



Amesbury Spark Plug Manufacturers

by

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Amesbury Carriage Museum
Amesbury, MA

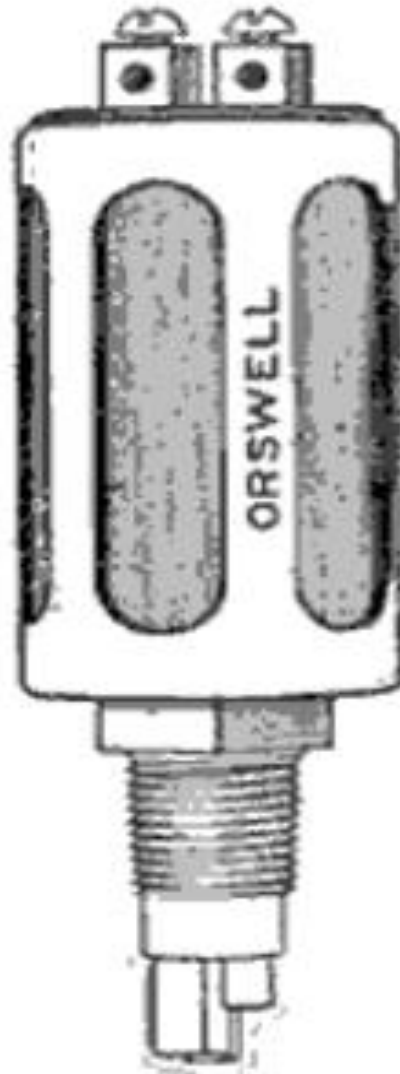
May 12, 2018

4 Spark Plug Brands Manufactured in Amesbury

Climax Igniter Co.
ca. 1902-9
26 Oak St.



Electric & Automobile
Co. ca. 1905-6



Atlantic Electric Co.
1905 - ca. 1914
12 Oakland St.



Randall-Miller Co.
ca. 1913-1915
10 Mechanics Row



1902 Automobiles, Gasoline Engines, & Spark Plugs

Internal combustion engines were sufficiently crude and inefficient in 1902 that many considered highly mature steam engines and less mature electric motors to be more likely for powering automobiles. In Amesbury, S. R. Bailey made electric cars from 1904 to 1914. Currier & Cameron made bodies for steam cars until Stanley Steamer went bankrupt in 1923.

One of many issues with gasoline engines was its electrical ignition system, and how to reliably create ignition sparks in the rising pressure ratios required for engine efficiency.



Thomas Edison with 1910 Bailey

High voltage was required to create and project powerful sparks. But, high voltage has a strong tendency to leak and arc to ground in low insulation areas, especially with dampness. (Many will recall still-common problems on imported cars during the 1970s, particularly during prolonged rains.) There was thus a quest for improved insulation materials, and for means of isolating high voltages to dry and well insulated locations. Another feature, continued on Model T Fords for many years, was a vibrator circuit, or tremblor, that rapidly switched on and off using a magnetically powered vibrating spring arm. Besides creating multiple sparks on each power stroke, the constantly changing electrical flux participated in creating high voltage. The following shows several early and unique combinations of these elements.

Climax Igniter Co. ca.1902- ca.1909



Climax Igniter Co. Manufacturer of Spark Plugs

Located at 26 Oak St., in the G. W. Ellis electrically powered Oak St. complex, ca. 1902-6. The building was previously (or simultaneously) occupied by the Boston & Amesbury Mfg. Co., which attempted to manufacture a complete automobile.

For car maker Boston & Amesbury Mfg. Co., carriage making historian J. J. Allen offers: The members of this company consisted of John Miller, Sr., Robert Patten, George W. Bryant and J. J. Reardon of Amesbury, and a Mr. Seymour of Boston. They commenced business in 1902 in a building on Oakland St. occupied by Miller Brothers, and later moved to the three story brick building on Oak St. (pg. 62)

John Spiller, of Boston, designed the engine for Boston & Amesbury Mfg. Co. (*The Automobile Bodybuilders of Amesbury*, by K. Doubleday, pg. 23) offering the possibility that Spiller either designed or acquired an ignition system that passed on to Climax Ignitor Company. Also, Mr. Spiller may have known or brought with him Mr. Israel Orswell, of Cambridgeport, Massachusetts, who had patented (687,648) an ignitor in 1901. That was a relatively early ignitor patent, for a tightly sealed spark plug having stacked mica wafer insulation, which was somewhat common in that period.

Regarding Climax Igniter Co., J. J. Allen offers: Consisting of John Miller, Henry Miller and Cullen B. Snell, manufactured spark plugs for automobiles in the Oak St. Mill in 1902. (pg. 73)

Climax Igniter Co. Spark Plug with Internal High-Voltage Coil

Climax igniters eliminated engine exterior high voltage wiring by placing that technology within the large ignitor shell. This would also account for the significant price of \$7.50, which was approx. 2-3 day's average wages. This trade journal advert was supplied by a spark plug enthusiast without a citation, so source & date are unknown. Note that Climax has a wholesale distribution agreement with Stevens & Co. of New York.

Order, with remittance, and specify thread.

Money refunded if not satisfactory.

This ignitor is ideal for autos, boats, and stationary motors. Sufficiently heat proof for air-cooled motors. Will ignite a poor mixture. Operates well on high or low speed. The powerful vibrating arm is self-cleaning and soot-proof, and not retarded by compression. Nothing within to get out of place or wear out.

Discounts to manufacturers and the trade.

Jobbers and retailers apply to Stevens & Co.,
99 Chambers St., N. Y. All others apply to

THE CLIMAX IGNITOR CO.

AMESBURY, MASS.

Write for particulars. Mention Trade Journal,

IGNITION PERFECTED

NO INDUCTION COIL
NO SPARK COIL
NO SPARK PLUG
NO HIGH TENSION WIRES

NO OILING
NO ADJUSTMENT

CHEAPEST
SIMPLEST

SUREST
RESULTS

WATER
PROOF

INTENSE
SPARKS
LIKE
ELECTRIC
FLAME

FINEST
MATERIAL
AND
WORKMANSHIP

50 PER CENT.
SAVING IN
BATTERY
CONSUMPTION

\$7.50,
EXPRESS
PAID



Climax Igniter Co. Principals and Products

Products from the Climax Ignitor Co. were appearing in trade journals by very early in 1904, implying that the company was formed no later than 1903, and perhaps in 1902, concurrently with the Boston & Amesbury Mfg. Co. making automobiles. From Amesbury city directories, issued in alternate years, Climax principals John Miller Jr. and William Miller (of 2nd generation of Miller Brothers carriage makers) were still involved in carriage making during 1902-3. However, in the 1904-5 directory, John Miller Jr. was president of Climax, while William Miller was a foreman at Climax. (Cullen Snell, a Haverhill resident, was described as “second treasurer.”) Another Climax foreman was Israel Cheney Orswell.

Climax was immediately making two very different products, only vaguely connected by having some relationship with electricity. While the first is obvious from the company name, the second is, seemingly randomly, a cast copper-alloy roller wheel, about 4 inches in diameter, that attached to poles atop electric trolleys, to roll along overhead electric cables that powered the trolleys. Electricity traveled from the cable, through the wheel and into its copper-alloy axel pin, then down to the trolley motor. It will be seen in the following pages that foreman, Israel Orswell, was almost certainly working with the ignitors, while foreman, William Miller, was most likely involved with the cast copper roller wheels.

In Amesbury, William G. Ellis had previously made electric trolleys, and R. F. Briggs was still actively making them at their Cedar St. complex, providing at least a local connection and interest in finding efficient and wear-resistant trolley rollers.

Climax Igniter Co. & Dayton Electrical Mfg. Co.

Climax Igniter Co., *Cycle and Automobile Trade Journal*, 1904, pg. 92, contract with Dayton Electric Mfg. Co. of Dayton, Ohio

Climax Igniter Co., *The Gas Engine*, Vol. 6, Jan, 1904, pg. 382

382 *THE GAS ENGINE.*

Climax Ignitor Now Handled by Dayton Electrical Mfg. Co.

The Climax Ignitor Co., of Amesbury, Mass., have closed a contract with the Dayton Electrical Mfg. Co., of Dayton, Ohio, by which the latter concern obtains the exclusive sale of the Climax ignitor in the United States.

The Climax Company, in addition to the patents on the Climax ignitor, have secured control of other patents on this type of ignitor. The Dayton Company, after a careful test, concluded that the Climax ignitor is the best

device to use in conjunction with their Apple dynamo and therefore entered in the contract referred to above.

The foreign sales of Climax ignitors are still handled by the Climax Ignitor Co., but they expect to make arrangements with some foreign house to control foreign sales.

The "Climax" igniter, made by the Climax Igniter Co., Amesbury, Mass., will, in the future, be placed on the market through the Dayton (Ohio) Electrical Mfg. Co., who will have the exclusive sale of this igniter.

Very near the founding of Climax Ignitor Co., it was reported that they had formed a relationship with the Dayton Electrical Co., manufacturer of a range of ignition system hardware.

It is unclear if, or for how long, the Dayton Electrical Co. became agents for Climax igniters.

Dayton Electrical Mfg. Co., Mfgr. of Ignition Hardware

Both the Dayton Electrical (or Electric) Mfg. Co., and the Apple Electric Co. were business entities of Vincent G. Apple, a prolific inventor who rivaled Edison for total number of patents. Born on a farm near Dayton, Ohio, he started Dayton Electrical Co. ca. 1895, at about 20 years of age, to develop and sell dynamos, magnetos, and battery systems for nascent gas engines. In 1903 he developed the magneto ignition system for the gas engine used in the Wright brothers' first powered aircraft.

THE AUTOMOBILE TRADE DIRECTORY. 41

APPLE 1907 IGNITION SYSTEM



THE APPLE 12-S SWITCH BOARD is the connecting link in the dynamo-storage battery ignition system. It contains a volt-ammeter, an indicating snap switch and an automatic cut-out. It shows the battery voltage, battery's discharging rate, dynamo's charging rate, and current consumption of every coil. With a knowledge of the current consumption of each coil, the coil vibrators can be accurately adjusted.

The automatic cut-out is located back of the switch and meter, and is for the purpose of severing the dynamo's connection when the engine is stopped, preventing short circuiting of the battery through the dynamo. No switch needed on the coil when this switch is employed.

The Apple 12-S Switch Board completes the Apple Dynamo-Storage Battery Ignition System. Write TO-DAY for complete description.



THE APPLE 1907 BATTERY CHARGER and the Apple 12-S Switch Board are for use with a storage battery to form a complete ignition system. The dynamo's charging rate, which is from one-half of an ampere to three amperes, can be varied by means of the new Apple Adjustable Automatic Friction Governor so that the dynamo will charge the battery in proportion to the battery's discharge. (Note new governor in cut.)

Charging the battery in this way is known as "Floating the battery on the line." "Floating the battery on the line" increases the battery's efficiency, lengthens its life, saves the charging expense incurred otherwise and gives uniform voltage.



By means of the new Apple encased ball bearing flexible driving shaft, the dynamo can be installed in most any convenient location on the car—under the seat or on the running board.

The Apple 1907 Model Generator combines the best features of the dynamo and the magneto, and gives its rated charging rate at an uncommonly slow running speed. You ought to know all about this Model.

Bulletin No. 1-A describes this apparatus in detail and it gives complete information regarding the "Floating the battery on the line" system. Write for it to-day.

THE DAYTON ELECTRICAL MFG. CO.
 87 St. Clair St. DAYTON, OHIO

See our exhibit at the New York Automobile Show, Madison Square Garden, January 12th to 16th, the Chicago Automobile Show, February 2d to 9th, the Chicago Boat Show, March 2d to 9th, and the New York National Sportsman's Show.

On page. 89 of *The Automobile Bodybuilders of Amesbury*, by K. Doubleday, is stated only that Climax Ignitor Co. made brass castings. Described below in 1905 is the cast copper-alloy roller by Climax, located on poles above electric trolleys, to roll along the overhead electric cables.

The Street Railway Review, 1905, pg. 260

The Amesbury Trolley Wheel.

The Amesbury trolley wheel is made of new copper, junk being never used, and by special alloy is rendered very hard and tough, not brittle, and has great durability. The wheel is hollow, and when assembled is filled with grease of a special composition, which melts slightly in the heat of operation and without refilling lubricates the bearing continuously. The bushing lasts as long as the material itself.

The manufacturer claims the unique achievement of constructing a trolley wheel in which the wheel itself, the bearing and the lubricant last equally long. In some cases a change of pin is required, but ordinarily the wheel needs no attention whatever from the day it is put on the car until it is worn out. Beyond these points the particular claims made for the wheel are the following:

The lubricant cannot work out, so that there is no dripping onto the pole and car roof, but the wheel remains always clean.

An ordinary bushing wears rapidly on the outer edges and quickly causes the wheel to wobble and leave the wire easily. The Amesbury bushing wears so little that it never wobbles and the wheel keeps the wire (according to the testimony of all motormen who have used it) very much better than any wheel they have ever seen.

Owing to the construction the current flows through the wheel freely and without the arcing which is so common, thus saving the trolley wire.

The Amesbury wheel is especially designed for extra hard service and while new to the market has been tested for months in severe service. The first road to complete tests, one of the most important and well equipped in New England, has adopted this wheel, as it saved this road one-third in cost, not reckoning the cost of oil and labor necessary in the use of ordinary wheels.

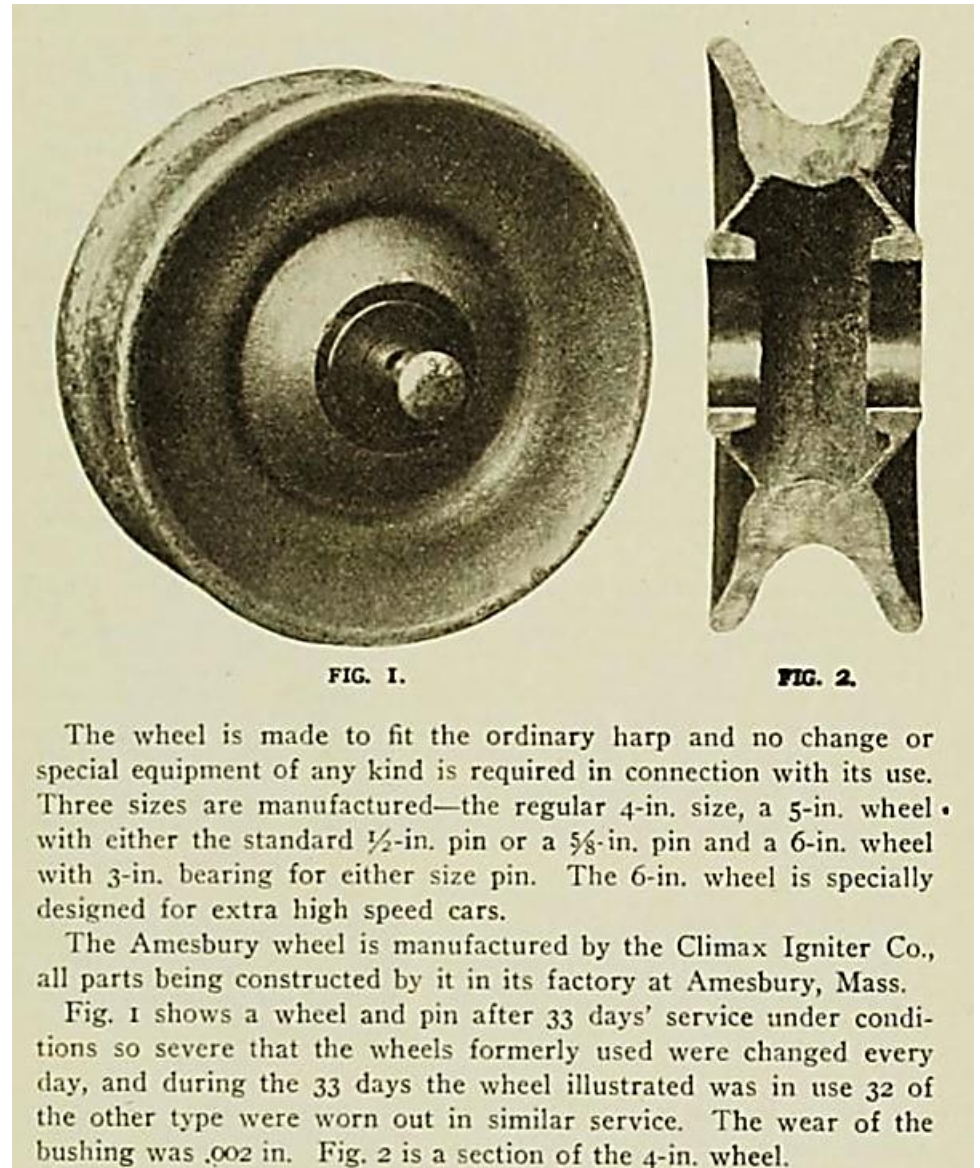


FIG. 1.

FIG. 2.

The wheel is made to fit the ordinary harp and no change or special equipment of any kind is required in connection with its use. Three sizes are manufactured—the regular 4-in. size, a 5-in. wheel with either the standard $\frac{1}{2}$ -in. pin or a $\frac{5}{8}$ -in. pin and a 6-in. wheel with 3-in. bearing for either size pin. The 6-in. wheel is specially designed for extra high speed cars.

The Amesbury wheel is manufactured by the Climax Ignitor Co., all parts being constructed by it in its factory at Amesbury, Mass.

Fig. 1 shows a wheel and pin after 33 days' service under conditions so severe that the wheels formerly used were changed every day, and during the 33 days the wheel illustrated was in use 32 of the other type were worn out in similar service. The wear of the bushing was .002 in. Fig. 2 is a section of the 4-in. wheel.

Climax Igniter Co. Changes after 1906

The 1904-5 edition is the only city directory in which the previously noted individuals, or any individuals at all, were associated with the Climax company.

This activity at Climax Ignitor Co. could have continued into 1906, but the 1906-7 directory placed John Miller Jr. as foreman at the Powow Foundry Co. (this firm is possibly related to the Essex Brass Foundry, which operated for several years during this same period). In the 1908-9 directory, John Miller Jr. was stated simply to be a clerk for an unknown employer, further supporting that the Powow Foundry had been related to the then defunct Essex Brass Foundry, putting John Miller Jr. out of work.

The 1906-7 directory also described William Miller as foreman at the Amesbury Brass Foundry Co., the casting operation established in 1903 by Biddle & Smart, maker of carriages and automobile bodies. He was Superintendent of Amesbury Brass Foundry by 1911 and for a number of years after. It thus appears that the Miller brothers were most likely involved with Climax cast copper trolley rollers. Despite claims of patents (see first page on Dayton Electrical Mfg. Co.) no patents have been found assigned to Climax, which could help to understand their technology sources.

The 1906-7 directory further describes Israel Orswell as having relocated to Hyde Park, Boston. Orswell had become an independent manufacturer of spark plugs, which will be described in the next section. The directories addressed individual people, not companies, and no other local references to Climax Ignitor Co. have so far been found. Climax operations were seemingly disrupted by 1907, and any later activity is something of a mystery. However, later references do appear elsewhere.

Climax Igniter Co. References, ca. 1909

Below are various 1908 & 1909 listings for the Climax Ignitor Co. of Amesbury, well after the last local references during 1904 & 1905. Little has been found in between, raising questions of how the later company was operating. Note that item on far right refers to Climax making magnetos and dynamos, sounding much akin to Dayton Electrical Mfg. Company. It may be that Dayton Electrical obtained rights to make and/or distribute Climax ignitors. Otherwise, Climax continued some other low-profile existence in Amesbury that has remained unfound.

Climax Igniter Co., on pg. 170 of the 1908 *International Motor Cyclopaedia Year Book* section on spark plugs, above Dayton Electric Mfg. Co. of Dayton, Ohio

Bougie Westland.—9 Rue Théophile-Gautier, Neuilly-sur-Seine, France.
Champion Co., Albert.—541 Tremont St., Boston, Mass.
Charter & Co.—303 Dearborn St., Chicago, Ill.
Cie des Megnetos Simms-Bosch, Ltd.—22 Rue Violet, Paris, France.
City Ignition Co.—14 Spencer St., Goswell Road, London, E. C., England.
Climax Igniter Co.—Amesbury, Mass.
Compound (Allumage Electrique).—Levallois (Seine), France.
Cros, J., et A. Laboureau.—12 Rue des Poissoniers, Neuilly-sur-Seine, France.
Darbilly, H., et Cie.—12 Rue Vincent, Paris, France.
Dayton Electric Mfg. Co.—87 St. Clair St., Dayton, O.
De Dion, Bouton et Cie.—Quai National, Puteaux, France

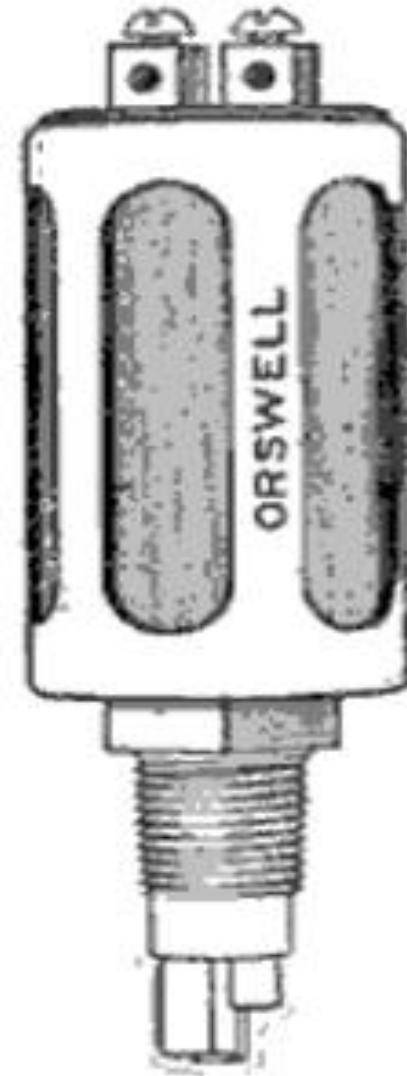
Climax Igniter Co., on pg. 214 of the 1909 *Motor Cyclopaedia Year Book* section on spark plugs, above Dayton Electric Mfg. Co. of Dayton, Ohio

York City.
Boston Igniter Co.—Brookline, Boston, Mass.
Broc-Barbier Auto Ignition Co.—143 W. 54th St., New York City.
Brown Co.—517 E. Water St., Syracuse, N. Y.
Bushey, Eli J.—1777½ Broadway, New York City.
B. & J. Mfg. Co.—3985 Cottage Grove Ave., Chicago, Ill.
Campbell, H. F.—5 Park Sq., Boston, Mass.
Champion Co., Albert.—541 Tremont St., Boston, Mass.
Charter & Co.—303 Dearborn St., Chicago, Ill.
Cleveland Spark Plug Co.—Power Ave., Cleveland, O.
Climax Igniter Co.—Amesbury, Mass.
Dayton Electric Mfg. Co.—87 St. Clair St., Dayton, O.
Delta Mfg. Co.—Bloomfield, N. J.

Climax Igniter Co., on pg. 133 of the 1909 *Motor Cyclopaedia Year Book*

Clifton Hotel Garage.—Niagara Falls, Ontario, and Upper Bridge, Niagara Falls, N. Y. Garage.
Clifton Mfg. Co.—Jamaica Plain St., Boston, Mass. Mfrs. insulating tape.
Clifton Motor Works.—265 E. Clifton Ave., Cincinnati, O. Mfrs. gasoline marine motors.
Climax Igniter Co.—Amesbury, Mass. Mfrs. magnetos and ignition dynamos, spark plugs.
Climax Machine Co.—Indianapolis, Ind. Mfrs. steel clutch discs, special machine work in order; leather washers.
Climax Motor, Ltd.—New George St., Coventry, England. Mfrs. mechanical auto

Electric & Automobile Co. ca. 1905



Orswell Spark Plug with Internal High-Voltage Coil

The Orswell ignitor was patented (1907) by Israel Cheney Orswell, who was described in the 1906 patent application as living in Amesbury. This is of similar concept to the Climax Ignitor, having its own internal high-voltage coil. A perceived advantage of the plug was that it eliminated exterior high-voltage wiring that could short out in wet environments. Orswell's patents were assigned to the Orswell Ignitor Company of Boston, a Maine corporation. The advert, below left, was found pictured online, having no citation regarding source or date. It is the only known reference to the Electric & Automobile Co. of Amesbury. No local references or information have been found regarding the company. About the only time-window for its existence is 1905-6, before Orswell left town.



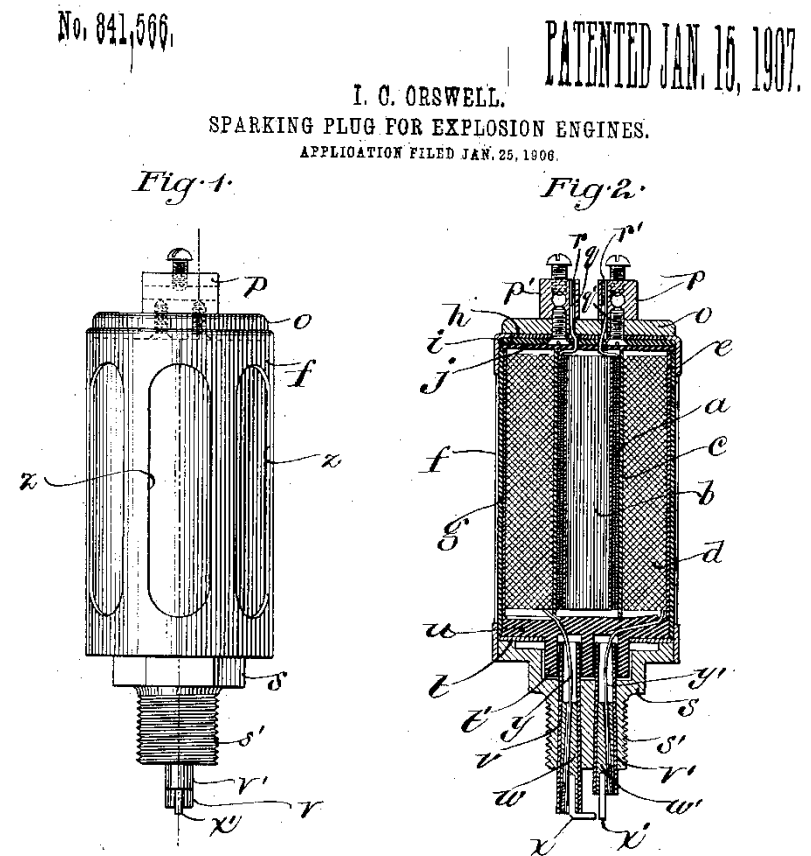
INDUCTION JUMP SPARK PLUG
(Without Secondary Wiring)

Has many advantages over the ordinary Spark Plug without the disadvantages. This Plug has stood the severest test and gives perfect satisfaction. Adopt the "Oswell" Plug and your car will run all the time.

PRICES ON REQUEST

Electric & Automobile Co., Amesbury, Mass.

Note that Orswell has been mis-spelled Oswell in the above advert.



Israel Cheney Orswell (1872-1952)

Israel Orswell's family was from around Bristol County, Massachusetts and nearby Portsmouth, Rhode Island (near Middletown & Newport). By 1900 he had a young family and was working as a machinist in Fall River, where he had married in 1895. He had not attended high school, and seems to have absorbed a technical background in his various jobs. In 1901 he had moved up to Cambridgeport, across the river from Boston, where he patented (687,648) a spark plug. He was not in the 1902-3 Amesbury directory, but had arrived by 1904 (when his last child, Kenneth, was born in Amesbury), renting a house at #1 Melrose Street. (Strangely, the directory also lists a Cheney Orswell at #2 Melrose Street.) At this point, he was a foreman at the Climax Ignitor Company, and is certainly the leading candidate as the source of technical knowledge behind Climax ignitors.

In 1906 he had applied for a patent (841,566) on his own form of integral coil ignitor, and by year's end had both set up the Orswell Ignitor Co. of Boston and had his ignitors advertised in trade journals. He simultaneously patented (878,467) an induction coil and tremblor system for operating multiple ignitors in an engine. By the end of 1906, he was living in Boston. One of his early customers was The Atlantic Co., Amesbury builders of motor launches in their Carriage Hill factory. Orswell ignitors were touted for their ability to spark virtually under water, appealing to marine applications. They were also marketed in the automotive trade, being as automobile engines essentially run outdoors in the rain, where shorting can be a problem. Orswell's business was succeeding well enough that by 1910 his family owned a home in Hyde Park, Boston, with a live-in domestic. Orswell was then billing himself as an inventor.

Orswell Ignitor Co. of Boston

In 1907, Orswell applied for a second patent related to integral coil ignitors, but for some reason did not rapidly pursue completing the process, as the patent did not issue until 1915. By that time, this form of ignitor was seemingly fading from the market, probably for several reasons. The gradually maturing auto industry was developing systems of both technical and cost effectiveness that likely rendered Orswell's designs obsolete and expensive.

The Chilton Automobile Directory had begun publication around 1911, and evidence shows that the Orswell Ignitor Co. was listed from 1913 through 1915, when the item below appeared on page 326.

burn, N. Y. "Auburn" & "Wright Automatic Cleaner."
 Nilson-Miller Co., 13th & Hudson Sts., Hoboken, N. J. "Record."
 Oakes & Dow Co., 15 Chardon St., Boston, Mass. "Comet" & "Sootless."
 → Orswell Ignitor Co., 37 Haverhill St., Boston, Mass. "Orswell." (Combined plug & coil.)
 Pasha Spark Plug Co., Bloomfield, N. J. "Pasha."
 Peerless Piston Ring Co., 95-107 Lafayette St., Newark, N. J. (De-carbonizing.)
 Perpetual Spark Plug Co., 330 E. Drinker St., Dunmore, Pa. "Ezekleen."

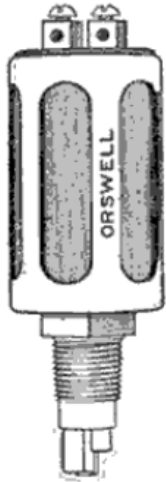
This was the last listing for Orswell, who had moved in 1915 to Middletown, Rhode Island, near his family home, and where he listed himself as a mechanical engineer.

Orswell Ignitor Co. of Boston

The MotorBoat, Dec. 10, 1906, pg. 99

ORSWELL

THE ORSWELL IGNITER COMPANY, of 382 Atlantic Avenue, Boston, Mass., have better facilities to manufacture the Orswell coil-spark plug and vibrator condenser. This is the first successful attempt to locate the induction coil in the plug structure, and its great advantage in marine work is obvious to those who have had practical experience, as the placing of the coil in the



plug means that all high tension wires are combined to the plug structure itself, and there is no high tension current about the boat. By the construction employed in the Orswell plug a thoroughly durable and well insulated coil is produced, which is of reasonable size and only measures 1 inch by 3¾ inches. Both of the secondaries of the coil are connected to the spark terminal, making it practically a double pointed plug and eliminating leakage of the secondary current. The vibrator condenser box, which may be located at any convenient point of the boat, also presents many novelties in construction, and by the use of this vibrator condenser the necessity of duplication of these parts is eliminated, and any number of cylinders can be taken care of by the one device.

This ignition system has come into general use along the Eastern coast, and has been found under the severest conditions to be absolutely waterproof. Among the users of this system are the Atlantic Company, and the Puritan, Essex, Palmer and Fairbanks engine companies.

The Orswell ignitor was promoted for marine use, the above 1906 advert mentioning The Atlantic Co. of Amesbury. The 1909 advert at right describes the ignitor sparking under running water, a test also mentioned in Atlantic Co. advertising (next section).

The MotorBoat, Nov. 10, 1909, pg. 210

ORSWELL IGNITER CO.

Orswell Igniter Co., of 77 Haverhill Street, Boston, reports a steadily increasing demand for its product, not only in this country but abroad as well. While the Orswell is generally conceded to be a perfect system of jump-spark ignition, in the Puget Sound country, where fog and dampness prevail, it is a practical necessity.

Every operator of a jump-spark motor—and the Orswell Co. claims to be in no small degree responsible for the rapidly increasing popularity of the jump-spark—knows, whenever it begins to rain, or the spray commences to fly, he must take steps to protect his plugs and high-tension circuit. Failing to do this, his motor stops, often under conditions of grave danger. With the Orswell all such possibilities are eliminated. The induction coil, being combined with the spark plug in a waterproof casing, there are no high-tension wires and the plug is absolutely waterproof. An Orswell plug will spark under water, while a bucket of water turned over the plug when the motor is running has no effect. The system is further simplified by the use of a master vibrator which answers for single or multiple cylinder motors. The Orswell Co. claims to offer an absolutely waterproof system of ignition, simple, durable, economical in battery consumption and combining all the advantages of jump-spark and make-and-break. A request addressed to the company at 77 Haverhill Street, Boston, or to Kershaw-Williams Co., the distributing agents, at the same address, will bring a catalog.



Israel Orswell after Ignitors

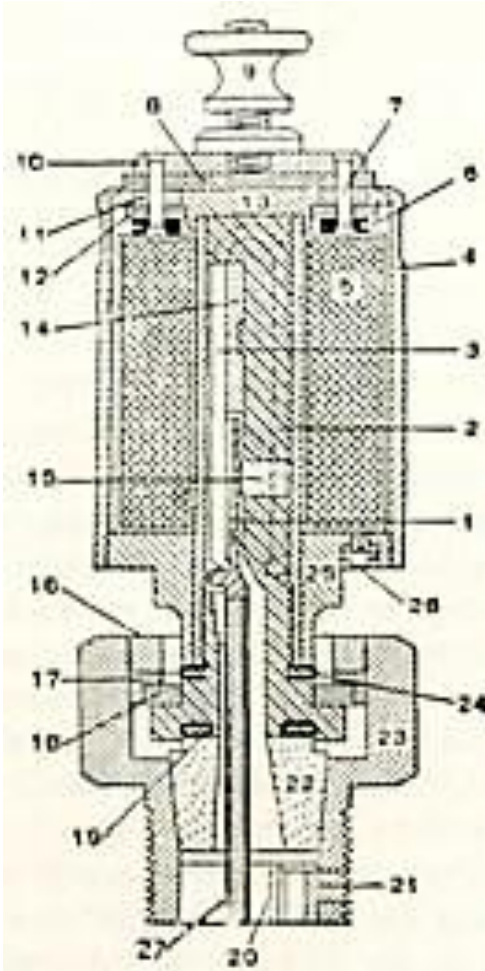
By 1920, Orswell was living in Quincy, Massachusetts, where his eldest son had married in 1919. Israel and his middle son, Merrell, were both working as machinists there at a radio school. Within a few years, Orswell was in Medford, near Boston, still working as an independent designer and inventor. In 1923 he applied for a patent (1,582,777) on a machine for winding wire, fabric, or other filament onto a supporting skeleton, to create a basket-weave object of desired shape. The device exhibits a range of machinery design knowledge in combining multiple rotation, sliding, and shifting motions and kinematic coordination using gears, levers, and cams. The patent is not assigned to any person or company (his ignitor patents were assigned to Orswell Ignitor Company), and it is unclear just what business or industry it was intended for.

He applied for a radically different patent (1,823,373) in 1926, while still in Medford, for a gaseous conduction electrical tube, assigned to the Amrad Corporation (American Radio & Research Corporation) of Medford. If nothing else, he was versatile and credibly versed in a range of technologies.

Sometime during the late 1920s, Israel Orswell moved to Los Angeles, and by 1930 billed himself there as a mechanical engineer, still as an independent consultant. His last patent (2,305,553) was another heavily kinematic machine for transferring decals from their backing onto a desired object, soaking them in water if necessary to remove them from their backing. This again was not assigned to anybody else, and seems intended for general use. His Amesbury-born son, Kenneth, died there in 1951, having worked as a watchmaker. Israel died in Los Angeles in 1952.

Other Spark Plugs having Internal High-Voltage Coils

Early Bosch-Honold ignitor having internal coil, dating originally to perhaps 1902



Online searches conducted for this article found several other makers of similar spark plugs having integral high-voltage coils. A version of the Perfex (right) had an internal vibrator.

Perfex ignitor by Electric Goods Co., Canton, Mass. Used primarily in marine applications, and advertised in boating journals from around 1910, & concurrently with Orswell's ignitor in mid-teen years



Atlantic Electrical Co. ca. 1905- ca.1914



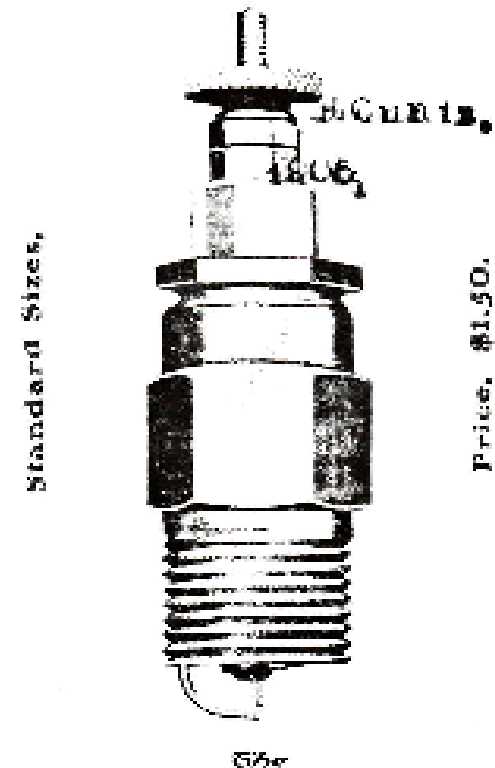
The Atlantic Electrical Co., Mfgr. of Spark Plugs

This is a branch of The Atlantic Co., which occupied former carriage factories around the intersection of Morrill and Oakland streets.

In 1905 the Connor Carriage Co. went out of business, after which its buildings at 12 & 14 Oakland St. was taken over by The Atlantic Co., maker of power dories, boats, and motors. Those buildings had been the old D. J. Folger factory at the above intersection. The Atlantic Co. arrived with its designs and products mysteriously complete and intact, so that they launched immediately into business, having had an extensive display at the 1905 Boston boat Show.

They made their own engines, which required waterproof ignition systems. Searching has found no evidence of a business entity called Atlantic Electrical Co., which may have been essentially a trade name. The image at right is part of an Atlantic advert, from a 1906 trade publication. It was supplied by a spark plug enthusiast without a complete citation.

THE ATLANTIC ..SPARK PLUG..



Atlantic Electrical Co.,
Amesbury, Mass.

The Atlantic Co. Boats, Engines, & Spark Plugs

The description at right is for The Atlantic Company display of boats and engines at the 1905 Boston Boat Show, with particular attention to their spark plug design. Of note is the statement that, “instead of mica washers, has its insulation made from a compounded stone made of talc...”. Stacked mica washers were used in various ignitor designs during that period.

Atlantic Spark
plug

That statement regarding insulation coincides with the advert for Atlantic Electrical Company on the following page. This ignitor design comes early in The Atlantic Co. history, and it seems later to be replaced by Orswell ignitors and perhaps others. So, this design may have lasted for only a few years around 1905-6.

From 1905 Boston Boat Show

THE Atlantic Co., of Amesbury, Mass., showed five motors on stands and six in boats, their boat display being the largest, most varied and unique in the Show. All the engines are of the three-port, two-cycle type, and are made in one, two, three and four cylinders and in h. p. from 1½ to 20. The special features of the motors are, of course, the use of the three-port system, their lightness, simplicity and neatness of their construction.

The Atlantic Marine Jump Spark Plug which they use is a specialty of their own. It is water-proofed by means of a nickel-plated jacket which is threaded on over it, the top being in the shape of a round elbow, so as to permit the easy entry of the wire through it. The plug is also oil and soot proof. The plug, instead of

having the usual mica washers, has its insulation made from a compounded stone made of talc, which is baked at a very high temperature so that it will stand a temperature of 2,000 degrees without cracking, as it does not expand or contract with variations of tem-

perature. An actual demonstration of this plug is made by showing it sparking in a glass jar filled with heavy machinery oil. Another positive demonstration of it was by having a steady stream of water running over the top of the plug in order to show its water-

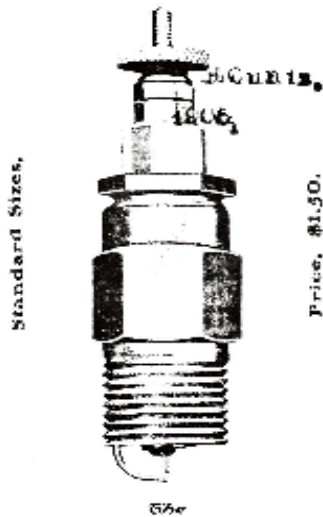
proof qualities. This concern also build the complete craft, and their boat display was one of the most important in the Show.

The Atlantic Electrical Co., Mfgr. of Spark Plugs

Automotive version, with description of their compounded stone/talc insulation

Marine version, with waterproof jacket and elbow piece threaded onto plug

THE ATLANTIC ..SPARK PLUG..



Atlantic Electrical Co.,
Amesbury, Mass.

AUTOMOBILE TYPE. **The Atlantic Spark Plug.**

In placing the Atlantic Spark Plug on the market, we desire to call the attention of manufacturers and dealers to its simple yet perfect construction.

The insulation of the Atlantic Spark Plug is made from stone, compounded and baked at a very high temperature. It will withstand a temperature of 2000 degrees without cracking, as it does not expand or contract from variation of temperature.

It is entirely free from Metallic Substances.

It is a perfect insulator of electricity. Its construction is perfect and is unaffected by either heat, soot or oil.

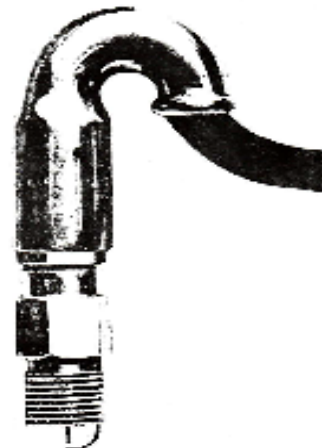
Standard Automobile Sizes,
\$1.50.

SPARK COILS.

We manufacture Spark Coils for from one to six cylinder engines, and guarantee them second to none on the market.

Prices and description on application.

The Atlantic Marine Jump Spark Plug



Made in all Standard Sizes.
Price \$3.00.

Absolutely Waterproof.

OUR **Marine Jump Spark Plug**

Is without doubt the only Jump Spark Plug on the market that is absolutely waterproof. Its construction is very much like our Automobile type. It is fitted with our water shield, which protects, absolutely, all vital parts from water.

We guarantee it to be superior to any Jump Spark Plug on the market.

Made in all standard sizes,
price \$3.00.

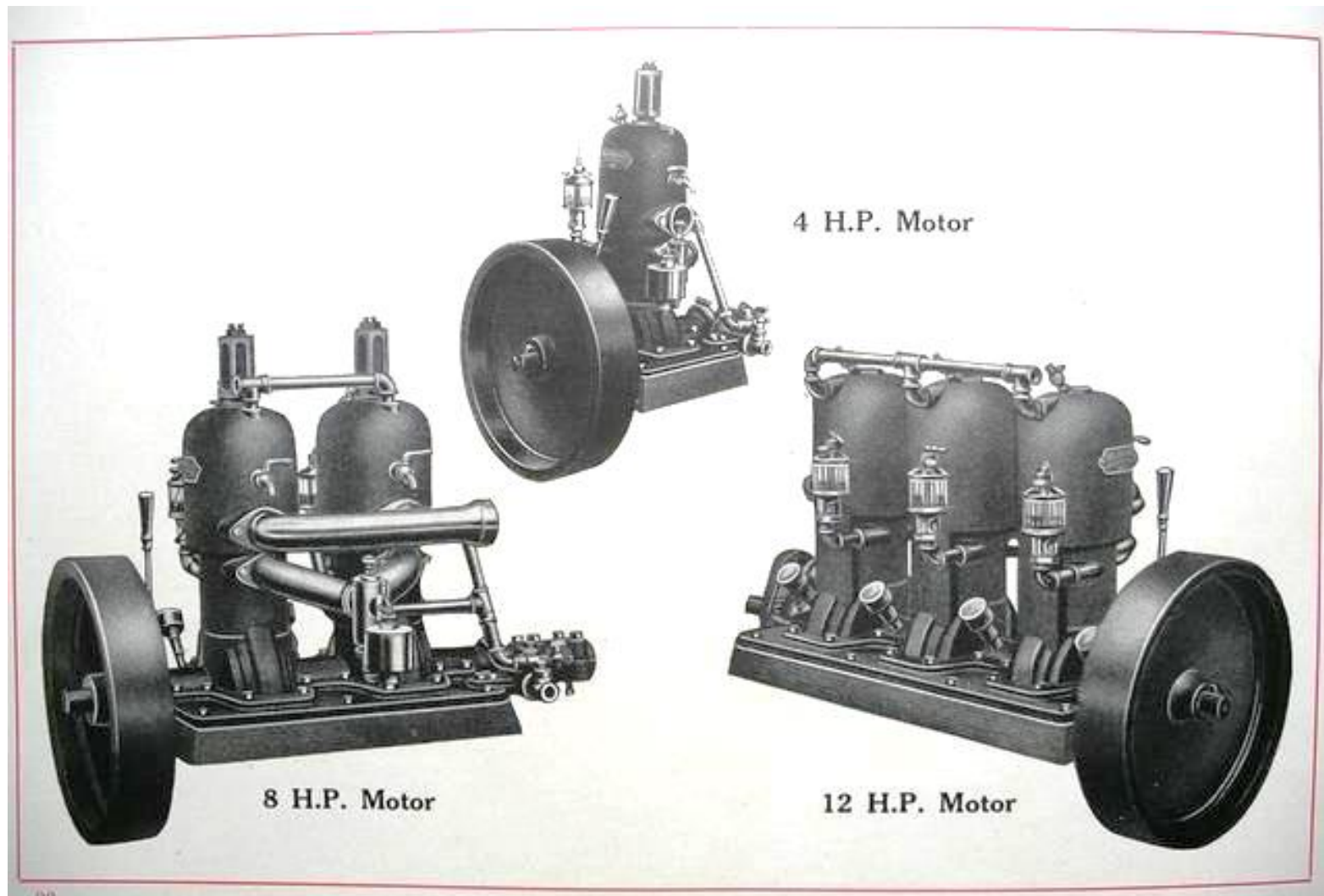
OUR GUARANTEE.

If our Spark Plugs do not give at least three months' entire satisfaction, return same, and we will either send a new plug, or repair the old one free of charge. Any time thereafter, return old plug and 10 cents, and we will repair and return as good as new.

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Atlantic Electrical Co.,
Amesbury, Mass.

The stone/talc insulation compound described here matches that of 1905 given on the previous page, connecting The Atlantic Co. boat-maker to the Atlantic Electrical Company. Lack of patents assigned to these companies make it difficult to trace their technology .

The Atlantic Co. Marine Engines With Orswell Ignitors



The above engines are essentially modular, and water cooled, bulbous jackets being water vessels around each cylinder, connected by pipes to a pump on the front end of the drive shaft. The two engines at left have Orswell ignitors, with their unique jackets and twin screws on top for electrical connections .

Randall-Miller Co. ca.1913- ca.1915



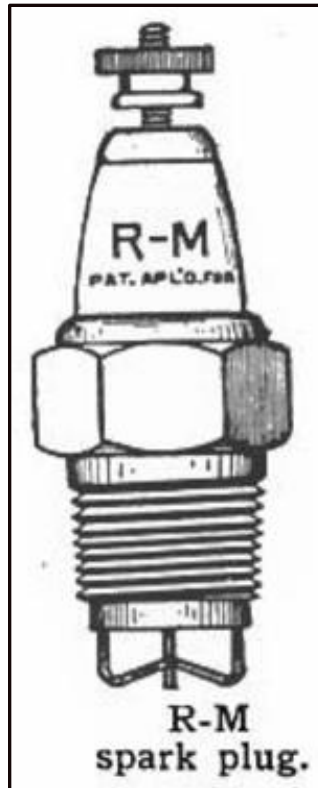
Randall-Miller Company, Manufacturer of Spark Plugs

10 Mechanics Row was the site of the former Pettingell Machine Co., which burned in 1887, and again in 1891. A new bldg. existed from 1892 until after 1930. Prior to R-M, the building had housed the Amesbury Thermometer Company.

J. J. Allen offers a simple 2-line entry that the company existed on Mechanics Row.

In *The Automobile Body Builders of Amesbury*, pg. 91, K. Doubleday speculates that the company may have existed in 1913

June, 1914 news item at right, from *Motor Boating Magazine*, pg. 34. R-M business office is at 1000 Boylston St., Boston. Given time for factory startup & distribution, the company could easily have existed in 1913.



The R-M Spark Plug.

The Randall-Miller Company, of 998-1000 Boylston Street, Boston, Mass., manufacture the R-M spark plug, which is said to be non-leakable and vibration-proof. High-tension porcelain of special formula is used, and its taper seat is wound with asbestos and pressed into the steel seat, the upper end of which is then spun over a ridge on the porcelain. An annular ridge on the lower end of the porcelain is designed to protect the packing from the force of the explosions, and the construction is such that the porcelain and shell will expand and contract in a uniform manner. It is claimed that the points, which are of special material, will not pit.

* * *

Randall-Miller Co. Spark Plug Examples

Drawing from article in *Motor Boating Magazine*, previous page



Unused condition example, found on ebay



Badly rusted example found near factory site, next page



As-Found in Amesbury Randall-Miller Co. Spark Plug



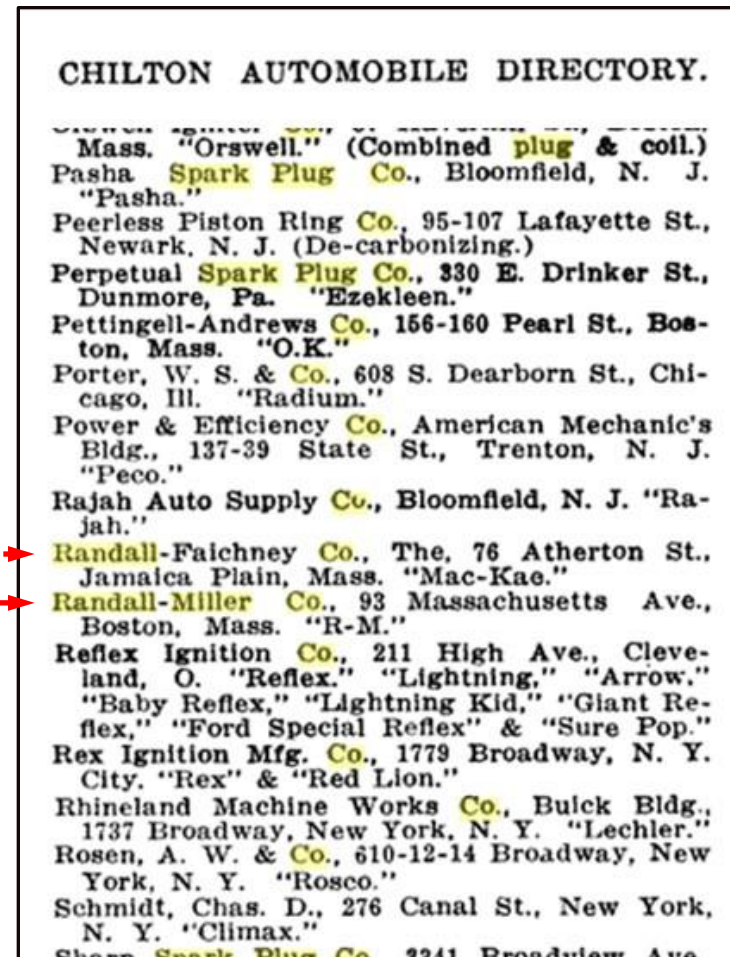
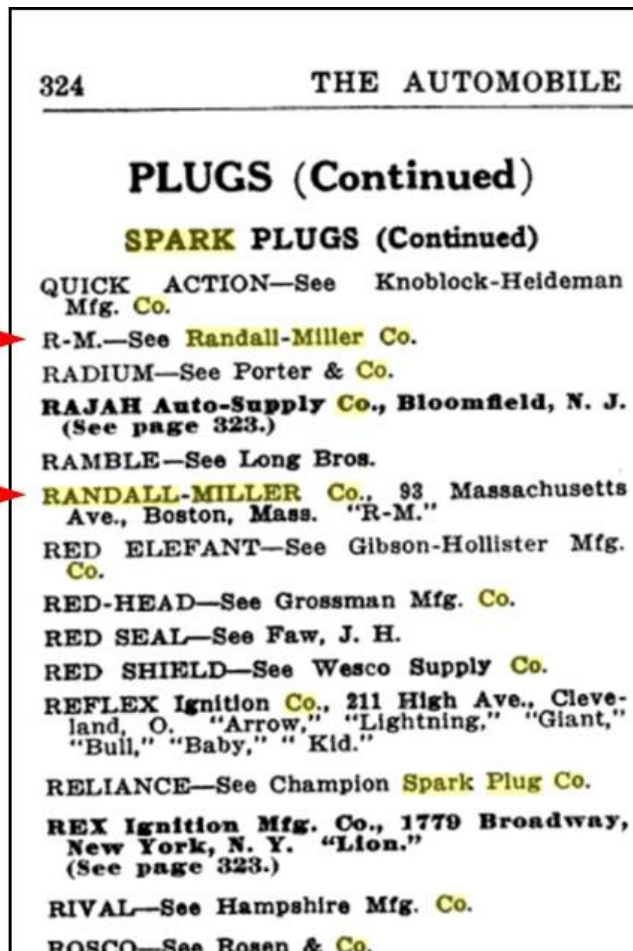
This artifact was found at the rear of 7 Mechanics Row, across the street from the factory site.

Given location & company timing, R-M may have been the source of partially machined WWI hand grenades found on the same property. At the least, those grenades must have originated in that factory, as it was the last factory building on Mechanics Row after the 1891 fire.

Randall-Miller Company Trade Journal Listings

The *Automobile Trade Directory* of 1915 lists the R-M Co. business office at 93 Massachusetts Ave, Boston. This seems the only year of R-M listings

R-M Co. is listed at the same address on pg. 338 of the 1915 *Chilton Automobile Directory*, beneath Randall-Faichney Co. of Jamaica Plain, a Boston suburb, who uses the trade name "Mac-Kae"



Mr. Randall & Mr. Miller, of Randall-Miller Spark Plugs

A lingering mystery is, who are Randall and Miller. Amesbury city directories of the period have nobody of either name (actually, nobody at all) associated with the R-M company. The Miller brothers, who were involved with Climax Ignitor Co. are both accounted for elsewhere. Once again, there are no patents assigned to the company to help identify their technology and who it came from.

With both R-M and Randall-Faichney having offices in Boston, it is a reasonable surmise that they shared the same Mr. Randall, making spark plugs at both locations. Randall-Faichney was a true spark plug manufacturer, as opposed to a distributor.

Several items below suggest that the large NY automotive & marine distributor, Charles E. Miller, had spark plugs made for him, with something new coming in 1913. This could perhaps be the Randall-Miller spark plug. News items regarding C. E. Miller appeared occasionally during this period in *Motor Boating Magazine*, where the R-M spark plug was also noted and described (see 1st page of R-M).

Charles Miller – 1915 Chilton Automobile Directory, under spark plug makers, pg. 326

York, N. Y. selling agents.)
See adv. p. 107.
Michigan Motor Specialties Co., 518-20 East Woodbridge St., Detroit, Mich. "Becco."
→ Miller, Chas. E., 97-103 Reade St., N. Y. City. "Miller." (Mica & porcelain.)
★ Milwaukee Auto Specialty Co., 705-15 Chestnut St., Milwaukee, Wis. "Centerfire" & "Victor." (Stewart Auto Accessories Co., 1509 S. Michigan Ave., Chicago, Ill., sales

January 30, 1913 THE AUTOMOBILE 363

Charles E. Miller Special Plug

Charles E. Miller, New York City, is having manufactured a special spark plug for his business. This plug is designed along conventional lines, consisting of a steel shell and bushing, a porcelain insulation, alloy steel wire electrodes and a terminal screw shaped in Fig. 20. The plug is said to be manufactured in large quantities and will be ready shortly.

The Years of Randall-Miller Spark Plugs

The Chilton Automobile Directory

Randall-Miller not in 1913 Chilton

Randall-Miller – in 1914 Chilton

Automobile Directory, pg. 326, right

Randall-Miller – in 1915 Chilton

Randall-Miller not in 1916 Chilton

→ Randall-Miller Co., 93 Massachusetts Ave., Boston, Mass. "R-M."
 Reflex Ignition Co., 211 High Ave., Cleveland, O. "Reflex." "Lightning." "Arrow." "Baby Reflex," "Lightning Kid." "Giant Reflex," "Ford Special Reflex" & "Sure Pop."
 Rex Ignition Mfg. Co., 1779 Broadway, N. Y. City. "Rex" & "Red Lion."

Randall-Faichney Co. apparently went bankrupt in 1915 (at right) and were reorganized. The company had existed since at least 1911, and the reorganized company existed in 1922. In the likely possibility that this is the same Mr. Randall of Randall-Miller, Randall-Miller Company may have been swept up in the Randall-Faichney bankruptcy, explaining the disappearance of R-M after 1915.

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MOTOR CYCLE ILLUSTRATED

October 14, 1915.

RANDALL-FAICHNEY REORGANIZATION SOON

Boston, Mass.—A committee of the creditors of the Randall-Faichney Company, of Jamaica Plain, purchased the property of the firm for \$150,000, at the receivers' auction sale on September 30. Under a plan for reorganization decided upon by the purchasers, a new company, known as the Randall-Faichney Company, Inc., is to be formed, with a new cash capital and board of directors. The business will be continued as before under the joint direction of Randall and Faichney.

Randall-Faichney Co. Products

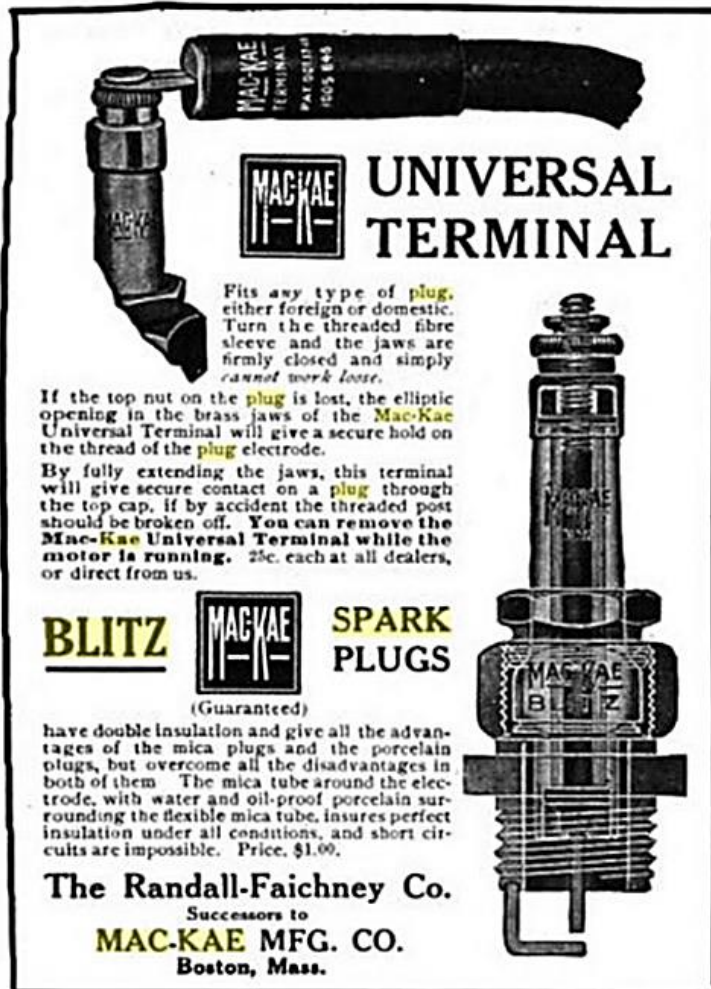


post card, ca. 1912

Randall-Faichney Co. manufactured a variety of products in Jamaica Plain. In the early part of the century they made automotive items, including grease guns, the *Jericho* and *Jubilee* horns (which operated off of exhaust gas, actuated by a foot pedal and pull chord), spark plugs, and spark plug terminals. They later manufactured glass & metal hypodermic syringes and related medical equipment. The building still exists, with extensive exterior alterations.

Randall-Faichney Co. - Spark Plugs

Automobile Dealer & Repairer,
1911, pg. 96



MAC-KAE UNIVERSAL TERMINAL

Fits any type of plug, either foreign or domestic. Turn the threaded fibre sleeve and the jaws are firmly closed and simply cannot work loose.

If the top nut on the plug is lost, the elliptic opening in the brass jaws of the Mac-Kae Universal Terminal will give a secure hold on the thread of the plug electrode.

By fully extending the jaws, this terminal will give secure contact on a plug through the top cap, if by accident the threaded post should be broken off. You can remove the Mac-Kae Universal Terminal while the motor is running. 25c. each at all dealers, or direct from us.

BLITZ SPARK PLUGS

(Guaranteed)

have double insulation and give all the advantages of the mica plugs and the porcelain plugs, but overcome all the disadvantages in both of them. The mica tube around the electrode, with water and oil-proof porcelain surrounding the flexible mica tube, insures perfect insulation under all conditions, and short circuits are impossible. Price, \$1.00.

The Randall-Faichney Co.
Successors to
MAC-KAE MFG. CO.
Boston, Mass.

Advertisement of unknown date, the Blitz trade name having previously been used by Mac-Kae



Two Plugs in One

Look at the smaller illustration. This shows the mica-wound sleeve still partly out of the porcelain shell which protects the mica from oil. Porcelain is safe-proof, but at best is fragile. Mica is unbreakable, but readily absorbs oil.

Thus, the Blitz is doubly insulated, combining the virtues of the mica plug and the porcelain plug without the weakness of either.

Thus to make assurance doubly sure, over all is placed an outer jacket of the toughest and strongest porcelain obtainable.

Even should both porcelain be broken, the sleeve of mica would still keep the spark jumping at full strength.

This is why it is known as

BLITZ

"The Spark That Never Fails"

The larger illustration shows how ingeniously the Blitz Spark Plug is finished.

The outer porcelain jacket—colored in rich bronze blue—gives additional strength and sturdiness, protecting the inner plug from rustiness and breakage. The shell is of cold cast steel, carefully polished and case-hardened. The top nuts are heavily nicked.

For service, appearance and faultless delivery, the Blitz Spark Plug is not equalled—our guarantee tags are attached to every plug—a guarantee against deterioration against failure through defective material or workmanship.

A very good reason why you should equip your car with the Blitz now and not your spark plug troubles.

Made in all sizes for domestic and foreign cars. Special type for Ford cars. Special type for motorcycles.

Ask your hardware or grocery dealer. All styles. In quantities. If your dealer does not have them send for name and price for set of four plugs.

THE RANDALL-FAICHNEY CO.
Jamaica Plain, Mass. Boston, Mass.

Makers of Jericho, "The Horn That Says Please" for automobiles and motorcycles

The Marketplace of the World for Guaranteed Goods