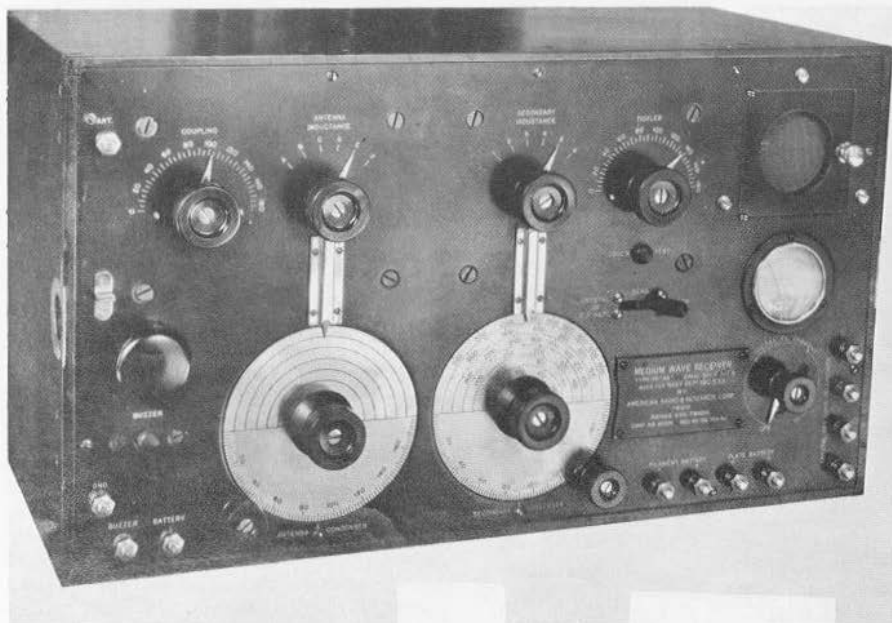




The Collector's Choice THE SE-1420/IP-501 RECEIVER



The most popular Navy version: The SE-1420C. The original version had a bridging condenser knob switch where the engraved nameplate is mounted (lower right).

Many advanced collectors feel every collection should have a Crosley Pup, a Philco cathedral, an AK breadboard, maybe a Scott or Leutz -- and to round off the collection, the most popular of early commercial receivers: an IP-501/501A/SE-1420. The latter are all about the same with slight variations.

First, let us read how former RCA historian George Clark described the receiver 40 years ago:

TYPE IP 501A Designed by Bu. of Steam Engineering. Manufactured by Wireless Specialty Apparatus Co. for Radio Corporation of America." So reads the nameplate on one of the last of a remarkable series of radio receivers about which there is a most interesting history.

This particular receiver was intended for commercial service, as its name clearly indicates. However, it had a Naval origin, and the Company that made it had long experience in receiver design and manufacture.

The complete story behind this model takes us back to the early days of the wireless art. In 1907, the Wireless Specialty Apparatus Company, of Boston, Mass., made, among other specialties, an efficient, compact receiver designed by Professor G. W. Pickard. It was marketed under the designation "I-P-76, 1907 type."

The prefix "I-P", soon changed to "IP" by popular re-christening, was the identification mark for all Wireless Specialty products of those days. For example, there was the I-P-200 silicon detector and the I-P-306 audibility meter. The designation "76" was given to all receivers. Redesign took place every year, culminating in the "double-decker," a short- and long-wave receiver of an upper- and lower-berth form, in 1914.

The chief features of the Wireless Specialty design were a units-and-tens switch on the primary, and the so-called "untuned" secondary of the tuning system.

The former provided a means of cutting in one turn at a time on the units switch or ten turns at a time on the tens switch. The latter was an inductively-coupled secondary coil of fine wire, closely wound and hence with considerable distributed capacity, with a 5-point switch to cut in 20 turns or more per contact. This "tuned" the circuit by varying the natural period of the coil section in use.

The next series of developments belong to the Navy Department, Washington, where the writer, as the first Radio Aide of the Navy, began the design of new receivers for Navy service.

These models employed capacitive coupling of the so-called "Cohen" type, and were characterized by dials pre-calibrated in wavelengths, by bank-wound coils of litzendraht wire, and by heavy copper leads, covered with spaghetti, for all fixed inductors. This last was intended to prevent breakage due to vibration.

When the "Type Number" system of nomenclature was introduced in the Navy during the year 1915, receivers were given a different form of designation. This consisted of a series number, "the next number in line," preceded by two letters

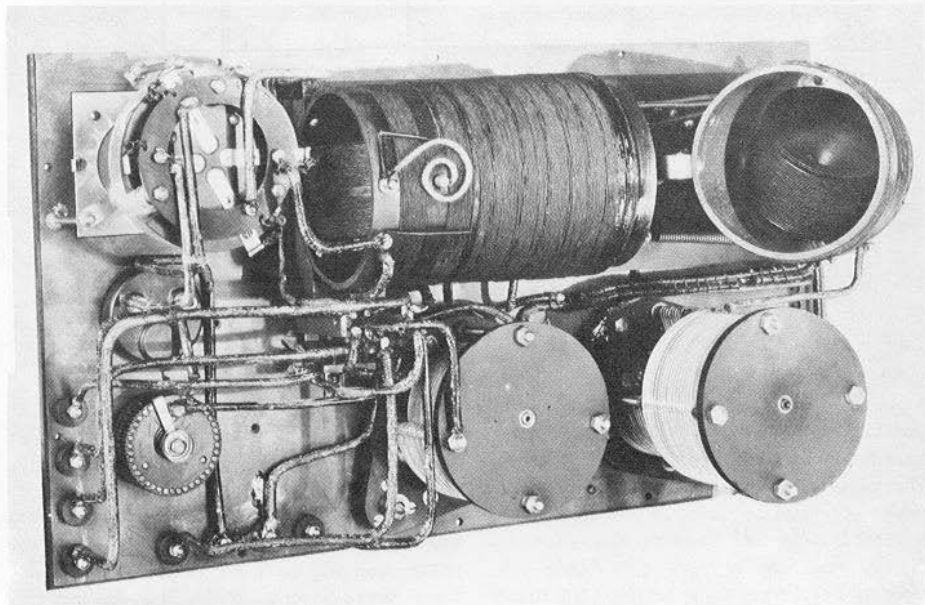
and followed, where necessary, by an alteration letter.

The preceding letters were SE when the design was of Navy origin, or C, followed by the company letter, when the work was done by one of the civilian manufacturers. For example, the CM 294 was a product of the Marconi Company.

The designs of the IP series followed the earlier standard, with modifications as the art advanced and as other engineers brought new ideas into the Naval service. The coupling, in time, changed to combined static and magnetic — some remarkable results were attained by the correct use of this dual arrangement — and later was made magnetic only.

Better shielding and different forms of feed-back appeared as new designs were added to the Navy list. Also, in time, special forms for use in aircraft were produced. As these newer types succeeded each other in service, the writer had less and less to do with the actual work, his duties having become more administrative. SE 143 was the last of his own design.

One of the subsequent series of Navy-designed receivers was SE 1420, in which the impress of Radio Aides Priess and



Rear view of the SE-1420C. The hole to the right of the rheostat was the location of the condenser switch.

Lester Jones was very evident. That was a medium-wave receiver, with a range of 250 to 6,800 meters. It contained a built-in audion detector with inductive feedback or "tickler," to use a name of the writer's coinage, and a two-step amplifier.

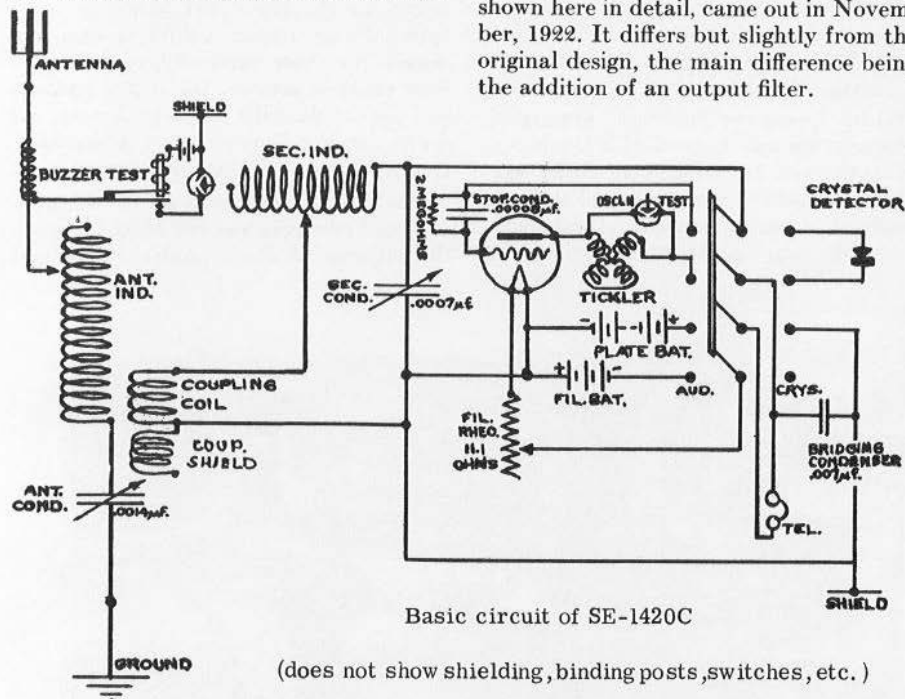
This receiver had greater sensitivity and selectivity, and less bulk and cost than its predecessor, the type 143. It was thoroughly shielded against external interference and undesirable interactions in the receiver itself. It was characterized by the Navy, in an official publication, as "the best receiver for general radio reception that the Service, and probably the world, has ever seen."

This well-designed model was manufactured, in general, by commercial concerns to whom the detailed blueprints and

built sets, and at the same time their experts received a little additional education in this class of work.

That the Company appreciated the worth of the design, and concurred in the Navy's opinion of it, is shown by the fact that directly after World War I they redesigned the receiver slightly, as by adding binding posts and links in the primary, secondary, and tickler circuits for the possible insertion of loading coils, and offered the modified set for sale commercially as type IP 501. It was first advertised in a Wireless Specialty catalog dated 1919, and later appeared in the RCA catalog "Radio Enters the Home" in 1922. The price quoted there was \$550.

RCA used it for some years particularly for marine service. The "A" modification, shown here in detail, came out in November, 1922. It differs but slightly from the original design, the main difference being the addition of an output filter.



specifications were furnished by the Navy. One of these firms was the Wireless Specialty Apparatus Company, which built several hundred of these receivers for the Navy, and did a very creditable job. Having been receiver specialists for many years, they were in a good position to translate the Navy's design into well-

According to the catalog description, the 501 type consisted of a two-circuit, inductively-coupled receiver with primary and secondary circuits shielded from one another by heavy sheet copper boxes. The range was 250 to 8,000 meters. The coils were bank-wound with high-frequency wire, as the illustrations show. Condensers were of the balanced-rotor type, with

heavy Bakelite discs for end plates. Var-nished cambric tubing covered the heavy, rigid copper connecting wires. Tuning dials on the condensers were calibrated in 180 divisions on one half. The other half carried six semicircles, correspond-ing to the six positions of the switch-actuated pointers. They were used for hand calibration.

The foregoing is as descriptive of the SE 1420 as of its grandchild.

Although dated today in its appearance, this set is by no means a worthless relic. One of these has been in use by the writer up to recent years, and it gave as good service as when it was in its prime. While it does not measure up to current designs for specialized applications, the difference in efficiency, for the same class of service and frequency coverage, is not as marked as its great age might imply.

So much for George Clark's comments of 40 years ago. Let us look at it today.

The U. S. Navy version (SE-1420) was designed in 1918, an off-shoot of the SE-143 (IP-500), but not placed in full production until the following year. An equipment release shows the following companies manufactured the SE-1420 for the Navy:

Wireless Speciality Apparatus Co. - 400 sets
Sperry Gyroscope Co. - 300 sets
American Radio & Research Corp. - 400 sets
Quantities by W. S. A. under the IP-501 (A) label is not available.

The U. S. Navy Instructional Manual print-ed in 1919 (approved by Horle and Eaton of vacuum tube fame) recommends the use of these tubes: SE-1444 (Moorhead), CW-933 (W. E. Type "J") or a CG-890 (G. E. Type "G"). The more popular UV-201 (A) was used in the 20's.

Filament voltage was set by a rheostat to the proper current (amperes) by a meter on the panel. 30 to 45 volts was used on the plate. An interesting feature of these early receivers was the operator could switch to a crystal detector in event of tube or battery failure.

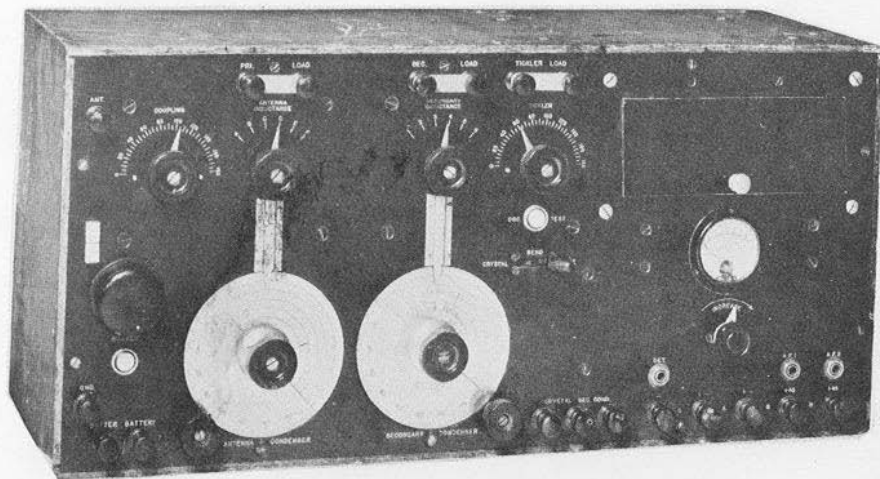
The original version had a range of 235 to 7500 meters. This was subsequently changed to 250 to 8000 meters. Loading coils would in-crease the wavelength to 21,000 meters.

The Navy made several modifications on the original design. Collectors will find the SE-1420, 1420C, 1420D, 1420E and 1420F are almost identical in construction with these ex-ceptions:

SE-1420C - the SE-1420 with a fixed capacity bridging condenser.

SE-1420E - same as the 1420C with additional

(Continued on next page)



The last version of the series: The IP-501 A which saw commercial service well into the 30's. This set differs from the earlier models in that it has two stages of audio.

“crystal” binding posts and two sets of detector battery binding posts in parallel having no connections to the receiver circuits.

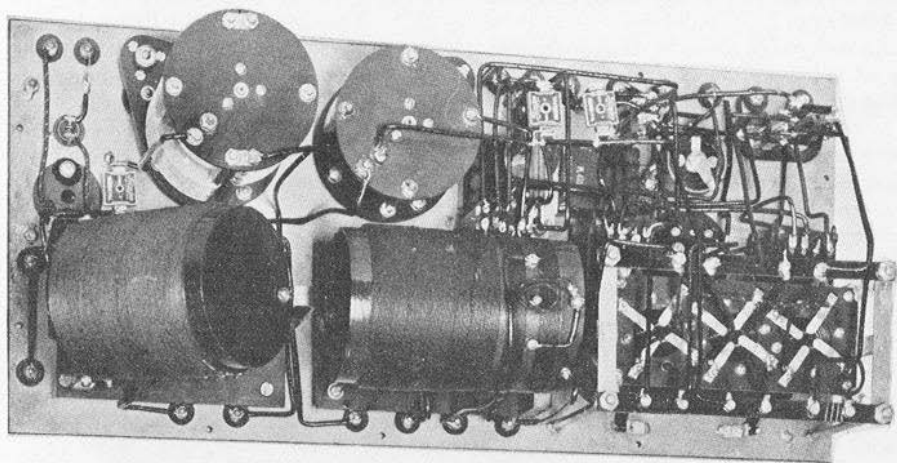
SE-1420F – same as the 1420C but with adjustable bridging condenser switch.

SE-1420D – same as 1420E but with adjustable bridging condenser.

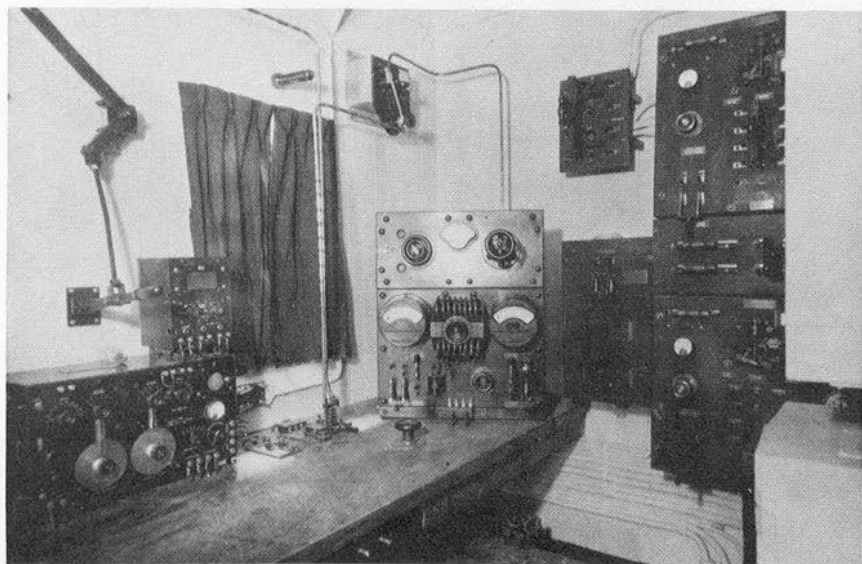
The bridging condenser switch is the adjustable knob located to the left of the rheostat which allows the operator to select various by-

pass capacities around the headphones. It was eventually replaced with a fixed condenser of .007 mfd.

The non-military version (IP-501) was released by W. S. A. shortly after the War (1919). The IP-501 A, released in early 1922, had two additional stages of audio. Prior to this, it was necessary to have an out-board audio amplifier as noted in the *SS AMERICAN LEGION* radio room.



Rear view of the IP-501 A. Note the panel is shielded. Both primary and secondary coils are banked wound with Litz wire. The three tube sockets are at the far left.



The radio room of the *SS AMERICAN LEGION* in the early 20's. Note the IP-501 at left with 2-stage audio amplifier mounted on top. The transmitter is a ½ kw. 500 cycle quench gap set made by E. Simon of New York. (Photo from W4ZB/W4ACG)