant soon started producing a line of new glow plugs known as OK brand- XL Glow Plugs.

During an interview with Ray by Bill Winter in 1948, Ray pulled down a small white box from a shelf. Contained within was a miniscule 12" wingspan Zipper-like model with neatly planked monocoque fuselage and built up wings and tail. It's tiny motor, smaller than a pack of matches, has hundreds of hours of running time and will turn up to 12,000 rpm. Model and engine together weighed less than one-half ounce. Ray loved the small sized motors and had also developed special tooling, including taps and drills to produce a miniscule model ignition engine, including a micro sized spark plug built under high magnification with the entire motor weighing 23 grains, or 1.49 grams or only .005 of an ounce. This one Ray carried around in an eyeglass case and at that time, even now, was/is the ultimate extreme in a miniscule ignition engine.

Ray Arden retired from the engine and glow plug manufacturing business in 1948, but in most probability, continued to invent and design new innovations until his final, final retirement in the 1950s.

Ray certainly deserves his place of honor in the Model Aviation Hall of Fame for his modeling achievements.

1. Miniature Spark Coils
2. Atom Engines
3. His revolutionary design of the Arden .099 and .19 engines

And saving the best for last...

4. From a man, born in 1890, who provided the modeling industry one of his finest achievements... the design and development of the first model engine Glow Plug; still in use today by modelers and manufacturers the world over.

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*The following is a true story by AMA member Lyman Slack.*

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## Meeting Ray Arden

Anyone who grew up in postwar Ohio and around the area knew that Cleveland was a hotbed of model aviation. With sponsors and support from the likes of the *Cleveland Press*, Plymouth, the NAA, twenty hobby shops (including Cleveland Model and Supply, Mac's Models, Red's Hobbies and Hobby House, Pan Am, American Airlines and many more), there was seldom a month that went by without some scheduled model aviation activity. We even had indoor CL speed record trials during the winter!

However, for the competition-oriented, there was *ONE* major event every summer, the "*Cleveland Junior Air Races*." This meet had competition one weekend for all free flight events, including gas, rubber, and glider. The following weekend would be the control line competition, including speed, stunt, and novelty. Notables from all over the Midwest would show up. As a kid, by the age of 13, I had met Carl Goldberg, Jim Walker, Hal "Pappy deBolt and *Ray Arden!*

The control line Junior Air Races in 1947 were being held at the new facility on Brookpark Road, near the Cleveland airport. With great pride, I have to brag here that my Dad was responsible for making the improvements on this donated property that made it a first class model-flying site.

We were still using ignition engines in our speed models, of course. Some had tried the exotic fuels that would 'allow' running without ignition, but without success. Anyhow, during the day, rumors started circulating that a man was selling a new gadget out of the trunk of his car. Word of mouth got around that he had this "Gold Plug" replacement for our Champion Spark Plugs and that we could throw away our coils, condensers, points, and batteries! Of course, it was his "Arden Glow Plug," and modeling was forever changed! Ray and Ben Shereshaw, the designer of the Bantam engine had both been working on the Glow Plug idea. Mr. Arden formally introduced the plug at the 1947 Minnesota Nats a month or so later.

Oh yes, just as Ray Arden was selling his "Glow Plugs" out of his car, another car trunk yielded a collection of revolutionary props that were being introduced by two brothers from Indiana, Tony and Stanley Grish. These were, of course, the famous Tornado pressed wood props that set the standard for many years to come.

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*The following comes from Victor G. Didelot courtesy of Tandy Walker.*

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## **A Little Background on Ray Arden**

Ray Arden was involved in experimenting with gasoline engines for model airplanes in the 1920s. It was the results of this experimentation that gave him the ideas for what later became the Atom model engine.

Using the results of his experimentation, Ray developed his ideas into a working prototype design over several years. While living in Danbury, Connecticut with his wife and daughter, Ray got the Polk brothers, out of New York City, to provide the necessary financial support for him to put his Atom .09 model engine design into production using the Microdyne Company. He also used a local medical supply company to produce the many small precision parts required for the Atom design.

Ray was advanced in years in the mid-1940s, when he designed a new more robust model engine. Then, in 1946, using Micro-Bilt Inc., he started producing his new design in two displacements, which were designated the "Arden .099" and the "Arden .199." Production of the marvelous little Arden engines was finally discontinued near the end of 1949. He still used that local medical supply company to produce the many small precision parts required for the Arden design.

Ray Arden passed away not long after that in the early 1950s, while still living in Danbury, CT. After Ray's death, his wife retained all of the Atom and Arden tooling for several years. However, there was an unusual Connecticut law enforced at that time that required her to provide semi-annual financial statements to the state. Even though the engines were no longer in production, this was still a requirement because she owned the tooling that could produce these engines. To put a stop to this difficult task of providing these financial statements each year, she had all of the Atom and Arden tooling destroyed. Shortly thereafter, the state of Connecticut did away with that law!

Mrs. Ray Arden passed away in Danbury, CT in the mid-1960s. As far as it is known, the daughter is still living there.

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*An unknown author wrote the following piece.*

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## **Ray Arden Engine Designer and Manufacturer**

Ray Arden was born in New York in 1890. He built a rubber powered model airplane in 1901 from plans included with an article in St. Nicholas magazine.

Ray's first model aircraft engine was built after school in his home workshop. He made his own patterns for the castings and machined the cylinder from 20 pounds of cast iron. The coil and condenser for the spark ignition weighed 2 ounces, phenomenally lightweight for its time. The

engine was troubled by a high-speed miss, which Ray cured by adding a glow element to supplement but not replace the spark ignition. Ray later manufactured glow coils for Glen Curtiss' full size prop driven aircraft.

Ray built a 12-square-foot, 6-foot-span biplane for his first engine. With no dihedral, the plane displayed what was probably the first spiral dive in gas model history. The second version of the design incorporated upturned tip panels on the upper wing and turned in many successful flights.

Between 1916 and 1918, Ray operated his own toy company, and then he worked as a freelance industrial designer. He and a partner made over 300 inventions on various products.

In the late 1930s, Ray developed a valve-in-piston engine called the "Mighty Atom" which was produced by the Microdyne Co., owned by Nat and Irwin Polk. The engine was later re-named the "Super Atom" and over 30,000 were produced.

In early 1946 Ray introduced the Arden .099 engine and the Arden Flight Timer. The Arden Free Flight Chassis followed these shortly. The Chassis incorporated the engine mount, landing gear, flight timer and other ignition components all in one molded plastic unit ready to mount on the airplane. Later the same year the Arden .199 reached the marketplace with a modified Chassis to suit it.

Ray's Arden .099 and .199 engines continued in production through the late forties by the Microbuilt Co. but the Free Flight Chassis was discontinued when the Introduction of the glow plug made it unnecessary. The .099 and .199 engines were very successful and popular with fliers in all types of models.

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