

The Wireless Specialty Apparatus Silicon Detector, by John Staples, W6BM (2019)

— Archivist's Note by Bart Lee, K6VK.

“... Greenleaf Whittier Pickard, invented a complete wireless receiving system (a “crystal set” that was tunable) in August, 1906, using silicon alone and what came to be known as the “cat’s whisker” interface. His patent ... appears [nearby]. Pickard’s patent is number 836581 dated November 20, 1906, filed August 30, 1906. It employs silicon and what came to be called a “cat’s whisker” contact with the silicon. Pickard claimed silicon as a wireless detector that did not require a bias voltage with the inconveniences of batteries and the like. His circuit isolates the detector and its tuning from stray capacitance and body proximity effects.”

(Extracted from: *How Dunwoody’s Chunk of ‘Coal’ Saved both de Forest and Marconi* Bart Lee, 22 AWA Review 1 (2009); General HHC Dunwoody discovered the detecting and rectifying properties of carborundum a little before Pickard settled on silicon. In the 1890s Chandra Bose in India used galena and also mercury for detection of Hertzian waves).

The wiki says:

“Greenleaf Whittier Pickard (February 14, 1877, Portland, Maine – January 8, 1956, Newton, Massachusetts) was a United States radio pioneer. Pickard was a researcher in the early days of wireless. While not the earliest discoverer of the rectifying properties of contact between certain solid materials, he was largely responsible and most famous for the development of the crystal detector, the earliest type of diode detector. The crystal detector was the central component in many early radio receivers from around 1906 until about 1920. Pickard also experimented with antennas, radio wave propagation and noise suppression. On August 30, 1906 he filed a patent for a silicon crystal detector, which was granted on November 20, 1906.***

“On June 21, 1911 he filed a patent on a crystal detector incorporating a springy low inertia wire of about 24 gauge formed with a loop or helix and pointed to make contact with the crystal. Crystal detectors incorporating this construction would become the most widely used and popularly known by the term cat whisker detector. This patent was granted on July 21, 1914. *** Pickard was president of the Institute of Radio Engineers in 1913.

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“[The silicon “crystal detector” was] [p]atented and first manufactured in 1906 by Pickard, this was the first type of crystal detector to be commercially produced. Silicon required more pressure than the cat whisker contact, although not as much as carborundum. A flat piece of silicon was embedded in fusible alloy in a metal cup, and a metal point,

usually brass or gold, was pressed against it with a spring. The surface of the silicon was usually ground flat and polished. Silicon was also used with antimony and arsenic contacts. The silicon detector had some of the same advantages as carborundum; its firm contact could not be jarred loose by vibration, so it was used in commercial and military radiotelegraphy stations." [Notes Omitted].

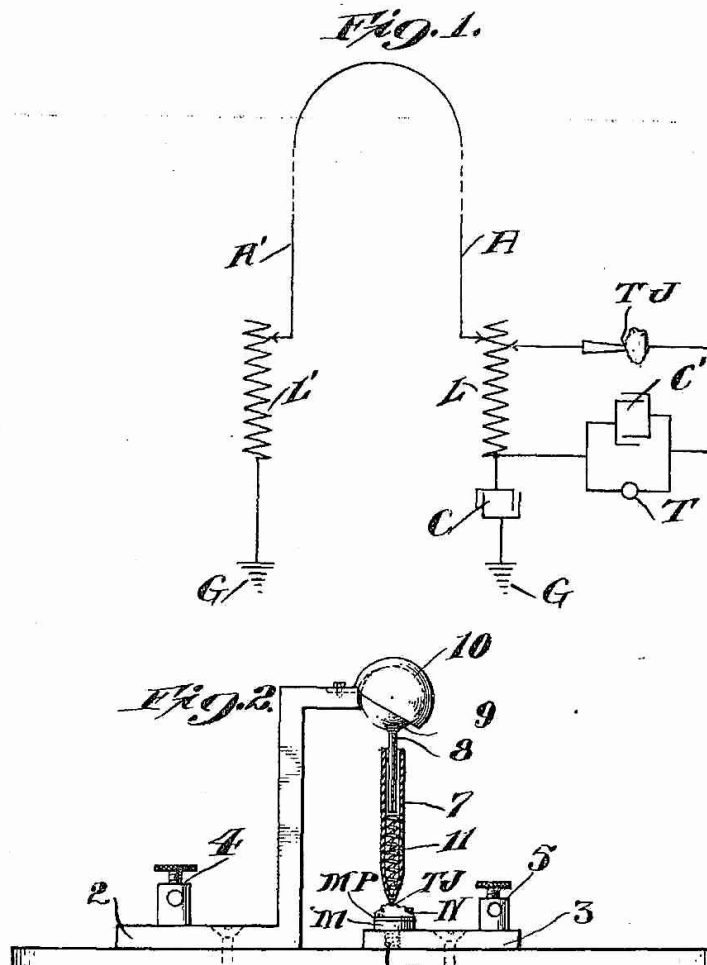
No. 836,531.

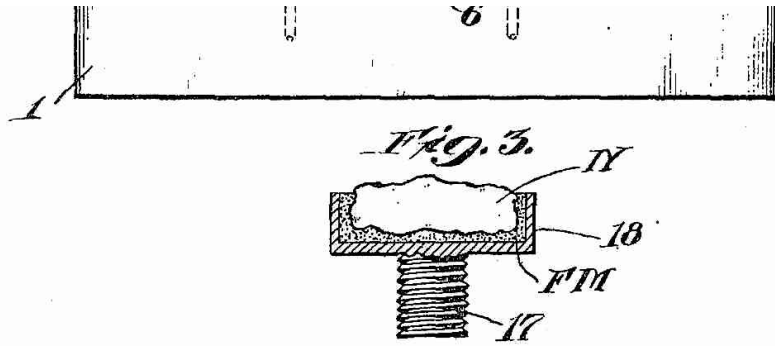
PATENTED NOV. 20, 1906.

G. W. PICKARD.

MEANS FOR RECEIVING INTELLIGENCE COMMUNICATED BY ELECTRIC WAVES.

APPLICATION FILED AUG. 30, 1906.





Attest:
James C. Sands
J. Sawills Meyers

Inventor:
Greenleaf Whittier Pickard
by *Philip Farnsworth Atty*

A wiki image of Picard appears below with its caption (partial):



Radio pioneer G.W. Pickard in his Boston laboratory

Born February 14, 1877
Died January 8, 1956 (aged 78)
Awards IEEE Medal of Honor (1926)
Scientific career Fields Electrical engineering

According to the IT History Society:

“The Wireless Specialty Apparatus Company in Boston was a major manufacturer of commercial and military radio equipment from 1907 until sometime in the 1920's when it was absorbed into the RCA conglomerate. Former AT&T engineer, Greenleaf W. Pickard and two associates founded the Wireless Specialty Apparatus Company to market crystal radio detectors in 1907. The company produced radio receivers for the Navy in 1908. In 1921, at which time it was owned by the United Fruit Company, the company was investigated by the government along with GE, RCA, and others for monopolistic trade practices related to radio apparatus.”

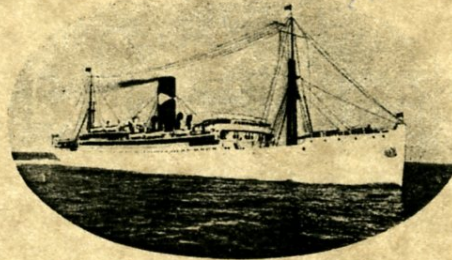
(<https://www.ithistory.org/db/companies/wireless-specialty-apparatus-company>).

An image of the cover of the the Wireless Specialty Apparatus Company catalog follows:

RADIO TELEGRAPH *and* TELEPHONE EQUIPMENT

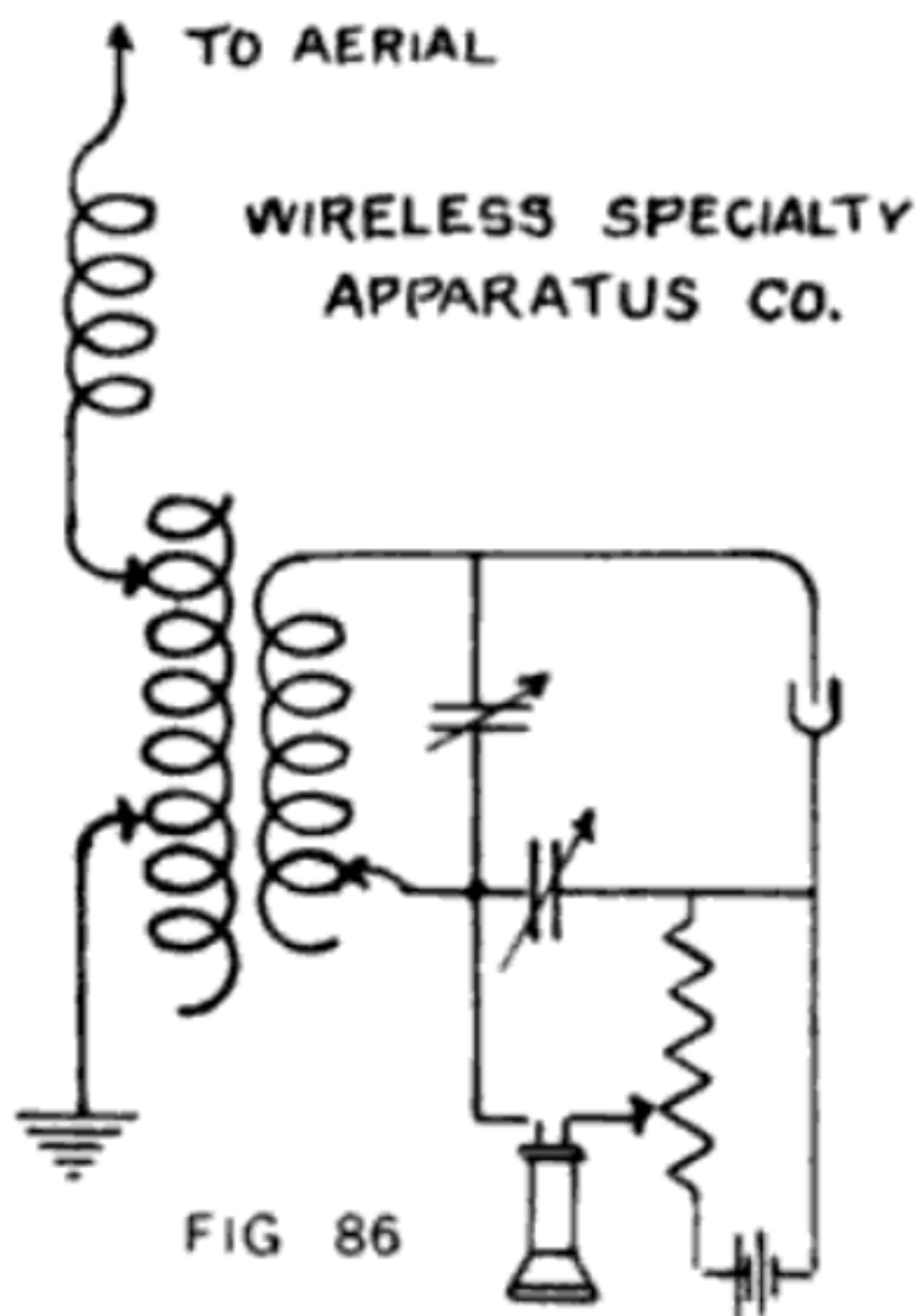
DESIGNED FOR

COMMERCIAL SHIP AND SHORE STATIONS
MILITARY INSTALLATIONS
PLEASURE YACHTS AND CRUISER AUXILIARIES
SCHOOLS AND COLLEGES
PRIVATELY-OWNED RESEARCH AND
EXPERIMENTAL STATIONS



United Fruit Company's Steamship *Pastores*

WIRELESS SPECIALTY APPARATUS COMPANY
ENGINEERS, DESIGNERS, AND MANUFACTURERS
BOSTON, MASS., U.S.A.



The crystal detector John Staples has examined and tested performed well even after a century. Wireless Specialty Apparatus Company made and sold these silicon detectors as “private label” items for at least three companies. The simple circuit above shows it employed with a variable bias voltage (from S.S. Robison, Manual of wireless telegraphy [etc.], US Naval Institute, 3d ed., 1915, fig. 86 at page 133). WSA made its silicon detector available to the industry, including the Ship Owners Radio Service, as a private label wireless detector. Hence the SORSINC trademark of the Ship Owners Radio Service, Inc. Sorsinc says of itself:

“Ship Owners’ derives its name from the fact that it was organized for the purpose of maintaining and repairing the radio equipment aboard vessels of the U.S. Shipping Board and private steamship lines.”

(Ad in Popular Science, Jan. 1922, at p. 103). It says of its detector:

"SORSINC" CRYSTAL DETECTOR.. \$2.50

“The Sorsinc Crystal Detector is sold for amateur, experimental amateur entertainment use. This detector represents careful design and manufacture and incorporates a ball-joint arm. The spring tension is carefully adjusted and the crystal is guaranteed to be super-sensitive and dependable. Manufactured and licensed by the Wireless Speciality Apparatus Co.”

(Ad in Radio, July, 1922, at p. 76; in 2019 money, \$2.50 is about \$25; it was dependable because the spring maintained tension holding the “cat’s whisker” to the surface of the silicon). The actual licensing text on the detector reads:

“Licensed for amateur experimental or entertainment purposes only. Any other use will constitute infringement.”

The difference in emphasis may result from a demand for crystal detectors for home entertainment radios by 1922, the beginning of the radio fad. Any manufacture of home radios (and many sprang up) would have to get a commercial license as would any marine user. SORS itself, in 1919, manned about 60 ships’ marine radio operations, about the same number as RCA (xMarconi; data from the Radio Service Bulletin, Dept. of Commerce, 1919).

[de Bart Lee, CHRS Archivist, 29 XI '19] ##