

SPARK KEY PROJECT

A Cooperative Effort by Collectors and Historians Worldwide

This list is updated as additional information becomes available

(Please see: <http://www.zianet.com/sparks/index.html> for updates and pictures)

Information compiled by Russ Kleinman - WA5Y and Karen Blisard - N5IMW

The following represents a summary of known spark telegraph key manufacturers in alphabetical order. Since we are constantly updating this information, you may want to visit the internet site for the latest listings and photographs.

Although we have tried to make this summary as accurate as possible, it is difficult to differentiate between early key manufacturing companies, companies that were solely wireless operating concerns and did not manufacture keys, and companies that only distributed keys. The distinction is frequently blurred, since some companies functioned as manufacturers, operating companies and also sometimes as distributors. Many early manufacturers of complete spark outfits also made the keys that went with their systems. However, to date, no keys made by Lodge-Muirhead are known (they probably used magnetic relay keys) and the keys used by Popov were manufactured by Ducretet (per Waterbury). No Rochefort keys have surfaced, but it is likely that the Rochefort system did design a key. Similarly, no de Cervera (Spanish system) or Armstrong & Orling (British) keys are known to exist. Please e-mail any information you have to sparks@zianet.com.

Homebrewing of spark keys was a very common practice, and design drawings were even published in *QST*. Unfortunately, many commercial spark keys were not labeled by the manufacturer, and it can be hard to tell a good job on a homebrew key from a commercially made one. Hopefully, this list and the updates and photographs on the internet will help in the identification of unknown commercially made keys.

ACME Wireless Construction Company ca 1909 Cambridge, MA...Regular Morse keys fitted with a special contact to carry the heavy currents. Prices \$2 and up.

Adams-Morgan 1911 Upper Montclair, NJ...AMCO Junior Wireless key, Superior and Peerless models, and "United Wireless Type" keys. Became Paragon Wireless Co. postwar.

American de Forest Companies *ca 1901-1914* New Jersey...operating company and full line under different names. Business fraud while with Abraham White. Cross-shaped keys. Large 10-kW key reported by Moreau as made by de Forest was probably in error and actually Marconi. Succeeded by United Wireless which then made de Forest cross-shaped keys.

American Sales Co. *ca 1925* New York...Brass wireless keys for 95 cents, 3/16" contacts. Looks identical to the J-3 trench telegraph key, probably surplus being marketed as spark.

Atlantic Radio Co. *ca 1921* Mass. and Maine...subsidiary of Telefunken. Ad for a key called the AJAX. None known in collections. Also marketed keys by General Radio, Clapp-Eastham, Signal Electric, Murdock, Wireless Specialty Apparatus Co., and Bunnell. The General Radio Type 151 is advertised in undated Atlantic catalog as handling 10A.

Bowman, A.W. *1911-1922* Cambridge, MA...marked and unmarked on marble base. Supplier to Sears and Roebuck, and Montgomery Ward (Meteor Key).

Brach, L.S. *1918, but mfg. other items as early as 1906* Newark, NJ...The J-7 was used with Synchronous spark type airplane radio transmitters. See Robison's Manual of Radio-Telegraphy and Telephony, 6th Revision, 1924, page 546. Nearly identical to International Radio Telegraph Co.'s Flame Proof Key and Winker Type C.Q. 1140 which was used in "flying boat" type aircraft with spark rigs. The J-5, J-6, and J-7 were used with the BC15 airborne spark transmitter and BC89 ground-based receiver of WWI vintage. They could also be used with the SCR-134 and SCR-135 CW/AM rigs. Not to be confused with J-5-A and J-7-A, most of which were produced during the 1940s. Brach also made a retractable aeroplane antenna during WWI. Patented carborundum lightning arrestor in 1911. Continued making lightning arrestors and insulators, etc., until as least 1946 as L.S. Brach; in 1951 listed as Division of General Bronze Corp., and in 1968 listing in Thomas Register says 'see JFD Electronics Co.' See "Old Familiar Strains," Vol. 2, No. 4/5, August, 1995. Brach also made the J-4, a spark practice set which looks essentially like a J-6 on a board.

Braun-Siemens-Halske (Gesellschaft fuer Drahtlose Telegraphie) *1901* Berlin, Germany...heavy handled keys. Complete sets to U.S. Navy. Merged in 1903 with Slaby-Arco to form Telefunken. No labeled examples.

British Admiralty Pattern *ca 1920-1930+* England...late, probably after CW, perhaps as backup to main CW rig. Several variations.

British Air Ministry *ca 1918* England...late, probably after CW. RAF No.1 Morse Key for Wireless. This key has a small bulb probably intended to allow the observer seated behind the pilot to copy transmissions. RCAF key no. 10A/556.

Brown, S.G. 1915- London, England...Flameproof key used in aeroplanes, with the mica disc on top under which sits a spark gap of sorts. Also made a very large 13" heavy spark key with triple crystal detector in rotary holder. Company still exists as gyro compass division of Vosper Thornycroft. Some keys marked "RAF" underneath. On April 1, 1918, the RAF was formed by union of the RFC (Royal Flying Corps) and the RNAS (Royal Naval Air Service). So no key marked "RAF" can have been made prior to that date.

Bunnell, J.H. *older landline co., but spark keys ~1915-1926+* New York...at least 7 different spark key models, including a "Cootie" type key. Small brass key with cutout corners. Small key on composite base. Similar key, but with push posts instead of screw down posts, different size contacts, and metal strips to posts on top of key. Key advertised as the "Jove Wireless Key." Straight Line Radio Key advertised 1919. Bunnell landline keys were extensively modified, some by adding contacts made out of dimes—these keys were nicknamed "dime keys." Other keys, such as Mascot Wireless Key with bronze lever arm and auxiliary copper strap, had larger silver contacts added to handle higher power. Heaviest of the Bunnell spark keys was on a long composite base.

Burlingame Telegraphing Typewriter Co. 1906 (*as Wireless Printing Telegraph Co*). San Francisco...wireless messages sent directly from typewriter keyboard to steamships. In business until at least 1910. See company stock certificates for picture.

Central Scientific Co. *ca 1917* company by same name now in Franklin Park, IL selling scientific equipment 'for over 100 yrs'...Boston pattern key shown in Hawkins Electrical Guide, USA 1917, with 10-50A capacity. See inside back cover MM47.

Chambers, F.B. 1912-1920s Philadelphia, PA...nickel-plated brass spark key, rotary gap, loose coupler. The Chambers key was a cross-shaped key on a marble base, and interestingly had a leaf spring and an intricate label.

Clapp-Eastham *maybe as early as ca 1910* Cambridge MA...The Boston Key and receivers, including early ¼-kW transmitter with beautiful wooden cabinet and external spark gap. Boston Key made on marble or composite base, range of contact sizes. Blitzen key (see Keyletter page 260), a smaller key on oval base and nearly identical to keys marketed also by Wallace and Bunnell. Repro of Boston Key by Indux Corp (K. Vanslette), Ormond Beach, FL.

Clark Wireless Telegraph Co. 1902 Detroit, MI...step lever wireless key, known only from photographs. Marble base.

Connecticut Tel. and Elect. Co. 1918 CT...See info under J.S. Brach. The J-5 was made for the low power BC15 aircraft spark rig, which was also made by Connecticut Tel. and Elect. Co.

“Cootie” Key *ca 1920* —...distributed by Young & McCombs of Rock Island, IL (incorporated 1910, sold general merchandise). But made by Bunnell, Tri-City and probably others also. The “Cootie” key is essentially a spark sideswiper, but what is the origin of the word “Cootie”?

Doron Brothers *1910-1915* Hamilton, OH...marble based spark key with heavy lever. Also built tuners, crystal detectors, wireless telegraph and telephone equipment, oscillation transformers, and spark gaps. Experimented with a Poulsen type arc transmitter. Operated 8ZU 5-kW spark transmitter. Made 100 wireless outfits for a large Chicago firm. Licensed in 1916 by Marconi Wireless Telegraph Co. to build and sell equipment under Marconi patents.

Dubilier *1912* London...small portable wireless set with large integral key. Wooden enclosure. Entire set weighed about 17 pounds. Also made electro-medical set.

Duck, Wm. B. and J.J. *1909- about 1920* Toledo, OH...small cross-shaped marble based key. Possible ties with RECO? Duck Overland Key available in 5-, 10-, and 20-ampere models. Fourteen different catalogs exist from J.J. and Wm. B. Duck from 1909 to 1920. No other Duck spark key models known.

Ducretet and Roger *1901-1919* Paris, France...both oil break flameproof keys for aircraft use and regular models. A drawing exists of the aircraft key with the spark transmitter from a 1914 French Army manual. See an excellent monograph by Neal McEwen. The very wide original knob skirt was dull reddish in color in rumored to have been made from ox blood. The lever has large holes along it, to decrease weight or to save brass. Also made an early mercury vacuum key known only from illustrations.

Eastern Precision Electric Company *1921* New York...advertised a key in *QST* in 1921. This key has bulky parts in a marble base. Wide lever arm, square blocky posts. Base is narrow in comparison to other marble base keys.

Economic Electric Limited *ca 1920* London, England...labeled ‘manipulating key,’ pictured in Economic catalogue circa 1920 pg. w-3.

Electrical Specialty Co *1921* Columbus, OH...1-kW Triumph style key. The station of the Electrical Specialty Company, call letters 8BYV, broadcast music, football scores, and other news at 7:30PM CST on 200 meters in Columbus as listed in Radio News March 1922 article by Armstrong Perry.

Electro Importing Co. (EICO) *1904-1915+* New York.....Electro Wireless Key on glass base. The Electro was advertised in the 1914 EICO catalog. The Electro was made in telegraph (No. 1117) and Wireless (No. 9212) versions. The wireless Electro was rated to 30-amperes and

sported 3/8" solid silver contacts and had an Opal Glass Base: cost in 1914 was \$1.75. An EICO strap key also was made. Hugo Gernsback President.

Elliott Electric Company (Radio Dept.) 1917 Shreveport, LA.....known only from ad in *QST*. Bakelite and brass, \$5. This company was the licensee in June, 1922 for radio station WAAG in Shreveport.

Electro-Set Co. 1916 Cleveland, OH...Advertised in *The Electrical Experimenter*. The Electro-Set Special Wireless Key. Cross-shaped key. It is similar to Wm. B. Duck and United Wireless cross-shaped keys, but is the only marble based spark key advertised with lantern style binding posts and cross frame.

Emilio Caimi ? Italy...One heavy key labeled with this name and 'tasto manipolatore' currently known. Size and shape reminiscent of Marconi 365A.

Erickson ? Stockholm, Sweden.....keys used aboard ship. Appearance similar to landline instruments by same manufacturer.

Etheric Wireless Mfg. Co. ca 1911 New York...the Etheric Key and strap keys. Possibly succeeded by Independent Wireless.

Federal Tel. Co. 1909-1920 Palo Alto, CA...mostly arc sets and keys, but also a few spark keys. It is common to mistake keys used with arc transmitters as spark keys. Type 496, with San Francisco label. CT-1576 key with circuit switch. Federal made a flameproof similar to SE-86 and SE-144.

French Army (supplied by ?) ? France...French army spark key with 8mm contacts.

A.W. Gamage Ltd. 1913 London, England...Wireless Key Type 1914. Also a G.P.O. pattern wireless key.

General Radio Co. 1915 Cambridge, MA...heavy duty combination spark key and relay called CAG 457 which was part of the CL342 (Lowenstein, 150-1000kc. 8 frequency rig used on naval vessels) 2-kW set and CL344 2-kW Quenched gap set (1918). Type No. 151 flameproof aircraft key (10-amp) that looks like J-5 but isn't. Also model with cooling fins on both upper and lower contacts. CAG 468 combined hand and relay key that along with CL462 was part of CL345 (1917). Unusual asymmetric designed key also, with lever off to one side.

Gilbert, A.C. ca 1917 New Haven, CT...Gilbert Wireless Telegraph Outfit, a youngsters teaching outfit that probably had a range of no more than a hundred feet or so. Integral strap key.

Gray 1910 England...Gray Magnetic Relay Key, really a spark arrestor of sorts. Used with Guillotine key to decrease sparking. Part of typical Marconi setup ca. 1910. See W.W. Bradfield.

Halcun Radio Co., Inc. 1919 San Francisco, CA...Halcun Commercial Type Transmitting Key, rated at 50-amperes. Cross-shaped leg key. Standard finish, polished copper. Also available on marble base.

Independent Wireless Telegraph Co., Inc. ca 1926 New York...Type K-1 2-kW Hand Key, 120V, 10A, 500 cycles. Labeled keys on slate base with heavy contacts and parts. Also made Panel Radio Transmitter type B-1 (300-600 meters). Logbook 'Instructions to Operators' by same company. Also was an operating company. An Independent Wireless lawsuit against RCA is still cited as a precedent in patent law cases—Independent Wireless Telegraph Co. v. RCA, 269 U.S. 459, 466-67 (1926). Possibly succeeded Etheric.

International Radio Telegraph Co. ca 1920 Pittsburgh, PA...succeeded NESCO, see below, and eventually bought by Westinghouse. Flame Proof Key and Winker Type C.Q. 1140 probably made for use with the CQ 1115 200-Watt and the CQ 1111 500-Watt transmitters (also known as SE-1300 and SE-1310 when assembled as complete outfits) that were used in flying boats—naval aircraft. Keyed synchronous spark type equipment powered by a wind driven generator mounted on the wing of a plane. C.Q. 1115 also supplied to the Army Signal Corps. Two keys were used, with the second key referred to as the 'observer's key' presumably mounted in front of the observer seated behind the pilot. See Robison's Manual of Radio-Telegraphy and Telephony, 6th Revision, 1924, page 546.

International Wireless Signal Co. 1912 NJ...The 'Inwesco Universal Sending Key.' On a marble base and has a seven inch lever. Sold for \$6.50.

Kilbourne & Clark 1901-1920+ Seattle, WA...SE-68. Another maker of cross-shaped keys. Another that looks like the Lowenstein Radio SE-923. A bakelite based key with a slender lever, and a brass key with a strongly downturned lever. A smaller key, the SE-1865. Edward Corliss Kilbourne lived to be over 100 years old.

Leach Relay Co. 1919- San Francisco, CA...Made a "Cootie" key, see The Radio Trade Directory, May 1925. Made spark relays. Later made the Speedoplex bugs in the 1920s or 1930s. Company still exists as Leach International and makes a full line of relays and switching products. Val Leach, who was a radio operator in WWI and founded the company, died in 1941. The company moved to Los Angeles in 1929.

Lehmkuhl 1926 Oslo, Norway...Large key labeled with 'Lehmkuhl' and a log 'L'. Finned contacts. One has complete nameplate reading: "ingenior j. lehmkuhl, nr 962 oslo." Still existed as part of Lehmkuhl Radio Systemer in Norway as recently as 1986. Also made a model identical to the one without the nameplate, but completely without identifying markings. Lehmkuhl also made tube radio receivers in 1926.

Liberty Electric Corp. 1916 Port Chester, NY...Made at least two models for BuSE, the SE-68A and SE-988. Also made a triumph style key, possibly for landline.

Lowenstein Radio Co. 1918 Brooklyn, NY...SE-923. SE-68. Fritz Lowenstein, an Austrian immigrant is credited with the wave changer, a tubular quenched gap, and the 'C' battery. Hand Key CL462 was part of the CL342 2-kW set (along with CAG 457). Hand Key CL830 along with relay key CL419 was part of CL343 10-kW Quenched gap set (1917) and CL344 2-kW Quenched gap set. Lowenstein Type A key, with rear pivot, see *CQ*, Mar. '99, p. 43. See *The AWA Review*, Vol. 9, 1995, p. 205.

M.A.E.S. ca 1915? Trevoux, Ain, France...Ebonite base, heavy levered key with large contacts and French style wide knob skirt. See MM56 February 1998, p. 32.

Mach'y Div. Boston Navy Yard before 1915 Boston, MA...SE-68A, one of the most common of the larger spark keys found today. SE-144 Flameproof Hand Key for 1-, 2-, and 5-kW submarine radio transmitters. SE-86 (superceded by the SE-653) ½-kW Flameproof Hand Key made for submarine transmitters. SE-137 2- and 5-kW relay keys.

Marconi's Wireless Telegraph Company of America 1899-1919, Aldene NJ plant starts 1912 NY and NY...Many models. CM425 along with CM408 and CM428 relay keys was part of a 2-kW quenched gap set (CM306 used in air stations, CM307 used in battleships, destroyers, tenders, and auxiliaries, CM309); 5-kW Signal Corps 1917 like the SE-179; 5-kW Navy Dept. SE-179 Navy Dept.; SE-482; Roadmap keys. The Roadmap key was probably made at the Aldene, NJ plant and is shown in a 1912 catalog. It was designed as an inexpensive key for the experimenter, in 15-amp and 30-amp ratings. There are at least 2 different variations on the Roadmap key, so named for the copper straps on top connecting to the binding posts. SE-68. Type A No. 217 (like United Wireless, 4-kW); No. 205 2-kW key that cost \$2.00 by catalog; other models without ID exist. At least 2 Weingarten repros. Succeeded by RCA. SE-86 which was part of the CM98 ½-kW Motor Boat Set with gasoline engine drive, and part of CM296A ½-kW quenched gap panel set. The CM86 key was used in the CM296 ½-kW quenched gap panel set. 'Aeroplane' set key CM394 to go in CM295. Relay key CM409 and hand key CM410 to go in 5-kW set CM297, CM298, CM299 and CM301. Hand key CM420 which was part of 10-kW set CM304 (95-400 kc rig on eight frequencies for use in battleships). Lots of related ephemera, e.g. catalog, Service News booklet, Marconigrams, etc. See *AWA Review*, Vol. 9, 1995, p. 7.

Marconi's Wireless Telegraph Co., Limited, London 1897 Chelmsford, England...many models, most with no label or ID. Grasshopper

key, which is U.S. patent no. 650,109 filed Oct 12, 1899. Guillotine key. See Hawkhead and Dowsett, Handbook of Technical Instruction for Wireless Telegraphists, Wireless Press Limited (Marconi House, Strand, W.C.), London, 1915, pp. 145-147. Type 365A key was probably made after the spark era, and was likely intended for use on CW. However, it is commonly seen in vintage photographs in the operating position in front of quenched gap transmitters and was probably used to key auxiliary spark rigs aboard ship in the 1930s. Type 100 key, a smaller key on wood base. A rear pivot key was also made with provisions for normally open or closed contacts. Keys with recessed upper surface of the lever. A model with captive round ball to complete the contact. The ball was self-centering.

Marconi Wireless Telegraph Co. of Canada, Limited 1902-1920 Montreal, Quebec...Operating company only until 1912. Type 705 key. Type 702 key with fancy label. Type 701, probably others.

Massachusetts Wireless Equipment Company 1908 MA...Odd looking 'mercury vacuum key;' a relay key; and the 'back stroke' key that looks like about half of a landline key.

Massie 1905-1909 Providence, RI...Operating company and manufacturer. Large pump handle key, one of the largest of the large. Unfortunately, probably more Weingarten repros than originals. An oil break key on a table with the contacts located underneath. Slate based key with long slender lever arm. Key and solenoid on wooden base. Also a wireless key that is similar to landline keys in most respects. See nice picture of three Massie keys in *Wireless Telegraphy and Telephony* by Massie and Underhill, 1908.

McIntosh Electrical Corp. *probably about 1922 for keys* Chicago, IL...Bent trunnion on a brown marble base with label. Others, made by McIntosh but possibly later and not necessarily even wireless, with similar construction on an ugly composite base, with mounting screws and obviously belong to a larger piece of equipment, unlabeled except for '2250-L-4' on the bottom. Also made quack medical equipment such as the Electrical Belt and the Sinustat, a device to treat sinus problems with small electric jolts. Apparently split from parent company McIntosh Battery and Optical Corp. The McIntosh Electrical Belt was advertised for \$10 by its designer Dr. L.D. McIntosh.

Manhattan Electric Supply Co. *ca 1910 for spark keys, probably* New York...Mesco Hand Radio Key with replaceable contacts, rated at ½-kW (a fancy triumph key look alike). Mesco Jr. Wireless key and the #51 key, all small keys. The "Heavy Wireless Key" List No. 442, 1-kW to 3-kW capacity listed in the 1912 Mesco catalog. CAM-805 and CAM-1189 which were part of the SE-1075 1-kW 500-cycle transmitter (315-1000 kc six frequency rig for use in submarine chasers) made by International Radio Tel.Co. An off-centered heavy sending key in

1916, 15-amps 100-volts for \$10. No reason given for why the lever is off-center.

Murdock, Wm. J. *founded 1896, keys ca 1910* Chelsea, MA...only one model of key, on marble base with ¼" contacts. Base in at least gray and green. Also a strap key for spark use. This company produced headphones and other radio gear up to the 1980s.

Nanao Musen Denki ? Japan...probably other Japanese manufacturers also. Glass based key with heavy British style influence. Distinctive binding posts.

National Electric Signaling Co. *1902* Philadelphia, PA...A Fessenden company. The Fessenden heavy radio key. Also arc keys. aka NESCO.

National Electric Supply Co. *1899* Washington D.C...supplied keys to signal corps mainly as part of airplane and field sets. See *AWA Review* No. 8, pg. 117. Unfortunately, sometimes also referred to as NESCO and confused with Signaling Co.

Nichols Electric Co. *1914* New York...the "Nichols Low Price Wireless Key." Sold for 70 cents by catalog. Looks like a Beeko key on base. Key just above it in catalog is clearly a Bunnell key. The "Nichols Low Price Wireless Key" may have been made by Bunnell and marketed by Nichols under its own name.

Pericaud, G. *ca 1915* Paris, France...wooden based key with brass parts. Company also made receivers, detectors, etc.

Radiguet and Massiot *1918* Paris, France...Type 4A, the key from the French portable set Model RM 1918. Like U.S. Signal Corps J-3, the front portion of the key is hinged and can be turned around at right angles so as to be out of the way when cover of box is closed.

Radio Engineering Co. (RECO) *probably before 1920* Baltimore, MD...at least two models of spark key. Boston pattern key.

Robertson Clock and Instrument Co. *1921* Detroit, MI...oil break key. John H. Robertson, manufacturer of "special radio apparatus," died October 15, 1946 at age 46.

Russell and Stoll *ca 1920s* New York...one model with thick black base and topside parts reminiscent of Bunnell.

Rouzet *1912* France...key used in airplanes with Rouzet spark transmitter system. Unlabeled key with chrome plated parts on composite base. In 1912, Lucien Rouzet produce a lightweight transmitter which was purchased by Naval and Military services. See MM28, June 1993.

Shoemaker, Harry *1901* while working at de Forest, Consolidated Wireless Co., and others...relay keys, modified Greeley Victor key. Designed radio controlled torpedo.

Signal Electric Mfg. Co. *ca 1916 to postwar* Menominee, MI...common small brass keys with mica (Isinglass) underneath. Distributed by numerous companies. Heavily advertised in *QST*.

Simon, Emil J. 1918 New York...pack set and collapsible key. Could be CW.

Slaby-Arco (Allgemeine Electrizitats-Gesellschaft) ca 1900 Berlin, Germany...early competitor for U.S. Navy contracts. Key with distinctive vertical handle, similar to drawing in Robison. Also made Ruhmkorff coil with key enclosed in same box and attached. Many field station/portable designs mostly using same key with tall handle.

Sperry Gyroscope Company 1916 New York...CS491 relay key for CS103 ½-kW Motor Boat Set and ½-kW aeroplane set with aerial and reel (1916).

Stone Telegraph and Telephone Co. 1902 Maine...early oil break designed by G.H. Clark; relay key; modification of landline key for wireless.

Telefunken 1903 Germany...name only occasionally appears on spark keys. One model, the H.T.3 known to have been used on submarines. Company continued to make keys into the 1960s. In Australia, Telefunken and Marconi interests consolidated into Amalgamated Wireless Australasia (AWA) about 1913. AWA made keys, but a clear example of an AWA spark key has yet to surface.

Tower Scientific ? Boston, MA...A huge key. One example at NE Steam and Wireless Museum. Also made economy headsets as late as 1927.

Tri-City Radio Labs ca 1915-1921 Rock Island, IL...Cootie key. Managed by R.K. Karlowa of Davenport, IA.

United Wireless 1906-1912 NY, and Seattle, WA...succeeded by Marconi. Inherited cross-shaped key design from de Forest, whom they succeeded. Very large operating company. Most keys not labeled. Many leg keys, others on marble base. Relay keys.

V.L. ? France...French Navy oil break key on wooden base. Only markings are "V.L." and sparks.

Washington Navy Yard 1914 diaphragm key made by Radio Test Shop (Bu.S.E.). Navy Yard also made the SE-59 combined buzzer and blinker practice set, and the SE-69 buzzer practice set.

Wireless Improvement Co. 1914 combined relay and hand key, 5-kW rating. In Navy testing, this key beat the Lowenstein version, but was bested by WSA Co.

Wireless Specialty Apparatus Company 1907-1919 Boston, MA...succeeded by United Fruit Co. Q-S-5004, Q-S-505, SE-68A, SE-653. 2 -kW Aux. Hand Sending Key, 1-kW Flameproof Type NS 1917, CP-675 designed by Cutting and Washington. Relay key Q-S-5003 and others. Light hand key type Q-S-504 for up to 6-amps. SE 137B relay key. See *Old Timer's Bulletin*, May, 2000, p. 52. Pack sets. Boston pattern key.