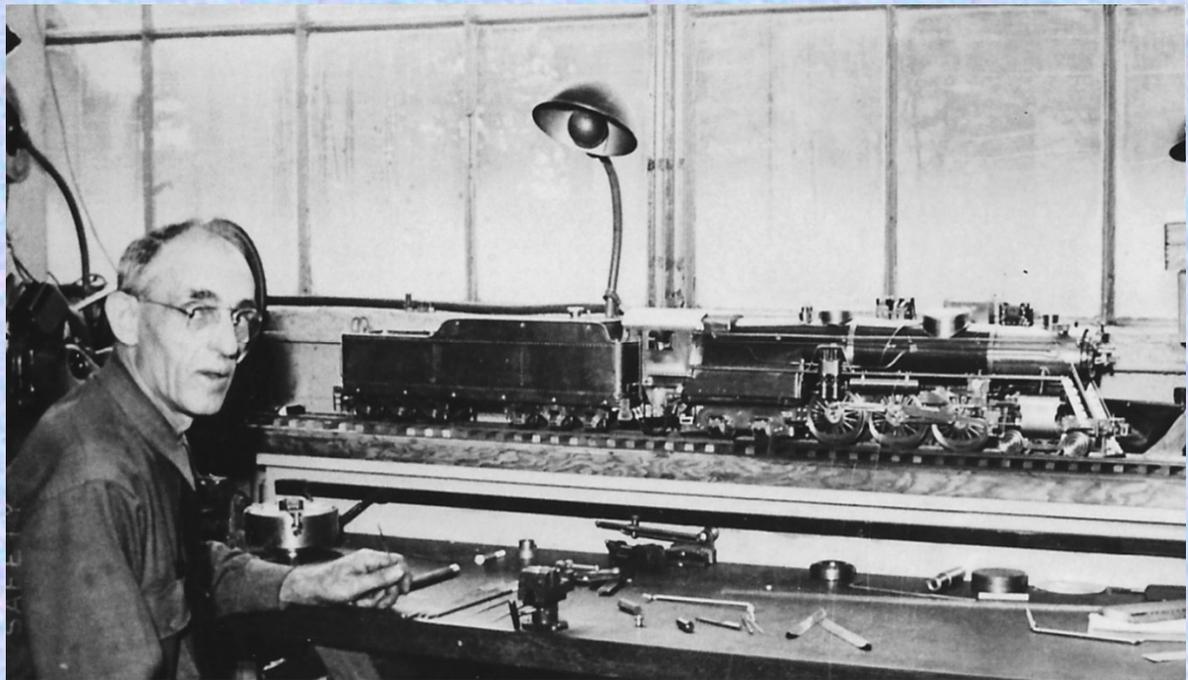


NORCO RADIOS
NORTHWESTERN RADIO
MANUFACTURING CO.



Dan Howard and Richard Howard
Northwest Vintage Radio Society
2026

NORCO RADIOS
NORTHWESTERN RADIO
MANUFACTURING CO.

***Dan Howard &
Richard Howard***



NORTHWESTERN RADIO MANUFACTURING CO.

1556 EAST TAYLOR STREET

PORTLAND, OREGON

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Northwest Vintage Radio Society (NWVRS)
Portland Oregon

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On the cover: Charlie Austin with his Hudson locomotive.

Purpose

NORCO Radios presents the history of Portland's Northwestern Radio Manufacturing Company and its radio production during the 1920's. Company owner Charles¹ Austin's career is an integral part of the story.

We are eager to revisit this subject and expand our report as more information becomes available. Please don't hesitate to share pictures and help us fill-in missing NORCO information.

Synopsis

Starting as a sole proprietorship in 1920, The Northwestern Radio Manufacturing Company was in the radio business in Portland, Oregon from 1920 through 1930. They manufactured radio components and battery-operated radios from 1920-1927.

Following the Company History section (pages 2-20), an illustrated Product Compendium, (pages 23-96), shows the company's products.

On page 22, Northwestern and NORCO logos are illustrated. A table of dates and company locations appears on page 21.

Appendices (starting on page 97) cover related topics including the Northwestern broadcasting station and the Hawley / Benson High School stations.

Acknowledgements

The following have provided key assistance with this project:

- The writings of NWVRS members Craig Adams and Ron Kramer and NWVRS charter member Art Redman, provided a great foundation for this project.
- NWVRS member Sonny Clutter allowed us to use his photos and his reproduction of the Northwestern Radio Manufacturing Company catalog.
- The Oregon Historical Society Research Library
- Portland Public Schools Archives
- Benson Polytechnic High School KBPS broadcasting instructor Jacob Patterson, KBPS operations station manager Richard Kinoshita, and retired teacher Darryl Conser.
- Hanna Pyles provided graphics assistance.

This project was peer-reviewed by members of the NWVRS and approved for publication.

¹ Reliable sources refer to Charles L Austin variously as "Charles," "Chas," "Charlie," and "Charley." Since there is no "right answer," we've chosen to be flexible in our references to Mr. Austin.

Company History

Charley Austin's Career Prior to Northwestern Manufacturing

From the point where Charles L. "Charley" Austin first demonstrated radio at the 1905 Lewis and Clark Exposition, to the founding of Northwest Radio Manufacturing in 1920, these milestones show how Charley Austin earned the title "Father of Oregon Radio." Additional details of his remarkable career follow in the Appendices.

- Charley Austin was born April 30, 1890 in Clinton, Iowa. The Austin family moved to Portland in 1902.
- In 1903, thirteen-year-old Charley read an article in *American Boy* magazine describing the construction of a wireless set that used a coherer detector and an induction coil transmitter. That article helped set the course for his career.
- In the summer of 1905, Charley demonstrated a coherer-based receiver at the Lewis and Clark Exposition in northwest Portland. The antenna hung from a bamboo pole with a T on top.² He had constructed an amateur station with a spark coil transmitter by 1906.



Figure 1 - Members of the Portland Boy's Wireless Telegraph Club (from left) Charles Austin, Reginald Savage, Charles Fine, Leland James (Oregon Journal 1/13/1908) (Image retouched using AI).

² *The Oregon Journal* 6/25/1922

- 1907 – The Portland Boy’s Wireless Telegraph Club began holding regular Friday-night meetings at various branches of the Multnomah County Library. Members included Charley Austin, Charles Fine, Leland “Lee” James³, and Reginald Savage. Within a year the membership had grown to 40 and the club had been renamed “The Progressive Club.” Maude Anderson and Charley’s sister Myra Austin (1892-1988), numbered among the members. Dr Ralph Walker⁴ was an adult advisor to the club.
- 1909 – Using the callsign “SN,” Charley demonstrated his sending station from the sidewalk-level windows of the Portland Railway Light and Power company office on SW 7th Ave.

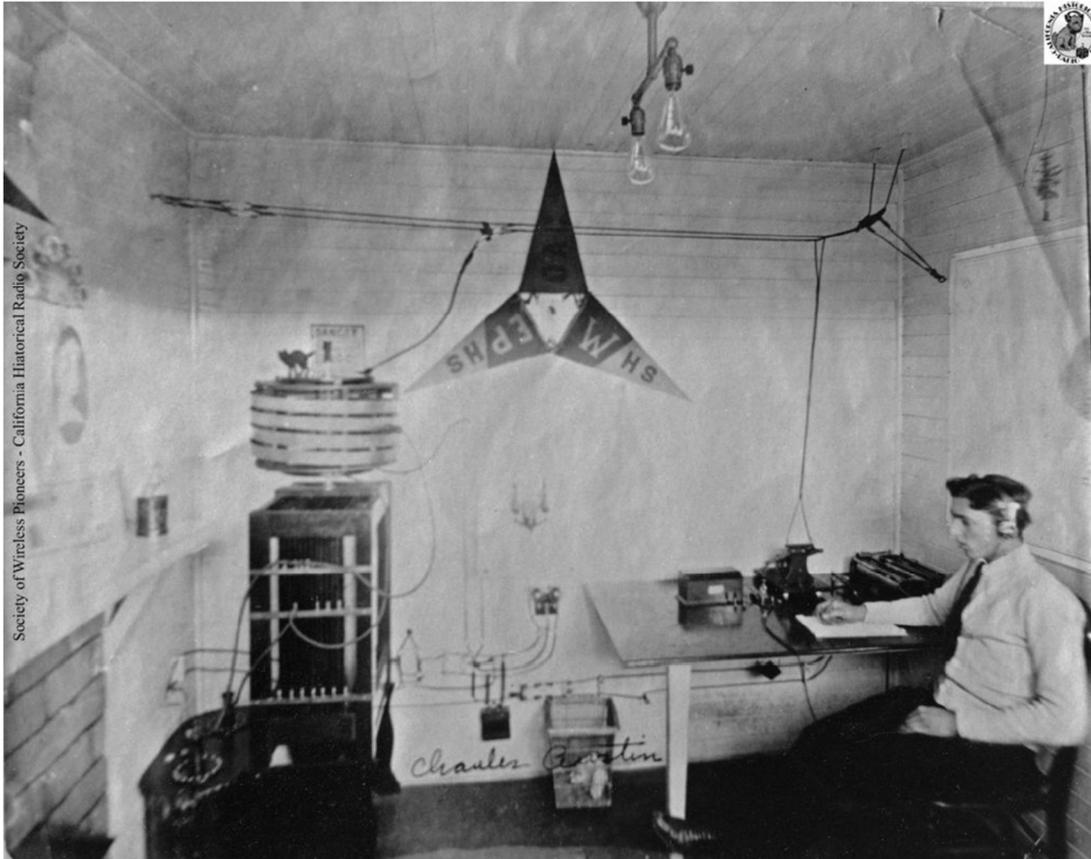


Figure 2 – Twenty-year-old Charley Austin's amateur wireless station in 1910. A transmitting helix and fixed spark gap sit atop a box containing Leydon jars, his transmitting condensers. Note the felt pennants on the wall from his alma mater - East Portland High School (later Washington High School). (Image courtesy CHR/SOWP)

- By 1910, Austin had built a station that could communicate with ships at sea. From this time on, he used his station to handle ship’s business for the Massie Wireless Telegraph Company who operated vessels on the Pacific Coast.

³ On April 1, 1929, Leland William James (1892-1964) founded Portland’s Consolidated Freightways, once a leader in the LTL (less-than-truckload) freight business. His design for a lighter semi tractor led to the creation of the Freightliner Company.

⁴ Dr Ralph Walker is not the same person as Ralph E Walker who worked for Hallock & Watson and cofounded Walker-Torgler in the 1920’s.



Figure 3 - Picture postcard of SS Rose City ca. 1910

- March 1911-1912 – Charley Austin worked as a Wireless Officer aboard the SS *Rose City*.⁵
- December 1912 – Charley Austin, and other members of the Oregon State Wireless Association, installed a 5-kilowatt station, “PSN,” in the basement of Portland’s YMCA. Charley worked as a radio instructor for the YMCA from January 1, 1913 until December 15, 1914.⁶
- August 1914 – Portland amateurs dismantled their transmitters under orders from Naval Censors as the US strove to maintain neutrality and to prevent communication with the ships of belligerents during World War 1.⁷ About fifty licensed Portland amateur stations, and as many unlicensed amateurs, were impacted. Amateurs in other parts of the country, and certain commercial stations, were allowed to continue operating. Charley Austin numbered among those who remained on the air.
- 1915 – Charles L Austin became an associate member of the Institute of Radio Engineers.
- August 1915 – Charley’s station, KDP, was licensed to communicate with ships on 300, 550, and 600 meters. In August, 1916, 200 and 425 meters were added and KDP was licensed to communicate with amateurs, as well.

⁵ See Appendix A for more details about Charley’s career at sea and shore-side Naval work.

⁶ See Appendix B for more details on Portland’s YMCA / OIT radio schools and station.

⁷ Aerials to Come Down (*The Oregonian* August 29, 1914).

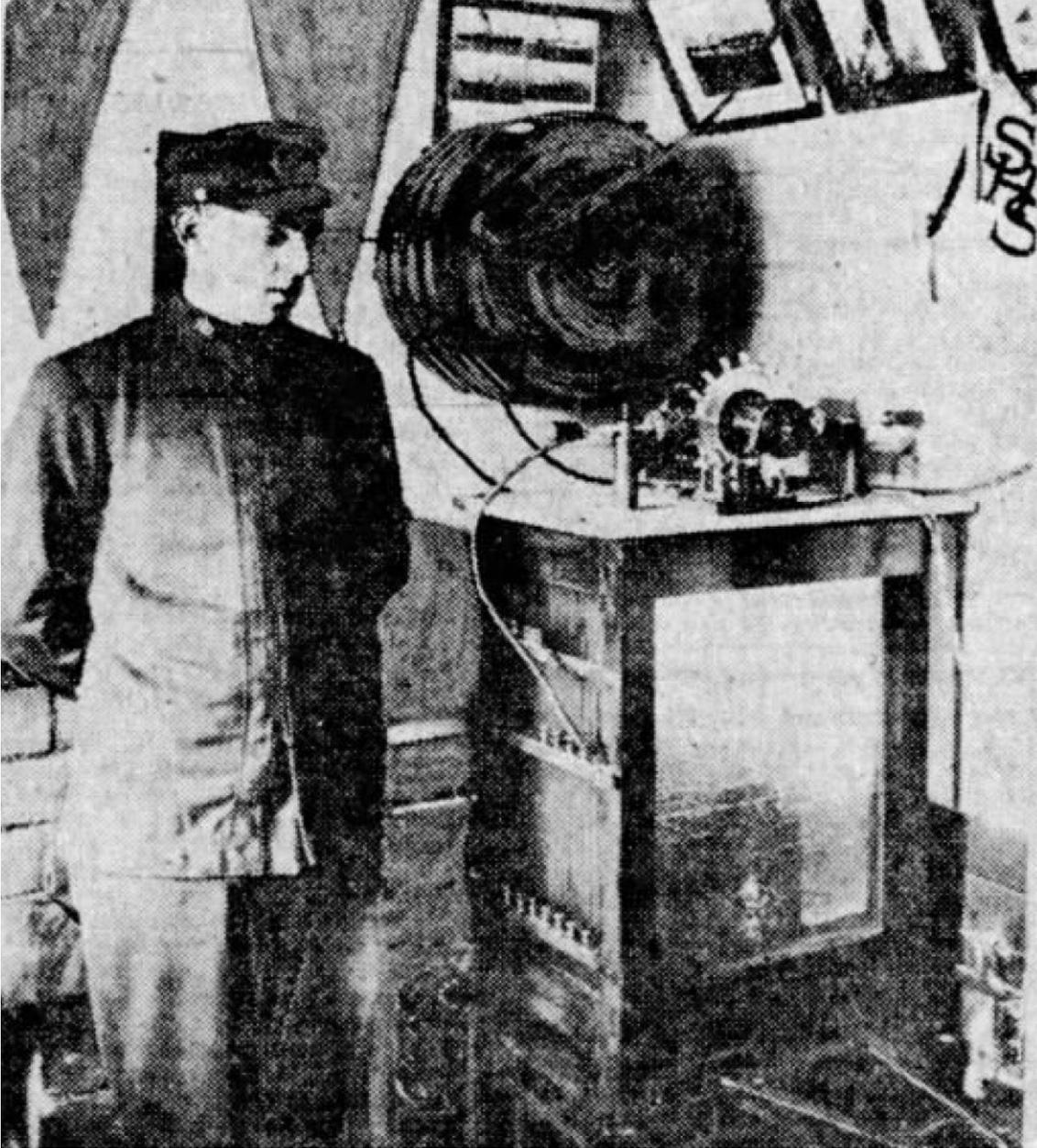


Figure 4 - Charley Austin in his wireless officer's uniform with his upgraded home station "SN." His improved transmitter used a rotary spark gap. (The Oregonian 3/17/1912)

- December 15, 1916 – Northwestern Audion Association organized with Charley Austin President.
- April 1917 – Once war was declared, all licensed US amateurs received a letter directing them to immediately close all stations for radio communications, both transmitting and receiving.⁸
- 1918 – After enlisting in the US Navy, Charley was put in charge of the Federal Wireless Telegraph Company station in Lents, Oregon.⁹

⁸ 200 Meters and Down pg. 50.

⁹ See Appendix A

- October 1918 – In the waning days of World War 1, Charley Austin was appointed Government Inspector of radio apparatus in Portland. His responsibilities included recruiting ship wireless operators.
- November 11, 1918 – Armistice was declared for World War 1. Radio restrictions remained in place.
- April 12, 1919 – “The Navy Department, in whose hands had been placed the control of all radio communications for the duration of the war emergency, announced that, effective that day, the ban on amateur **receiving** would be lifted; but that the restrictions on transmitting would continue in force until President Wilson officially announced that a state of peace existed.”¹⁰
- July-August 1919 – The US Forest Service tests war-surplus equipment for use in firefighting. Charley Austin was part of the team that packed a radio station (including antenna masts, storage batteries, a generator, and fuel) to the 11,250’ summit of Mount Hood and installed it in the fire lookout. The radio station was reestablished at the lookout in the summer of 1920.¹¹



Figure 5 - Clay Allen (US Forest Service Telephone Engineer) (left) and Charley Austin outside the Mount Hood Lookout August 1920 (Oregon Journal August 15, 1920). (Image retouched using AI).

¹⁰ 200 Meters and Down pg. 57.

¹¹ See *Mount Hood Calling* (listed in the Recommended Reading section) for further details about the Forest Service wireless tests.

- September 26, 1919 – “The director of the Naval Communication Service announced the removal of all restrictions on radio amateurs, and the resumption of authority by the Bureau of Navigation and of the Department of Commerce.,.,,Even so, the resumption of amateur transmitting was not immediate. Two and one half years had elapsed since the Navy took over control. So, all amateur licenses had expired. Before getting back on the air, it was necessary to secure new licenses from the Bureau of Navigation.”¹²
- October 1, 1919 – Charley Austin’s station for communicating with ships, KDP, receives its Provisional Commercial License.¹³ With the Department of Commerce being short of clerical help, license applications were delayed. “Temporary authorizations were provided, on which applicants were supplied with tentative calls in rotation, that permitted temporary operation; the actual licenses followed later when the clerical work could be completed.”¹⁴ This may explain why KDP’s callsign was handwritten on the license. See Appendix D.
- December 22, 1919 – 7DK, Charley’s amateur station, receives its General Amateur Radio Station License.¹⁵
- 1920 – Charley Austin founds Northwest Radio Manufacturing Company.
- June 7, 1920 – 7ZI receives its Special Amateur License for a Land Radio Station.
- March 20, 1921 – Charley Austin’s station, 7ZI, was being heard as far away as Los Angeles, making it Oregon’s first broadcasting station.

Additional dates are detailed in Appendix D “Austin’s Amateur, Experimental, and Broadcast Licenses.”

Author’s Note: Charley Austin - The Ultimate Amateur

Charley Austin’s early experiences which included:

- Experimenting and building
- Organizing and leading amateur radio clubs
- Building a commercial-quality station
- Serving as a wireless officer during World War 1

typified every aspect of the activities of an early American amateur radio operator as described in Clinton DeSoto’s 200 Meters and Down. Truly a remarkable man!

¹² 200 Meters and Down pg. 59.

¹³ See Appendix D

¹⁴ 200 Meters and Down pg. 59.

¹⁵ See Appendix D

Northwestern Radio Manufacturing Company

Charley Austin began fabricating radio components for sale at his Mount Tabor home in 1920. As an experienced amateur radio operator, and since broadcasting was still in its infancy, the purpose of his endeavor was to make sets for use by other amateurs. In the teens, Charley had already been helping amateurs get started by teaching at the YMCA, organizing local radio clubs, and offering his services for building and installing stations.¹⁶

With his expertise in machining and casting, and a well-equipped backyard shop, Charley was able to produce engraved radio panels, turn binding posts and knobs, and cast various metal parts. Most of the early items in the Product Compendium have the unmistakable marks of Charley's handiwork.

Charley began as a sole proprietor. His partnership with Frank Phillippi began in 1920. As the business began to gain traction, it made sense to get organized and bring on some employees. The April 20, 1922 *Oregonian* carried the news that Charles Austin, Frank Phillippi, and James H Page had organized Northwestern Radio Manufacturing Company. The corporation was capitalized with \$50000 in common stock. Charles Austin was the company president. Frank Phillippi (1888-1949) was the vice president and supervised production. Mr. Phillippi's other endeavors indicate that he may have brought financial expertise (and possibly financial backing) to the business.

Jesse Archibald Roehr (1881-1951) was the company secretary. Jesse married Myra Austin (Charley's sister) in January 1917.

NORTHWESTERN RADIO INSTRUMENTS
—A Quality Line, made on the Pacific Coast

After 18 months of constant research and development work, we have perfected a complete line of Radio receiving apparatus, which we know will fill the wants of the most exacting radio man. Our instruments are designed and built by men who have been constantly in radio work for the past 12 years, and who understand amateur needs.

We are now printing a catalog of our complete line. Write for your copy now. We have a really superior line, and want you to become acquainted with it.

Northwestern Variometer
An instrument second to none in design and workmanship. Rotor and stator turned to close limits, giving high maximum and low minimum.
Price, \$9.00
Mounted as above with turned Bakelite dial and knob, \$11.25.

Northwestern Variocoupler
Designed for use in connection with Northwestern Variometer and when so used will give superior results.
Price, \$8.50
Mounted as above with turned Bakelite dial and knob, \$10.50.

Northwestern Radio Manufacturing Co.
1556 East Taylor Street
PORTLAND, OREGON

Figure 6 – An early Northwestern ad showing the SR-7 Northwestern Variometer and the SR-8 Northwestern Variocoupler. (*Pacific Radio News* April, 1921)

For the first few years, Northwestern was a home-business without a storefront. Some in-personal sales doubtlessly occurred but most sales were handled by distributors and

¹⁶ *The Oregon Journal* 6/25/1922

retailers. The company frequently worked with Portland's Hallock & Watson to design, advertise, and retail its products. Later, other Portland retailers¹⁷ sold the company's components and radios.

A Quick Product Overview

There were several phases in Northwestern's production. The first products were assigned "SR" numbers. These products ranged from simple components, to panel sets, to complete radios. The highest "SR" number we've documented is the SR-28 Northwestern Audio Transformer.

After the "SR" numbers, Northwestern produced the Type D receiver. This set was followed by the NORCO-brand TRFs.

All products are presented in order-of-production in the Product Compendium.

Early Production

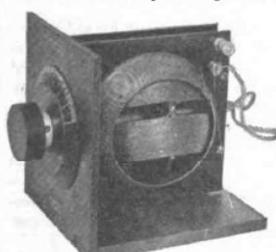
In the spring of 1921, NORCO created a catalog comprised of ten "Bulletins" and advertised it in *Pacific Radio News*. So, at least for a short while, they engaged in direct mail order catalog sales.

QST QSP All Amateurs QSQ QSL
HALLOCK & WATSON RADIO SERVICE **Announce**
THE OPENING OF THEIR RADIO SUPPLY STORE IN PORTLAND, OREGON, WITH A COMPLETE STOCK OF RADIO TELEPHONE AND TELEGRAPH EQUIPMENT OF STANDARD MAKES.

PERSONNEL

J. H. HALLOCK Formerly Radio Construction Engineer, U. S. Navy Dept. and Federal Telegraph Co.	C. H. WATSON Formerly in charge U. S. Naval Radio Laboratory, Mare Island, California.
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We believe we have the **MOST EFFICIENT** short wave receiving equipment on the market today and would like you to prove that statement to your own satisfaction.

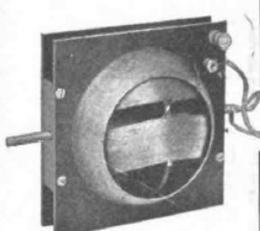


**Northwestern Variometer
Mounted \$10.00**

We refer to the new UNIT VARIOMETER and VARIOUPLER built by the Northwestern Radio Mfg. Co. of Portland, with whom we are co-operating in design work and whom we also represent as exclusive distributors.

Here are a few points of design that make the efficiency of the set apparent:

- NO DIELECTRIC WHATEVER in or around the field of the coils, thereby reducing the dielectric hysteresis to a minimum—"NOTHING THERE BUT THE WIRE."
- NO SPRING OR BEARING CONTACTS between stator and rotor. Flexible conductors permanently connected to binding posts in rear.
- NO moulded material to warp or chip. Panel, knobs and dials machined from XX bakelite.
- NO small, high resistance wire; No. 20 double SILK thruout.
- NO binding posts or switch points on fronts of panels.



**Northwestern Variometer
Unmounted \$6.50**

AND FURTHERMORE—NO TROUBLE getting that distant fone station. We're putting Avalon on the Magnavox with an indoor antenna in a first story flat!

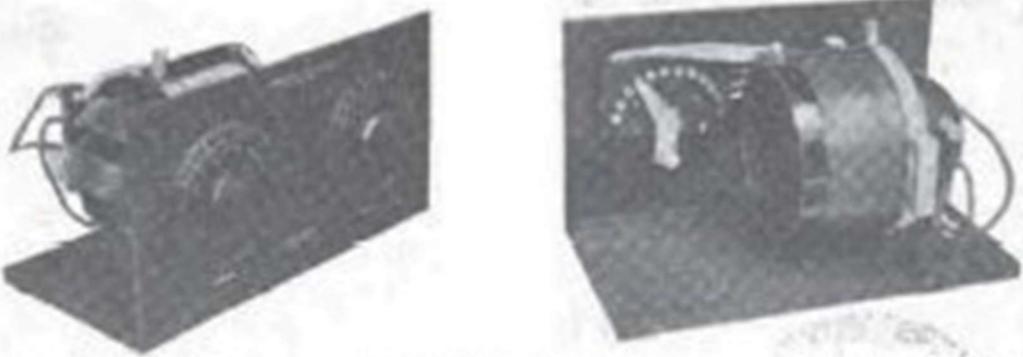
INCIDENTALLY our 100 watt fone will be in operation the latter part of March. Drop us a line and get acquainted.

HALLOCK & WATSON RADIO SERVICE
192 Park Street Portland, Oregon

Figure 7 - Hallock & Watson ad for the Northwestern SR-16 variometer, mounted and unmounted (Radio April, 1922)

¹⁷ Besides Hallock & Watson, NORCO retailers included: Grand Electric Co, Honeyman Hardware, Hynson Electric Co, Lectro Mfg & Sales, Portland department store Lipman Wolfe & Co, Opperman Radio Shop, Union Ave Tire & Battery Shop, Weed Radio Shop, and Woodard-Clarke (*The Oregon Journal* May 27, 1923).

HERE SHE IS!
THE NEW NORTHWESTERN VARIOCOUPLER



Panel $9\frac{1}{2} \times 5\frac{1}{2} \times \frac{1}{4}$. **XX Bakelite** Throughout. "No Dielectric" Rotor.
Twelve point back connected Switch. Silver Plated.
Aluminum Brackets. Wire—No. 20 Double Silk, Green.

**Mounted Unit
as shown
\$15.00**

We're
Trebbling
the Factory.

**Unmounted
Coupler Only
\$6.50**

HALLOCK AND WATSON RADIO SERVICE
122 PARK STREET "KGG" PORTLAND, ORE.

Figure 8 - Hallock & Watson ad for the Northwestern SR-8 Variocoupler, configured as a stand-alone panel. This is an example of some of the print advertising that deemphasized or omitted the Northwestern name, sometimes implying that their products were made by others. This omission has resulted in confusion in the collecting community. (Radio magazine June, 1922).

Like many other companies, such as DeForest and Remler, Northwestern produced "panel sets" in the early 1920's. The company's amateur customers could purchase components (panels) of their choosing as interest, and budget, allowed. These could then be reused in more elaborate circuits or be enhanced with additional components of the same, or competing, brands. Most of the company's early products, SR-1 through SR-20, fit this definition. Some are single components; others are assemblages, but all are designed to work in combination with other parts.

A timely shift of direction

In 1920, Charley Austin began building radios for the purpose of serving the amateur community. Indeed, his initial offerings were components and panel-style radios that were best suited to experimenters and those who were willing to assemble their own radios.

In 1921, the SR-14, a complete radio, marked a shift away from the Amateur market and towards the broadcast-listener market. Its production coincides with the emergence of the early broadcasters in the Pacific Northwest which included Northwestern's own station 7XF, and the Hawley station, 7XG.

After building 10-watt broadcast transmitters for Willard Hawley Jr. (7XG) and himself (7XF), Charley Austin penned an article about the Northwestern SR-15 transmitter for *Radio Waves* magazine. His article included plans¹⁸, schematics, and construction instructions.

The SR-15 transmitter's design allowed it to be used for voice transmission ('phone,) CW (Morse code), and modulated CW.

Regenerating the Regen – The story of the SR-22 non-regenerative tuner and the SR-23 regeneration control

In mid-1922, the Northwestern SR-22 non-regenerative tuner replaced the SR-1. The SR-22 was designed to be used with the SR-2 Detector/Amplifier even as the SR-1 had been. When used together, the SR-2 / SR-22 combination was variously known as:

- the "SR-22"
- the "22-2"
- or the "2-22"

The SR-22 is very similar in appearance to the SR-1 regenerative tuner except for the conspicuous absence of the Plate Variometer (regeneration) control.

So, why step back from the performance advantages of the regenerative circuit? Had Armstrong's patent attorneys directed Northwestern to cease-and-desist? The evidence suggests so.¹⁹

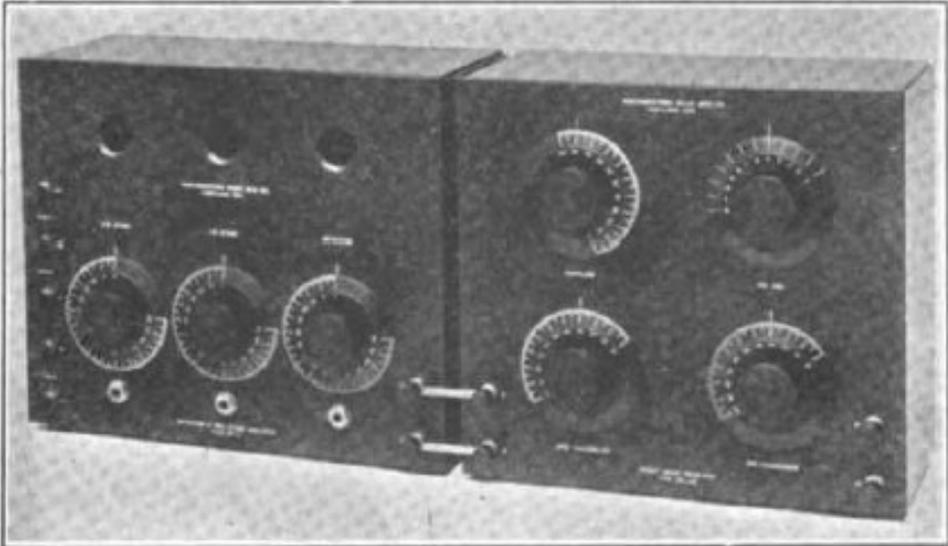
Not by chance, the SR-22 tuner was followed by the stand-alone SR-23 variometer which was functionally a regeneration control. Thus, by purchasing the SR-23 and doing a little wiring, the purchaser could convert the non-regenerative SR-22 into a regenerative receiver. The SR-1 used SR-16 Bakelite-frame variometers for its grid variometer and plate variometer (regeneration) control. The SR-23 was just a cased version of the SR-16.

Though together the SR-22 / SR-23 are equivalent to the SR-1 regenerative tuner, offering the components separately apparently helped Northwestern distance itself from further patent concerns.

¹⁸ Shown in the Product Compendium

¹⁹ See Appendix H for more information on the Armstrong patent.

IT'S HERE!



**THE NON-REGENERATIVE RECEIVER DE LUXE
FOR BROADCASTING RECEPTION—NEAR OR FAR**

Hallock & Watson Radio Service

192 Park Street "KGG" Portland, Ore.

*Figure 9 - SR-2 detector amplifier (left) and SR-22 Non-Regenerative tuner (right)
(Radio October, 1922)*

Expansion

By 1922, Northwestern had outgrown its workspace in the backyard of the Austin's home. Manufacturing and warehousing moved into a space "ten times the size" at 37th and SE Division St. The company offices remained at the Austin's home on SE Taylor.

Overseas Sales

Per Tex Sloat, Northwestern radios were shipped to many foreign countries, some six or seven hundred going to Japan in 1923 and 1924. Charley Austin remarked that this was good business as they received payment as soon as the goods went aboard the ships.

The Northwestern TRF Receivers

Like most of the industry, in the mid-1920's Northwestern discontinued producing regenerative radios. Regens were notorious for causing interference and they could be more complicated to operate than other sets that were coming to the market. Up until it began producing Tuned Radio Frequency "TRF," receivers, Northwestern had been fabricating most of its components in its own factory. Beginning with the TRF's, Northwestern began using a few more commercially-available parts in their radios.

Their first two TRFs were the Northwestern SR-25 and the Northwestern Type D. The SR-25 may have been the last receiver to use the "SR" numbering system. And, after the Type D, Northwestern began producing radios under the NORCO brand.

"NORCO: A sure sign of a wonderful radio buy"²⁰

The NORCO brand TRF Receivers

Following the Northwestern Type D, came the radically-different NORCO Telomonic receivers that used the Acmedyne circuit.

The NORCO Telomonic receiver is the first model to use the round "NORCO" logo. Although the company name didn't change, from this point onward, the NORCO brand began supplanting the Northwestern Radio Mfg Company brand.



Figure 10 - NORCO Telomonic radio

[story continues on page 16]

²⁰ Honeyman Hardware ad Oregon Journal November, 21, 1926

“Radio Factory Makes Every Part of Set”

(abstracted from an article in the December 13, 1925 *Oregon Journal* newspaper)

With equipment to make practically every part of a radio receiving set from the condensers to the sockets, the Northwestern Radio Manufacturing Company has started quantity production of its new “NORCO” sets, which have several new features.



Figure 11 – NORCO’s Bakelite molding machine. (Image retouched using AI).

One piece of equipment found in this manufacturing plant is the 75-ton all hydraulic press and Bakelite machine, the only Bakelite machine to be found in this state. With a large aggregation of special molds and dies, the Bakelite powder may be changed into any of the many parts to be found in every radio made of this material. The process

requires high heat and heavy pressure of 3,000 pounds per square inch applied at the same time.

After the parts are taken out of these molds, they are sent through a line of drill presses, which bore the proper sized holes, and another automatic machine speeds up the work of tapping and threading the parts which are put together with screws or nuts.



Figure 12 – Company vice president and production manager Frank Phillippi inspects a NORCO TRF chassis. (Image retouched using AI).

Frank Phillippi looks after the production end of the business. Charles Austin, one of the pioneer radio men of the company,

is president of this company and very active in trying out equipment and designing new devices.



Figure 13 – Company founder, Charles Austin. (Image retouched using AI).

Changes made in the set have slowed down production somewhat, for it takes time to work out the best systems of procedure in manufacturing.

The plant with a crew of five is now able to put out sets at the rate of two per hour, and this production will be speeded up according to present plans.

The new “NORCO,” as this set is called, is equipped with [MARCO brand]²¹ micrometer dials throughout to make tuning both accurate and easy. These dials are easily read, yet they are not conspicuous and they add to the beauty of the set front panel which is grained red and black Bakelite.

Two distributors in Portland are handling “The NORCO” and are enthusiastic in their praise of its ability to receive under most any conditions and with a clearness found in few other sets. This is believed due not only to the hook-up used in the five-tube set, but also to the special loud speaker which Austin has designed and is now building.

“The NORCO” has found a ready market from Japan to Wisconsin and is growing in favor with radio fans of the Northwest, according to Jesse A Roehr, one of the officials of the company.

Local distributors are The Electric Corporation and the Gould Battery and Service Company. (*The Oregon Journal* December 13, 1925 pg. 4).

²¹ Considering the headline “...Factory Makes Every Part...” it’s ironic that the reporter chose to highlight the set’s MARCO verniers, one of

the most visible parts that Northwestern did not make themselves.

[continued from page 13]

NOR WES CO

At the end of the Product Compendium, we have a section entitled “The Other ‘NORCOs.’” While researching, we found references to several obscure Northwestern radio models. The NOR WES CO is one such example. Though it’s listed as a 1924 radio in the Radio Collector’s Guide, we found little about it. The Radio Dealer Year Book for 1925-1926 says that Northwestern was selling dials and rheostats (but not radios) under the NOR WES CO name. More information would be welcome.

Too little, too late? “The NORCO” TRF - 1925



Figure 14 - "The NORCO" five-tube TRF. Its three-dial design is typical of many Tuned-Radio Frequency sets that were produced in mid 1920's.

Following the Telomonic, Northwestern produced “The NORCO” and The NORCO 55, more typical “three-dial” TRFs.

When it was introduced in 1925, “The NORCO” version of the TRF was truly a milestone in Northwestern’s design evolution. The company finally had an alternative to the complicated, hard-to-tune sets with their large cabinets and plethora of knobs. As a simple “three-dialer” in a compact cabinet, it marked a shift to a more mainstream design, similar to the sets being produced by others in the mid-1920’s.

At the same time that its simplified design opened up new markets, it had no discernable advantage over the products of the company’s competitors such as Hallock & Watson’s 1925 TR-5; their offerings were essentially indistinguishable from each other. By this time, the national companies had been around long-enough to develop brand loyalty with their customers. Further, the larger manufacturers enjoyed advantages of scale, well-establishing distribution networks, and huge advertising budgets. Ironically, NORCO’s best potential source of local advertising, its KGN broadcast station, had been off the air since May, 1923.

With its improved design, and affordable \$55 price point, The NORCO surely generated sales for the company. However, in our opinion, the set's biggest impact was to render their earlier sets obsolete.

According to information on the instruction sheet, Lectro Mfg & Sales Co, a Portland retailer, was the exclusive distributor of The NORCO, a five tube TRF. Since this agreement did not extend to other NORCO models, this is intriguing and we'd like to find out more about it.

“Who would buy a set with three tuning knobs in 1926?”²²



Figure 15 – 1926 NORCO 55 three-dial TRF receiver

Northwestern introduced the NORCO 55, NORCO 66, and NORCO 77 in 1926. By this time, most customers were demanding simplified “one dial tuning.” Thus, the NORCO 55’s design was already somewhat dated when it was introduced.

Their follow up designs, the NORCO 66 and NORCO 77, with their sloped front panels and thumb-wheel tuning, resemble the appearance of RCA’s Radiola 28 superheterodyne, a 1925 design.

²² Larry Babcock posed this rhetorical question in his history of Wurlitzer Radios (*ARCA Gazette* Fall 1987). Though we love Northwestern’s products, Larry’s question resonated with us as we contemplated NORCO’s design choices.



Figure 16 - NORCO 66 (George Kirkwood collection)

Even though the designs were a year-or-two behind the market, Northwestern must have decided that these radios were what their customers wanted to buy. And, given that the company lacked a license to produce superheterodynes, producing these high-style TRFs may have been their best option.

The NORCO 66 and NORCO 77 were Northwestern's final production models. Manufacturing likely lasted until 1927.

Waning Days

NORCO products were displayed at the Portland Radio Shows through 1925. Although some of NORCO's previous retailers, such as Gould Battery, exhibited at the Fall 1926 Pacific Northwest Radio Show, the products of Northwestern Radio Manufacturing were conspicuously absent.²³

Like other local manufacturers, Northwestern didn't survive long enough to produce the next generation of radios with one-dial tuning, and internal power supplies and speakers.²⁴ Its production ended with the battery-operated TRF's.

²³ *The Oregonian* 9/19/1926

²⁴ NORCO TRF consoles did have built-in speakers. But the table models did not.

New Digs

In 1922, the Northwestern factory and warehousing functions moved to 1103 Division St (near 37th and SE Division St). The company office remained at the Austin's home on Taylor.

In 1927, the Austins moved to a home on SE 58th. At that time all business functions were consolidated at the Division location. This became the company's first commercial storefront location in their history.

With the move, the business became diversified with other lines apart from radio including model airplane kits. One of Charley Austin's hobbies was building models. And, there was a nationwide surge in interest in flying models during this time. Thus, this was a logical next step for his company.



Figure 17 - Ad showing Northwestern's expanded product line. (Oregon Journal March 17, 1929).

Key employees at the time included Carl Lundell, an electrical engineer, bookkeepers Walter Russ (W7ED) and Jesse Roehr, Roy Yonge²⁵, and Ray Stoeker.²⁶

Over and Out

In late 1929, Northwestern Radio Manufacturing Company shut down. The company manufactured and sold numerous²⁷ radio sets during its nearly ten-year run. Besides the economic decline of the Great Depression, radio patent litigation was likely a determining factor in the closure.²⁸ By this time, the RCA-patented superheterodyne circuit was becoming the industry standard and many small companies like Northwestern, who were unable to secure a license, were forced from the market.

In 1930, the company was briefly reborn as "Model Aircraft Works & Radio Apparatus." Model Aircraft Works didn't last long.

²⁵ Roy Yonge was formerly with Hallock & Watson where he did radio design and manufacturing and managed their retail store. See [Hallock & Watson Radios](#) for more information.

²⁶ "The Northwestern Radio Manufacturing Co Portland, Oregon"

²⁷ The figure of "over 100,000" has been asserted. We feel more comfortable saying "numerous." We have been unable to verify a specific figure and don't want to add credibility to, what may be, an implausible production count for a small backyard business. Regardless of the actual number produced, very few examples are known to be in the hands of collectors today.

²⁸ "The Northwestern Radio Manufacturing Co Portland, Oregon"

Epilogue

In 1932 Austin was hired by the City of Portland to install Portland Police station KGPP at Mount Tabor.²⁹ He would become one of two Radio Operators taking care of the transmitter the other being Temple V. Ehmsen.

In 1955 Charles Austin retired from the City of Portland Radio Department at age 65. In retirement he continued to teach Morse Code classes at the YMCA as he first did in 1912.

Charley also occupied his retirement years building scale model train locomotives. His meticulously-detailed model of a "Hudson" style steam locomotive was featured in a 1968 *Oregonian* story about his career. Charley invested 3,000 hours in scratch-building the model.

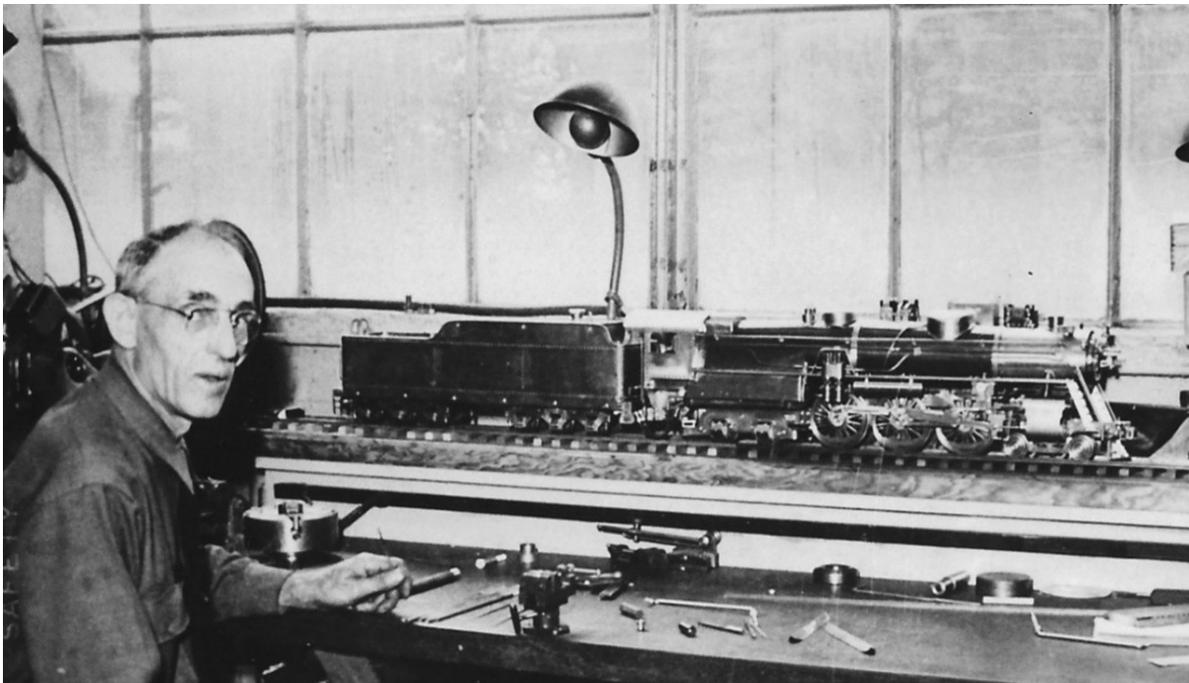


Figure 18 - Charley Austin with his Hudson locomotive scale model ca. 1968

On August 29, 1971, Anna, Charley's wife of 58 years died. In 1978 Charley moved from the family home to the community of Blue River in Lane County, Oregon to be near the couple's daughter Virginia and that's where Charley died on June 11, 1980. Charles L. Austin was 90 years old.

²⁹ See Appendix I

Northwestern Dates and Locations³⁰

1908-1920 **651 Salmon St**
(1725 SE Salmon St)
Charley Austin's first Portland home and the location of his first lab, station, and factory.

1920 – 1927 **1556 E Taylor St**
(5830 SE Taylor St)
Phone: TAbor 2686
This was the Austin's home, the location of Charley's broadcast station, factory, and offices.³¹ Manufacturing and warehousing moved to SE Division in 1922.³²

1927 **376 E 58th St**
(2004 SE 58th Ave)
The Austin's moved to a new home in 1927 and the NORCO offices moved to Division.

1922 -1930 **1103 E Division St**
(3705 SE Division St)
Phone: TAbor 2686
We believe that this location was first used as an off-site warehouse and factory in 1922. It became NORCO's primary location and a retail storefront in 1927.



This is a Signal Corps Model 1914 "Service Buzzer" also known as a "portable field telegraph." It was designed for signalmen to send and receive telegraph messages by wire. Stromberg-Carlson from Rochester, NY made this example in 1918, during World War 1. We haven't determined why Charley Austin, a stateside Naval officer, would have had it; it certainly would not have been practical for teaching Morse code to recruits. Regardless, Charley carved his name in the leather cover with a pen knife and kept it around. So, we keep it as a fun remembrance of him.

³⁰ Portland revised its addressing schema in 1932. Current addresses are shown in parenthesis.

³¹ *Oregon Journal* April 24, 1922

³² *Oregon Journal* November 15, 1925

Northwestern & NORCO Logos



"Plain Text"



"Triangle"



"Flying N"



"Small Winged Triangle"



"Large Winged Triangle"



"Round" (SOWP)



"Round Outline"



"Round Decal"

Northwestern & NORCO Product Compendium

(products are presented in production order)

The Northwestern Products		Page
1920-1921	Northwestern SR-1 – SR-21	24
1922	SR-22 (22-2) - SR-25 (8 knobs), SR-25 (early version)	65
1923	SR-25 (later version), SR-26 - SR-28	70
1924	Northwestern Type D receiver	73
The NORCO Products		
1925	NORCO Telomonic, "The NORCO"	75
1926	NORCO 55, NORCO 66, NORCO 77	83
NORCO Jack Box and Speakers		93
The Other "NORCOs"		95

About Northwestern Radio Products

Abstracted from the Northwestern Radio Apparatus Catalog

The Northwestern Radio Manufacturing Company is engaged in the manufacture of reliable radio equipment for amateur and experimental use. All apparatus has been designed by radio men who have been engaged in radio work for the past fifteen years and who are able to appreciate the wants of the radio amateur or experimenter to the minutest detail.

We have put forth every effort to make this apparatus the very best that can be procured both from an electrical and mechanical point of view and we feel that we have accomplished this result to a very marked degree.

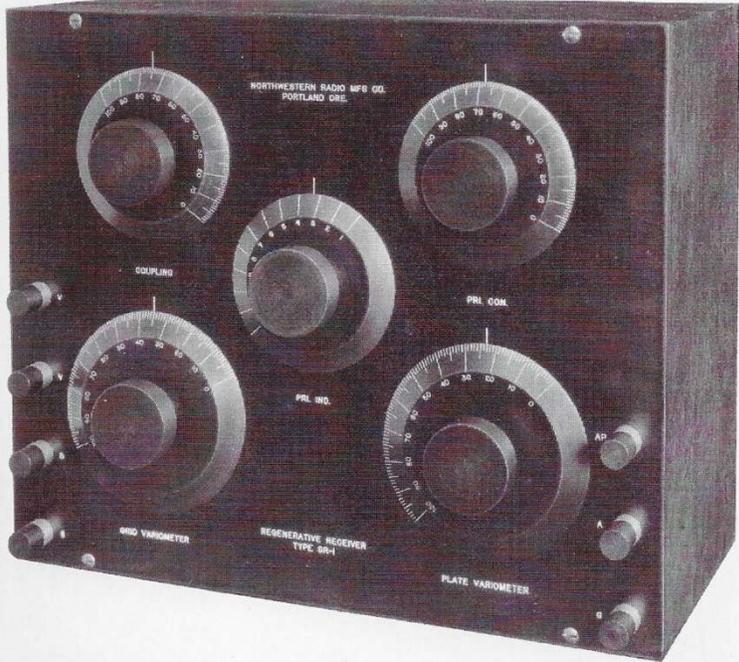
The materials used in all our apparatus are absolutely the very best that can be obtained regardless of price. All our panels are made of 1/4-inch Grade XX Bakelite. All metal parts are made of brass, phosphor bronze, or aluminum. All brass parts are nicked in white satin finish to prevent undue corrosion. Supporting brackets are made of cast aluminum. The cabinets are made of oak, finished in Flemish oak, and are well-waxed.

Northwestern SR-1 Short Wave Regenerative Receiver Catalog A-500 - 1921

BULLETIN No. 1

NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON





Short Wave Regenerative Receiver

Type SR-1
Wave Length Range 170 to 850 Meters.

WITH the needs of the Radio Relay Man in mind we designed our type SR-1 Short Wave Receiver. We believe that in this set we have embodied all of the most desirable qualities needed in a receiver for this service.

The wave length range of this receiver is such that all waves used by the Amateur may be readily covered without using any external capacities of any kind. The secondary circuit of the Type SR-1 is such that when shunted by a small fixed capacity the operator may tune to waves up to and including 850 meters. This fixed capacity is furnished with each receiver, and allows the receiver to be employed for the reception of commercial ship and shore stations.

The primary circuit of this receiver consists of a variable inductance connected in series with the Antenna tuning condenser. The inductance is so tapped as to enable the operator to select the proper values of inductance and capacity. The switch controlling the variations of this inductance is mounted on the back of the panel, the amount of inductance in circuit at any time being indicated by a dial on the front of the panel. Binding posts are so arranged that the antenna condenser can be connected in parallel with the primary inductance to cover longer waves when the set is used in connection with a small antenna.

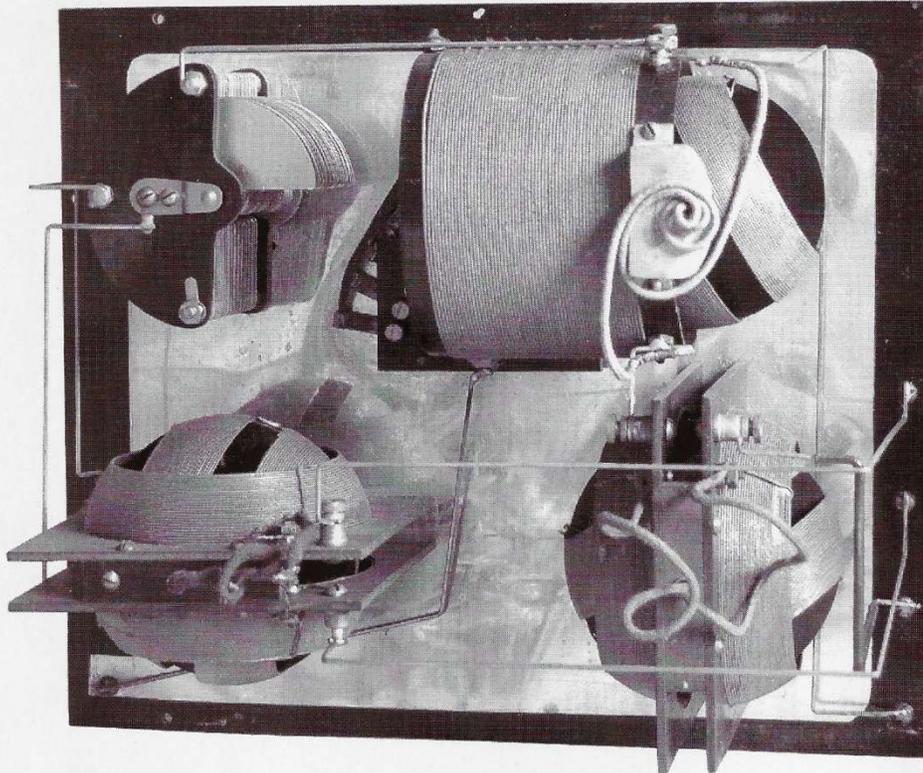
The secondary circuit is tuned by means of a Variometer connected in series with a Variocoupler. The Variometer is the same as our standard Variometer, Type SR-7, which is fully described elsewhere. The Variocoupler used is our Type SR-8.

Regeneration is accomplished by tuning the plate circuit with a Variometer, this being one of the most efficient methods for short wave reception.

Our Type SR-1 Short Wave Regenerative Receiver consists of the following units properly mounted in correct relation to one another: Variocoupler Type SR-8, two Variometers Type SR-7 and balanced series condenser.



BULLETIN No. 1
NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON



SPECIFICATIONS

PANEL—Bakelite Dilecto Grade XX hand finished.

CABINET—Oak, Flemish finished and waxed.

DIALS—Turned from quarter inch Grade XX Bakelite Dilecto (figures engraved on Pantograph Engraving Machine.

KNOBS—Turned from one-half inch Bakelite Dilecto Grade XX.

WINDING FORMS—Bakelite Dilecto tubing and Kiln Dried and treated Hard Maple.

METAL PARTS—Brass nickeled Satin finish, Aluminum Castings on Vario-Coupler.

ENGRAVING—All engraving done with Gorton Pantograph Engraving Machine.

DIMENSIONS—Panel $10\frac{1}{2} \times 12\frac{3}{4}$ inches, one quarter inch thick. Cabinet 5 inches deep.

WEIGHT—Net weight 13 pounds, Shipping weight 20 pounds. Wiring diagrams and instructions are furnished with each set.

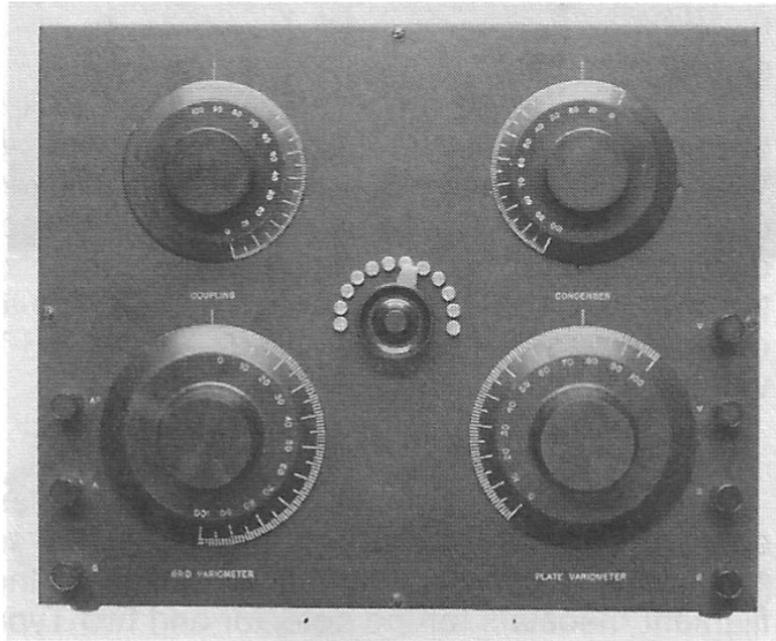
CAT. No. A-500. TYPE SR-1. DESCRIPTION—Short Wave Regenerative Receiver.
PRICE \$60.00

NORTHWESTERN RADIO MFG. CO.

1556 EAST TAYLOR STREET

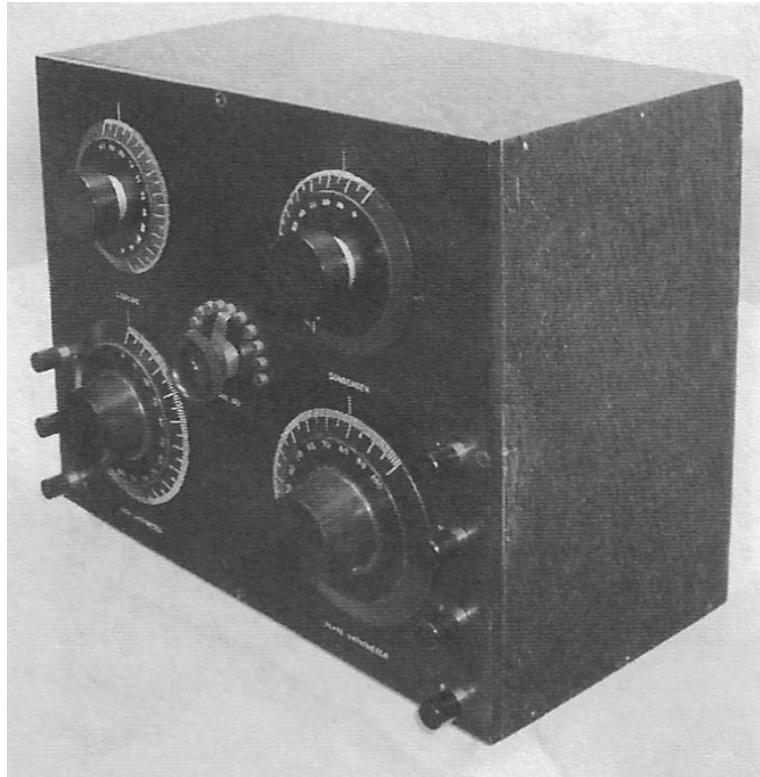
PORTLAND, OREGON

Northwestern SR-1 Short Wave Regenerative Receiver (unmarked version)
SR-1 front view



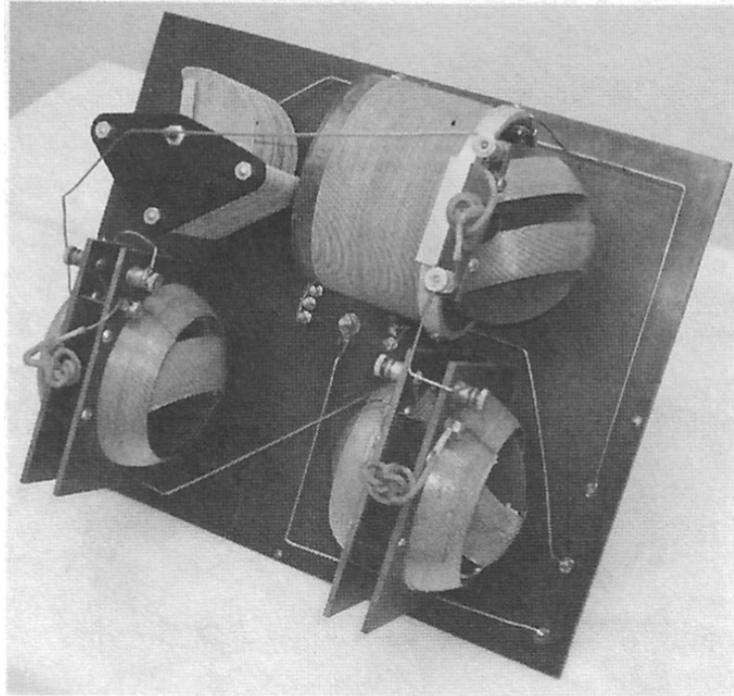
Sonny Clutter photo (*Antique Radio Classified* September, 2005)

SR-1 front oblique view



Sonny Clutter photo (*Antique Radio Classified* September, 2005)

SR-1 inside view



Sonny Clutter photo (*Antique Radio Classified* September 2005)

SR-1 inside detail view



Sonny Clutter photo (*Antique Radio Classified* September 2005)

Northwestern SR-2 Detector and Two Stage Amplifier 1921 Catalog A-503 1921

BULLETIN No. 2

NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON





Detector and Two Stage Amplifier
Type SR-2

REALIZING what was required in both a detector and an amplifier, we constructed this unit, our Type SR-2. This detector and two-stage amplifier embodies the latest improvement in radio engineering.

This set has the same outside dimensions as our Regenerative Receiver, Type SR-1, and when these two sets are used in conjunction they form "THE COMBINATIONS OF ALL COMBINATIONS," making the ideal receiver for the relay man. However, this set is so constructed that it may be used in conjunction with any receiver, either short or long wave.

Special care has been taken to eliminate all howling and squealing which is often found in amplifiers of more than one stage.

Our Type SR-9 machined aluminum tube sockets are used throughout this unit.

The three tube sockets are mounted on a sub-base of one-eighth-inch Bakelite, which is supported by aluminum brackets attached to the back of the main panel. This makes a neat and compact arrangement.

The amplifying transformers are also mounted upon this sub-base and to the rear of the tube sockets.

The Grid Condenser is constructed of the best mica interleaved with thin metal plates tightly clamped between one-eighth-inch Bakelite, and is located on the sub-base directly behind the detector tube. Our grid leak is adjustable and is made a part of the grid condenser.

Our Bridging Condenser is similar in construction to the Grid Condenser, and is of the proper size for efficient operation on all wave lengths.

Rheostats are mounted directly on back of main panel, and are of sufficient resistance for the control of the filaments on all standard types of tubes. Our standard bakelite Knobs and Dials, Type SR-10, are used to indicate the position of the rheostats.

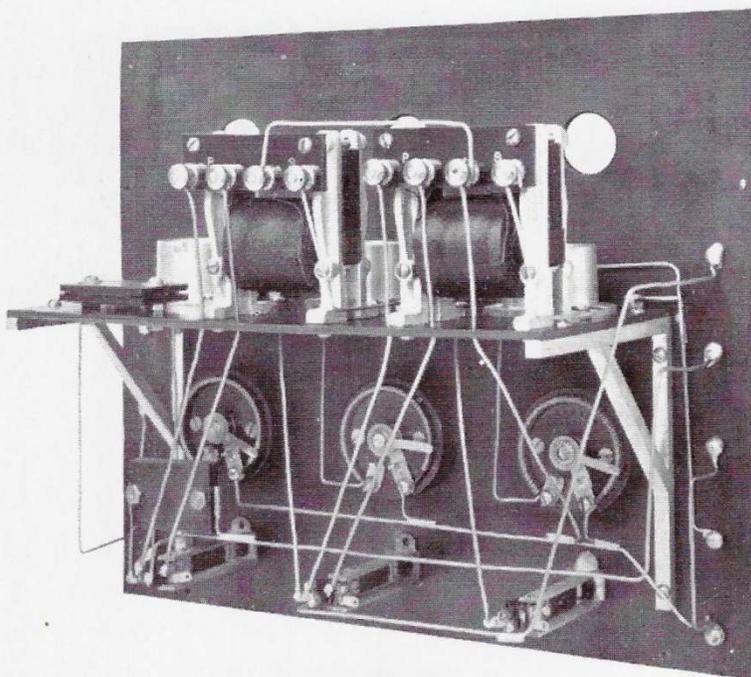
Western Electric Jacks are used in all our detector and amplifier units. These we have found give superior results and stand up under the hardest use.

Accessibility to the grid leak and tube sockets is obtained in a novel way, the upper portion of the cabinet being hinged in such a manner as to make them easily accessible without subtracting from the appearance of the unit.



BULLETIN No. 2

NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON



Type SR-2. Back View

SPECIFICATIONS

PANEL—Bakelite Dilector Grade XX Hand finished.

CABINET—Oak, Flemish finish and waxed.

DIALS—Turned from quarter-inch Grade XX Bakelite Dilecto. Figure engraved on Pantograph Engraving Machine.

KNOBS—Turned from one-half inch Bakelite Dilecto, Grade XX.

METAL PARTS—Brass parts nicked satin finish. Bracket supports cast aluminum.

ENGRAVING—All engraving done with Gorton Pantograph Engraving Machine.

DIMENSIONS—Panel $10\frac{1}{2} \times 12\frac{3}{4}$ inches. One quarter inch thick. Cabinet 6 inches deep.

WEIGHT—Net 10 lbs. Shipping weight 17 lbs..

CAT. No. A-503. TYPE SR-2. DESCRIPTION—Detector and Two Stage Amplifier.

PRICE \$70.00

NORTHWESTERN RADIO MFG. CO.

1556 EAST TAYLOR STREET

PORTLAND, OREGON



SR-2 Ray Nelson collection (Sonny Clutter photo)

The SR-3 Vacuum Tube Detector Unit

In keeping with the emphasis on flexibility, the detector portion of the SR-2 was sold separately as the Northwestern SR-3 Vacuum Tube Detector Unit. When the SR-3 was used in combination with the SR-5 Two Stage Amplifier, the pair would be equivalent to the SR-2.

The SR-3 uses a single 01-A tube. A 200-A soft tube detector would be suitable, as well.

**NORTHWESTERN RADIO—A New
and Improved Line of Receiving Apparatus**



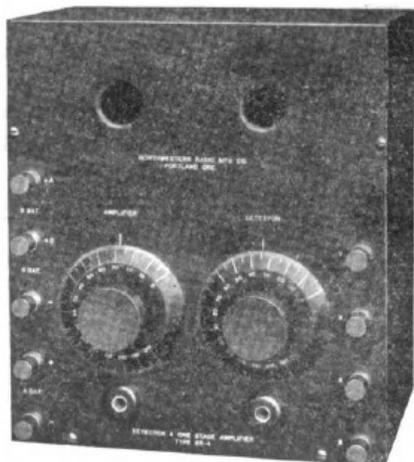
Detector Unit Type SR3. Size of Panel 10¼x5¼. Complete, less tubes and battery. \$20 f.o.b. Portland

These illustrations show two more of our complete line of receiving instruments—our Detector, and our Detector and One-Stage Amplifier.

These instruments are of the finest materials and workmanship.

Panels are of quarter-inch grade XX Bakelite. The engraving is done with Gorton Pantagraph engraving machine. Cabinets are of oak, flemish oak finish.

Knobs and dials are turned from sheet Bakelite.



Detector and one-stage Amplifier, Type SR4. Size of Panel 10¼x9¼. Complete, less tubes and battery. \$46 f.o.b. Portland.

Write for illustrated Catalog, prices and our Guarantee

NORTHWESTERN RADIO MANUFACTURING CO.
1556 EAST TAYLOR STREET PORTLAND, OREGON

Ad for the Northwestern SR-3 vacuum tube detector and SR-4 detector and one-stage amplifier combination. (Pacific Radio News May, 1921)

Northwestern SR-3 Vacuum Tube Detector Unit Catalog A-506 1921

BULLETIN No. 5
NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON





Vacuum Tube Detector Unit
Type SR-3

FOR the reception of radio telegraph and radio telephone signals the vacuum tube has come to be almost indispensable and in order to meet the demand for an efficient vacuum tube control unit we offer our Type SR-3 to the radio fraternity. We feel certain that this unit covers all the desirable points that could be wished for in the control of a vacuum tube when used as a detector.

This unit has the same general appearance as our other vacuum tube units and is constructed along the same practical lines. It is equipped with the necessary binding posts to enable the operator to use the set in connection with any type of receiving apparatus or with any type of amplifying equipment, without adding to or changing any connections other than those already on the unit.

The telephone receivers may be connected to the set either by means of a regular telephone plug or by connection to binding posts at the side of the panel.

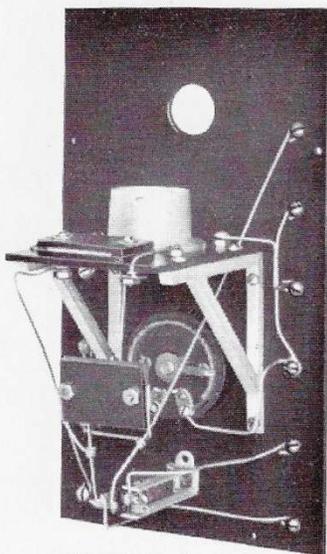
Type SR-3 is equipped with our standard grid condenser and grid leak. This condenser is built up, of the best grade mica and thin shim metal, the whole being firmly clamped between pieces of Bakelite Dilecto. The bridging condenser which is normally connected across the telephone receivers is constructed in the same manner as the grid condenser and is of the correct value to insure maximum results.

The top portion of the cabinet opens in a novel way, giving free access to the interior for the changing of tubes or varying the grid leak.

Bulletin No. 5 pg. 1



BULLETIN No. 5
NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON



Type SR-3. Back View

SPECIFICATIONS

- PANEL**—Bakelite Dilecto Grade XX hand finished.
CABINET—Oak, Flemish finished and waxed.
DIAL—Machined from quarter-inch Bakelite Dilecto sheet. Figures engraved on Pantograph Engraving Machine.
KNOB—Turned from half-inch Bakelite Dilecto.
METAL PARTS—Brass parts nickered satin finish. Tube socket supported by aluminum brackets attached to front panel.
ENGRAVING—All engraving done on Gorton Pantograph Engraving Machine.
TUBE SOCKET—Our standard Type SR-9.
DIMENSIONS— $10\frac{1}{2} \times 5\frac{3}{4}$ inches and one-quarter inch thick. Cabinet 6 inches deep.
WEIGHT—Net weight, 4 pounds. Shipping weight, 8 pounds.

CAT. No. A-506. TYPE No. SR-3. DESCRIPTION—Vacuum Tube Detector Unit.
PRICE \$20.00

NORTHWESTERN RADIO MFG. CO.

1556 EAST TAYLOR STREET

PORTLAND, OREGON

Northwestern SR-3 Vacuum Tube Detector Unit
SR-3 front view



SR-3 inside view



This SR-3 was restored by the authors. It had been gutted and the front panel was badly broken when we received it. However, the original cabinet and binding posts were deemed salvageable. A piece of hard rubber left over from the Northwestern factory was located and used for creating a new front panel. The SR-3 was then reassembled according to factory photos.

The SR-4 Vacuum Tube Detector and One-Stage Amplifier

The SR-4 is an economical version of the SR-2 with only a single stage of amplification. "This unit makes an ideal equipment for the average amateur station...[for radiomen that] do not desire amplification greater than that obtained from a detector and one additional step of amplification."³³

"The SR-4 is so arranged that, in case the purchaser desires to add another stage of amplification, he may do so without altering in any way the internal connections. Our SR-6 amplifier unit makes an ideal amplifier to add to this set, as it is identical in construction...."³⁴



³³ Bulletin No 3

³⁴ Ibid

SR-4 - inside view



Northwestern SR-4 Detector and One Stage Amplifier Catalog A-505 - 1921

BULLETIN No. 3
NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON



Detector and One Stage Amplifier

Type SR-4

MANY RADIO men in equipping their stations do not desire amplification greater than that obtained from a detector and one additional stage of amplification. It is to this class of radio enthusiasts that we particularly offer our Type SR-4 Detector and One Stage Audio Frequency Amplifier. This unit makes an ideal equipment for the average amateur station and when used in connection with a regenerative receiver will give results that are surprising.

This unit is designed and constructed along the same lines as all our other vacuum tube detectors and amplifiers, and the same high standard of workmanship is maintained throughout.

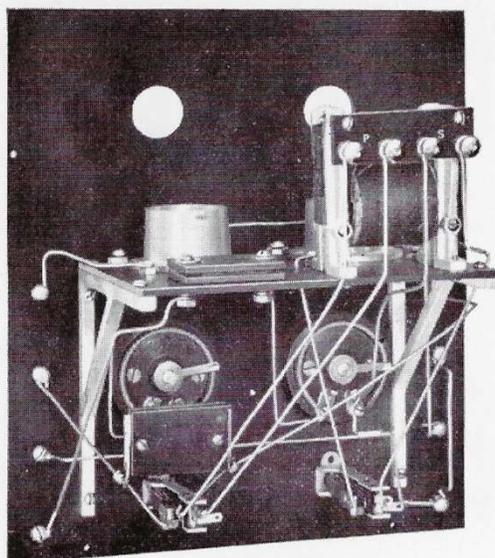
Type SR-4 is so arranged that in case the purchaser later desires to add another stage of amplification he may do so without altering in any way the internal connections, it simply being necessary to make the necessary additional connections to the amplifier. Our SR-6 amplifier unit makes an ideal amplifier to add to this set, as it is identical in construction and the panel height is the same.

We cannot too highly recommend this detector and amplifier for all around results. A trial will convince you of the truth of this statement.

Bulletin No. 3 pg. 1



BULLETIN No. 3
NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON



Type SR-4. Back View

SPECIFICATIONS

PANEL—Bakelite Dilecto Grade XX hand finished.

CABINET—Oak Flemish finished and waxed.

DIALS—Machined from quarter-inch Bakelite Dilecto sheet. Figures engraved with Pantograph Engraving Machine

KNOBS—Machined from one-half inch Bakelite Dilecto sheet.

METAL PARTS—Brass parts nickel plated satin finish.

ENGRAVING—All engraving done with Gorton Pantograph Engraving Machine.

DIMENSIONS—Panel, $10\frac{1}{2} \times 9\frac{1}{4}$ inches and one-quarter inch thick. Cabinet 6 inches deep.

WEIGHT—Net weight 8 pounds. Shipping weight 13 pounds. Wiring diagram and instruction accompany each set.

CAT. No. A-505. TYPE No. SR-4. DESCRIPTION—Detector and One Stage Amplifier.
PRICE \$46.00

NORTHWESTERN RADIO MFG. CO.

1556 EAST TAYLOR STREET

PORTLAND, OREGON

The SR-5 Two-Stage Amplifier

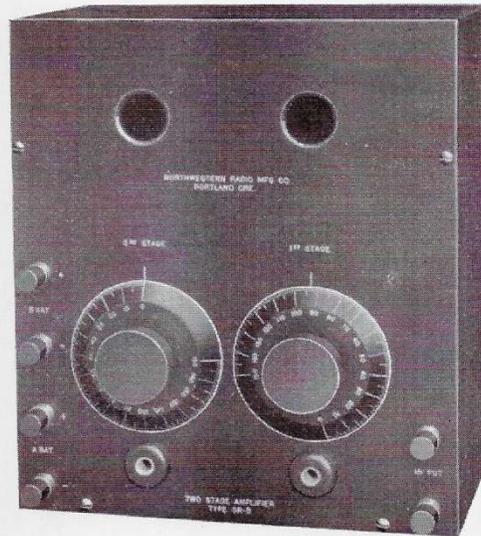
The SR-5 was Northwestern's version of the popular two-stage audio amplifier.

In early days of broadcast radio with widely-scattered stations running lower power, audio amplifiers were popular add-ons. Amplifiers made weak signals strong-enough to be audible for the family to listen in on a speaker instead of listening one-at-a-time on headphones.

Many companies made similar audio amps such as RCA's Radiola III Balanced amp, Clapp-Eastham's HZ, and the Westinghouse Aeriola Senior Type AC amplifier.

Northwestern SR-5 Two Stage Amplifier Catalog A-504 - 1921

BULLETIN No. 4
NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON



Two Stage Amplifier

Type SR-5

TO ENABLE the man who is now using a single Audion Detector or a Crystal Detector to obtain maximum results from his present equipment, we offer our Type SR-5 Two Stage Audio Frequency Amplifier. This unit may be used in connection with any style of receiving apparatus for amplification of the received signals. Its use increases the range of reception of the station to a very marked degree; in fact, signals that are inaudible without the amplifier may be easily copied after it is installed.

This unit may also be used to amplify weak electric currents in other than radio circuits. Its field of usefulness to the electrical experimenter is very wide.

Special care has been taken to eliminate all howling and squealing, which is found in amplifiers of more than one stage.

Our Type SR-9 Machined Aluminum Tube Sockets are used in this unit.

The tube sockets are mounted on a sub-base of one-eighth-inch Bakelite Dilecto, which is supported by aluminum brackets secured to the back of the main panel. The amplifying transformers are also mounted on this sub-base to the rear of the tube sockets.

Rheostats are mounted directly on the back of the main panel and are of sufficient resistance to control the filaments of all standard type receiving tubes. Our standard Bakelite Knobs and Dials, Type SR-10, are used to indicate the position of the rheostats.

Western Electric Jacks are used in this unit.

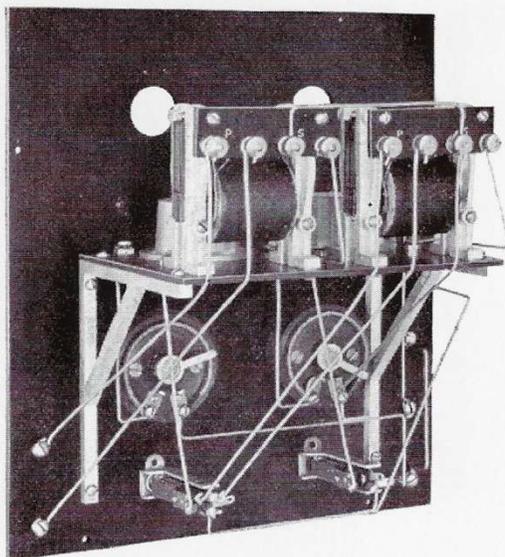
Accessibility to the tube sockets is secured by the upper portion of the cabinet being hinged in such a manner that the operator may easily and quickly change tubes and examine the interior of the cabinet without removing any connections.

The construction, material and workmanship in this unit is of the best.



BULLETIN No. 4

NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON



Type SR-5. Back View

SPECIFICATIONS

PANEL—Bakelite Dilecto Grade XX hand finished.

CABINET—Oak, Flemish Oak Finish, and waxed.

DIALS—Turned from one-quarter inch Bakelite Dilecto Sheet. Figures engraved with Pantograph Engraving Machine.

KNOBS—Machined from one-half inch Bakelite Dilecto Sheet.

METAL PARTS—Brass parts nickered satin finish. Bracket supports cast aluminum.

ENGRAVING—All engraving done with Gorton Pantograph Engraving Machine.

DIMENSIONS—Panel $10\frac{1}{2} \times 9\frac{1}{4}$ inches, one-quarter inch thick. Cabinet 6 inches deep.

WEIGHT—Net weight 9 lbs. Shipping weight 14 lbs.

CAT. No. A-504. TYPE SR-5. DESCRIPTION—Two Stage Audio Frequency Amplifier.

PRICE \$50.00

NORTHWESTERN RADIO MFG. CO.

1556 EAST TAYLOR STREET

PORTLAND, OREGON

The SR-6 Amplifier Unit

“This amplifier unit is a complete one-stage audio frequency amplifier. Type SR-6 was designed to fill the needs of the radio man who already has some vacuum tube apparatus, but desires to increase the amplification and still utilize the apparatus which he has on hand.”³⁵

“In general appearance, this unit is the same as [the Northwestern SR-3 Detector] and may be used in connection with it by merely bridging the necessary adjoining binding posts.”³⁶

³⁵ Bulletin No 6

³⁶ Ibid

Northwestern SR-6 Amplifier Unit Catalog 511 - 1921

BULLETIN No. 6
NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON



Amplifier Unit

Type SR-6

THIS AMPLIFIER unit is a complete one-stage Audio Frequency Amplifier. Type SR-6 was designed to fill the needs of the radio man who already has some vacuum tube apparatus, but desires to increase the amplification and still utilize the apparatus which he has on hand.

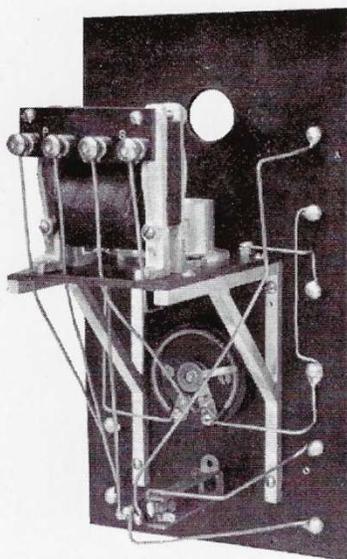
In general appearance this unit is the same as our Type SR-3 and may be used in connection with same by merely bridging the necessary adjoining binding posts. These units are ideal for the man who desires to assemble an amplifier in small units, but eventually have a complete set of two or three stages and also have a set that will function properly and present a good appearance. These units fill these requirements.

The material and workmanship is the best throughout and we have spared no pains to produce an instrument that is without a rival.

Bulletin No. 6 pg. 1



BULLETIN No. 6
NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON



Type SR-6. Back View

SPECIFICATIONS

PANEL—Bakelite Dilecto Grade XX hand finished.
CABINET—Oak, Flemish finished and waxed.
DIALS—Machined from quarter-inch Bakelite Dilecto Sheet. Figures engraved with Pantograph Engraving Machine.
KNOBS—Turned from half-inch Bakelite Dilecto sheet.
METAL PARTS—Brass parts nicked satin finish. Socket supports cast aluminum.
ENGRAVING—All engraving done on Gorton Pantograph Engraving Machine.
DIMENSIONS—Panel $10\frac{1}{2} \times 5\frac{3}{4}$ inches and one-quarter inch thick. Cabinet 6 inches deep.
WEIGHT—Net weight 5 pounds. Shipping weight 9 pounds.

CAT. No. 511. TYPE No. SR-6. DESCRIPTION—Amplifier Unit.
PRICE \$25.00

NORTHWESTERN RADIO MFG. CO.

1556 EAST TAYLOR STREET

PORTLAND, OREGON

Northwestern Components

SR-7 – SR-12, SR-16, SR-18, SR-23, SR-26, SR-28

Northwestern manufactured and cataloged a variety of radio components. These were available for separate purchase and many were also incorporated into Northwestern receivers. Their binding posts and knobs, in particular, are distinctive designs, peculiar to the company.

Controlling their own fabricating resources meant that NORCO welcomed custom work. No doubt there are other catalogued, and uncatalogued, Northwestern components.

The SR-7 is a wood-frame variometer. It was featured in some of the company's earliest ads and was regularly paired with the SR-8 variocoupler. The SR-7 variometer was updated with a Bakelite frame and was released as the SR-16.

SR-13?

We've not determined if Northwestern produced a component with this number.

Collector's Tip: Since so many types of NORCO components were available for separate sale, collectors should not be surprised to discover them loose or in home-built projects.

The advertisement features two images of the SR-7 variometer. The top image shows the unmounted unit, a square metal frame with a circular dial and a central shaft. The bottom image shows the mounted unit, which is housed in a larger, more complex metal enclosure with a Bakelite panel on the front. The text is arranged around these images, providing technical details and pricing. The Hallock & Watson logo is visible in the top left and bottom right corners of the ad.

HALLOWAT

The Variometer

Par Excellence

No Dielectric
No Bearing Contacts
Hollow shaft may be grounded
affording a real "shield."
Unmounted, \$6.50

HALLOCK & WATSON RADIO SERVICE
192 Park St. "KGG" Portland, Ore.

DISTRIBUTORS FOR

NORTHWESTERN RADIO MFG. CO.
1556 E. Taylor "KGN" Portland, Ore.

"BOOST OREGON PRODUCTS"

The "Unit" Form

Back Connected—Bakelite Panel

Two variometers and one coupler "unit" make a two circuit regenerative receiver of highest quality and beautiful finish.

Variometers, \$10.00
Couplers, \$15.00

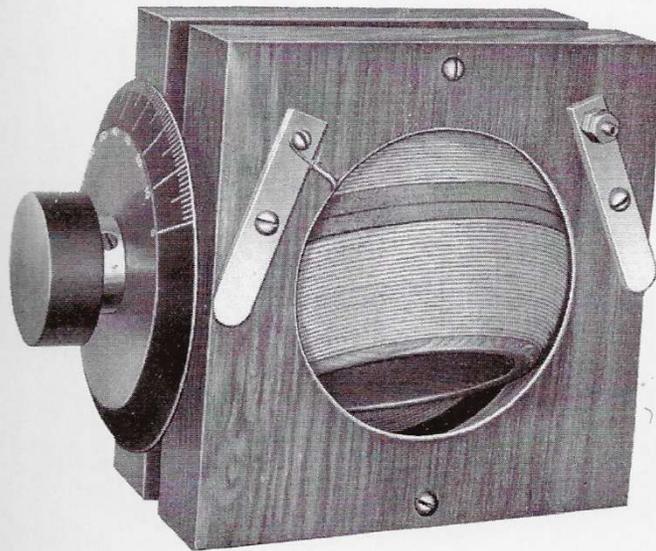
HALLOWAT

Hallock & Watson ad for the Northwestern SR-16 variometer – unmounted and mounted. (Radio Waves July, 1922)

SR-7 Northwestern Variometer Catalog A-502 - 1921

BULLETIN No. 7

NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON



Northwestern Variometer

Type SR-7

IN DESIGNING this variometer we have endeavored to produce an instrument above the ordinary, one that would have the greatest possible electrical efficiency combined with the most rugged construction compatible with neatness and low cost. We feel that we have succeeded in accomplishing this result.

The forms for this variometer are turned from selected, well-seasoned maple, by means of jigs which insure great mechanical accuracy. All of the wood parts are thoroughly impregnated with an insulating compound, which also prevents the absorption of moisture. All metal parts are of brass, and are finished in white nickel to prevent corrosion.

The bearings are formed of heavy brass blocks; the shafts are cut from quarter-inch brass rod. Connections to the motor are taken out through the bearings which are further provided with a special form of brush to insure positive contact at all times. These same brushes act as thrust bearings to prevent end play.

Size of windings and the spacing between the stator and rotor are so designed that as high a maximum and as low a minimum of inductance as possible will be obtained and still maintain a low distributed capacity.

This variometer is ideal for use in constructing your own Short Wave Regenerative Receiver; in fact, it is the same instrument that we use in our Type SR-1 Short Wave Receiver. When used with the proper sized variocoupler it will cover all waves between 160 and 450 meters. This variometer may also be used to tune the plate circuit for regeneration.

CAT No. A-502. TYPE SR-7. DESCRIPTION—Variometer.
PRICE, Without dial, \$9.00. With dial, \$11.25.

NORTHWESTERN RADIO MFG. CO.

1556 EAST TAYLOR STREET

PORTLAND, OREGON

Northwestern SR-8 Northwestern Variocoupler Catalog A-501 - 1921



BULLETIN No. 7

NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON 20



Northwestern Variocoupler

Type SR-8

WE TAKE pleasure in introducing our variocoupler, which, we believe, compares with the best on the market, and embodies many features not found in others. This variocoupler was designed principally for efficient 200-meter work, and is intended for use with our variometer. When so used it will give a range of wave length in the secondary circuit from 160 meters to 460 meters, and with a small shunt condenser this range may be extended to 800 or 900 meters with excellent results.

The primary winding consists of sixty turns on a four-inch Bakelite tube, with taps taken out in an unusual manner every five turns. The method of tapping makes possible a more secure connection, and is much neater than in common practice. The secondary winding is constructed on a ball turned from well-seasoned, and especially selected hard maple.

The secondary is supported on shafts of quarter-inch brass rod run in bearings formed of heavy blocks of cast aluminum. Connections are made through the bearings. Special brushes are provided to insure a perfect electrical contact at all times. These also act as thrust bearings, and prevent end play. The coupler is designed for back-of-panel mounting, and for this purpose is provided with suitable supports of cast aluminum.

Wooden parts are thoroughly impregnated with an insulating compound to exclude moisture before the windings are applied. All metal parts, with the exception of the aluminum castings are finished in white nickel to prevent corrosion. The windings are varnished with a special insulating varnish to maintain perfect insulation and to aid in securing the windings.

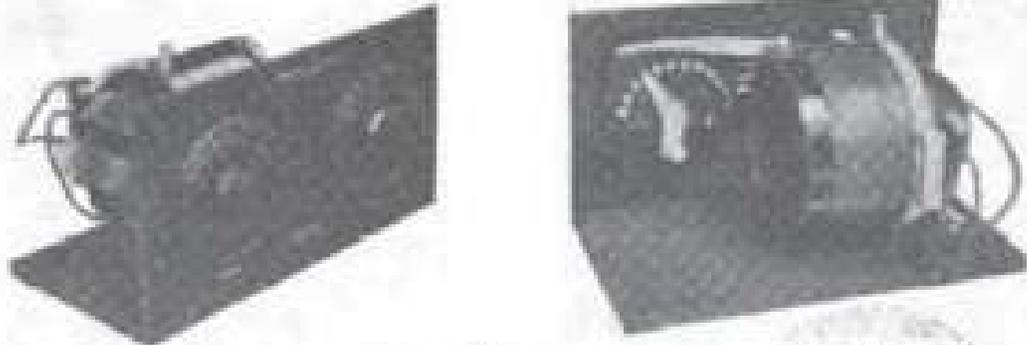
CAT. No. A-501. TYPE SR-8. DESCRIPTION—Variocoupler.
PRICE, \$8.50. With dial and knob, \$10.50.

NORTHWESTERN RADIO MFG. CO.

1556 EAST TAYLOR STREET

PORTLAND, OREGON

HERE SHE IS!
THE NEW NORTHWESTERN VARIOCOUPLER



Panel $9\frac{1}{2} \times 8\frac{1}{2} \times \frac{1}{4}$. **XX Bakelite** Throughout. "No Dielectric" Rotor.
Twelve point back connected Switch. Silver Plated.
Aluminum Brackets. Wire—No. 30 Double Silk, Green.

Mounted Unit
as shown
\$15.00

We're
Trebbling
the Factory.

**Unmounted
Coupler Only**
\$6.50

HALLOCK AND WATSON RADIO SERVICE

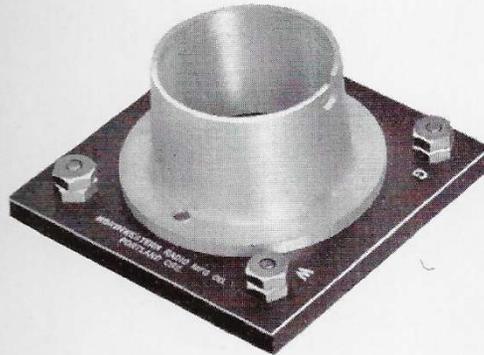
122 PARK STREET "KGG" PORTLAND, ORE.

Hallock and Watson ad for the Northwestern Variocoupler Panel incorporating the SR-8. *Radio* June, 1922. The mounted installation, with the 12-point back connected tap switch, is similar to the way that the variocoupler was utilized in the SR-1.

Northwestern SR-9 Vacuum Tube Socket Catalog 510 - 1921

BULLETIN No. 9

NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON



Vacuum Tube Socket

Type SR-9

THIS TUBE socket was designed to accommodate the standard four-prong vacuum tube. The top part of this socket is a machined aluminum casting of such size as to make a durable and rugged socket. The machining is accurate and all standard tubes will fit without having too much clearance.

This casting is mounted on a quarter-inch Grade XX Bakelite Dilecto base, which insures strength and freedom from undesirable leakage losses.

Connection with the tube contacts is obtained by means of heavy Phosphor bronze springs of sufficient length to insure ease in replacing tubes and still maintain sufficient spring to insure a perfect contact. These springs are nickel plated to prevent corrosion.

Many of these tube sockets have been in actual daily use for many months and all users are more than pleased with their performance.

These sockets are identical to the sockets used in our other standard vacuum tube equipment. They may be used either for front or rear panel mounting.

We are in a position to supply these sockets in banks of as many sockets as desired mounted on one base. This construction is especially desirable for use in constructing amplifying apparatus. Price per socket same as listed below.

SPECIFICATIONS

BASE—Bakelite Dilecto Grade XX.

SOCKET—Cast Aluminum Accurately Machined to size.

SPRINGS—Phosphor Bronze Nickel plated.

DIMENSIONS—Base $2\frac{3}{4} \times 2\frac{3}{4}$ inches. Height over all $1\frac{1}{2}$ inch.

CAT. No. 510. TYPE SR-9. DESCRIPTION—Vacuum Tube Socket.

PRICE \$1.50.

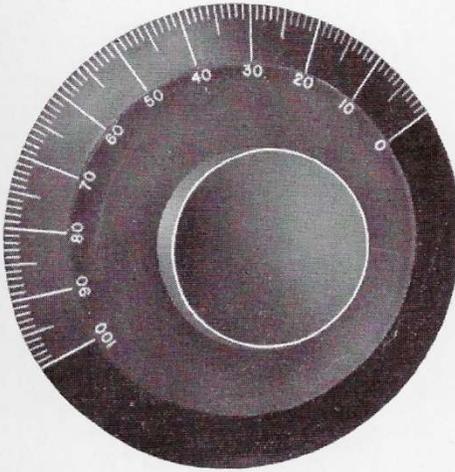
NORTHWESTERN RADIO MFG. CO.

1556 EAST TAYLOR STREET

PORTLAND, OREGON

SR-10, SR-11, SR-12 Bakelite Knobs and Dials Catalog 507, 508, 509 - 1921

BULLETIN No. 8
NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON



Bakelite Knobs and Dials

Type SR-10-11-12

IN ALMOST all of the better and most up-to-the-minute types of radio apparatus the various adjustments of the moving parts are indicated by means of dials. This method of indicating not only makes a neater appearance, but also makes it possible to keep the front of a panel much cleaner and in better condition than is ordinarily possible where the panel is covered with contact points and other protruding parts.

Our dials are machined from sheet Bakelite Dilecto and are true. This is a point worth considering when purchasing dial, as no matter what care may have been taken in mounting the apparatus, if the dials are not true the entire appearance of the set will be destroyed and in many cases the smooth working of the controls will be impaired. Our knobs are not fastened solid to the dials, but are placed over the shaft and held close to the panel by means of a special spring washer placed between the knob and dial. The dial itself is driven by a pin which fits snugly in a hole in the metal part of the knob. By this arrangement the dial always fits up close to the panel, even if the shaft on which the dial and knob are mounted does not protrude from the panel absolutely true; this makes assembly an easy matter, and a satisfactory job sure to result.

Our dials are furnished regularly in two sizes; the largest are $3\frac{3}{4}$ -inch in diameter, engraved with 100 divisions per 180 degrees. The other two types of dials are $3\frac{1}{4}$ -inch in diameter, the Type SR-11 being engraved with 100 divisions per 180 degrees. The Type SR-10 is engraved with 150 divisions in 270 degrees. We can also furnish dials of $3\frac{1}{4}$ -inch diameter engraved 50 divisions in 90 degrees.

Knobs for use with the above dials are machined from heavy sheet Bakelite Dilecto and are mounted on a true brass bushing, which is drilled to fit $\frac{1}{4}$ -inch

Bulletin No. 8 pg. 1



BULLETIN No. 8

NORTHWESTERN RADIO MFG. CO., PORTLAND, OREGON

shaft. Knobs are held to the shaft by means of a tempered set screw. The edges or gripping surface of these knobs are not knurled, but are left smooth. The reason for leaving these knobs smooth can be appreciated after glancing at a knurled knob that has been in use for some time. It is invariably dusty and dirty and can not easily be kept clean. The Bakelite portion of these knobs is $1\frac{1}{2}$ -inch diameter and we contend that if the control works so hard that it is impossible to finely adjust it with this size knob, the control works too hard to be practical on radio apparatus. These knobs and dials are all that can be desired for any high class radio equipment. They are used on all our standard equipment.

CAT. No. 507. TYPE SR-10. DESCRIPTION—Dia. $3\frac{1}{4}$ inches. Knob and Dial 270 Deg.
PRICE \$2.25.

CAT. No. 508. TYPE SR-11. DESCRIPTION—Dia. $3\frac{1}{4}$ inches. Knob and Dial 180 Deg.
PRICE \$2.00.

CAT. No. 509. TYPE SR-12 (large). DESCRIPTION—Dia. $3\frac{3}{4}$ inches. Knob and Dial 180 Deg.
PRICE \$2.25.

NORTHWESTERN RADIO MFG. CO.

1556 EAST TAYLOR STREET

PORTLAND, OREGON

Bulletin No. 8 pg. 2

The SR-14 One-tube Regenerative Receiver - 1921

The SR-14 receiver combines an SR-3 one-tube detector and an SR-1 regenerative tuner in one cabinet with a shared panel. Though the two components are inseparable, the layout uses external jumpers to join them just as if they were sitting side-by-side. As such, the SR-14 represents a half-step between the panel-style sets of the early 1920's and the purpose-built complete receivers that followed. In many ways, it is similar to how Westinghouse combined the RA and DA components and produced the RC receiver (also in 1921).

Though still relatively primitive in design, the SR-14 is a complete radio that marked a shift away from the Amateur market and towards the mainstream consumer market. This timing coincides with the inauguration of the area's first broadcast station.

This example shows verniers in place of the lower two knobs. According to Northwestern ads³⁷, customers could pay a premium to have verniers, with their precision control, in place of standard knobs.

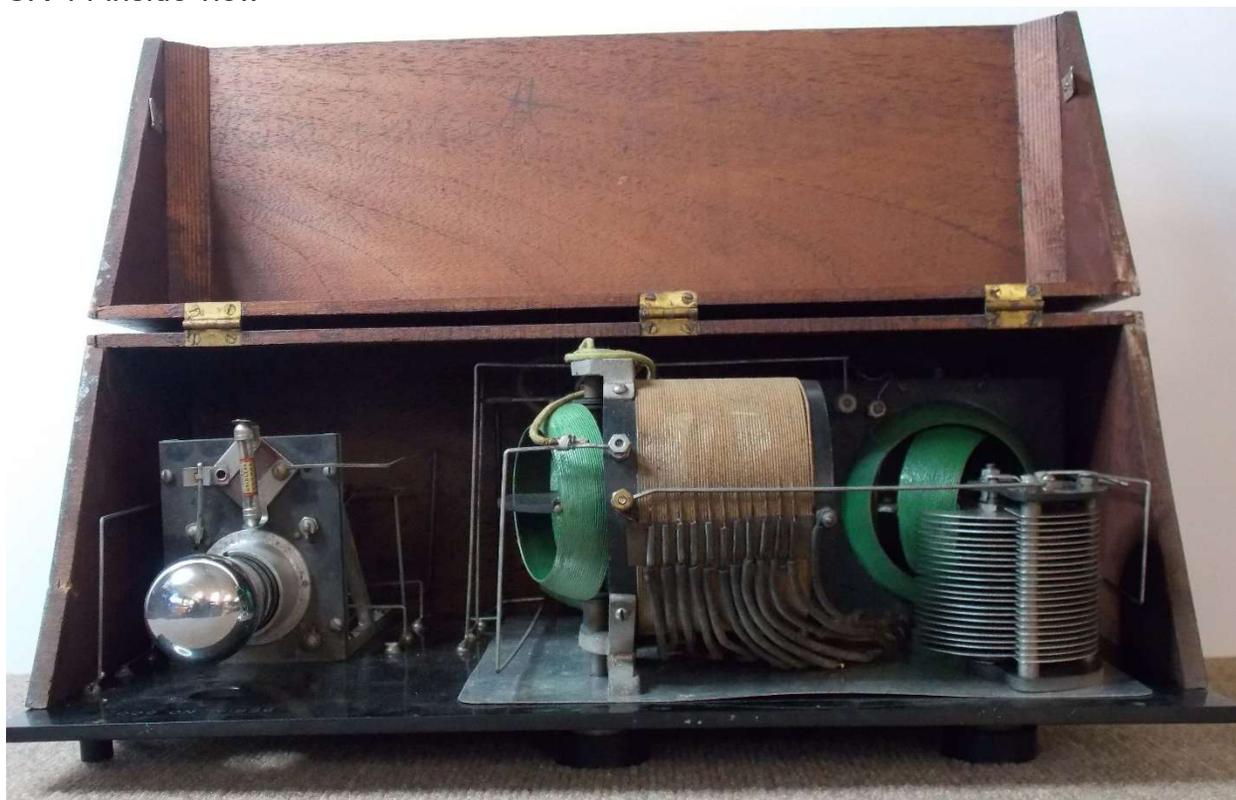
Northwestern SR-14 Regenerative Receiver serial number 14

SR-14 front view

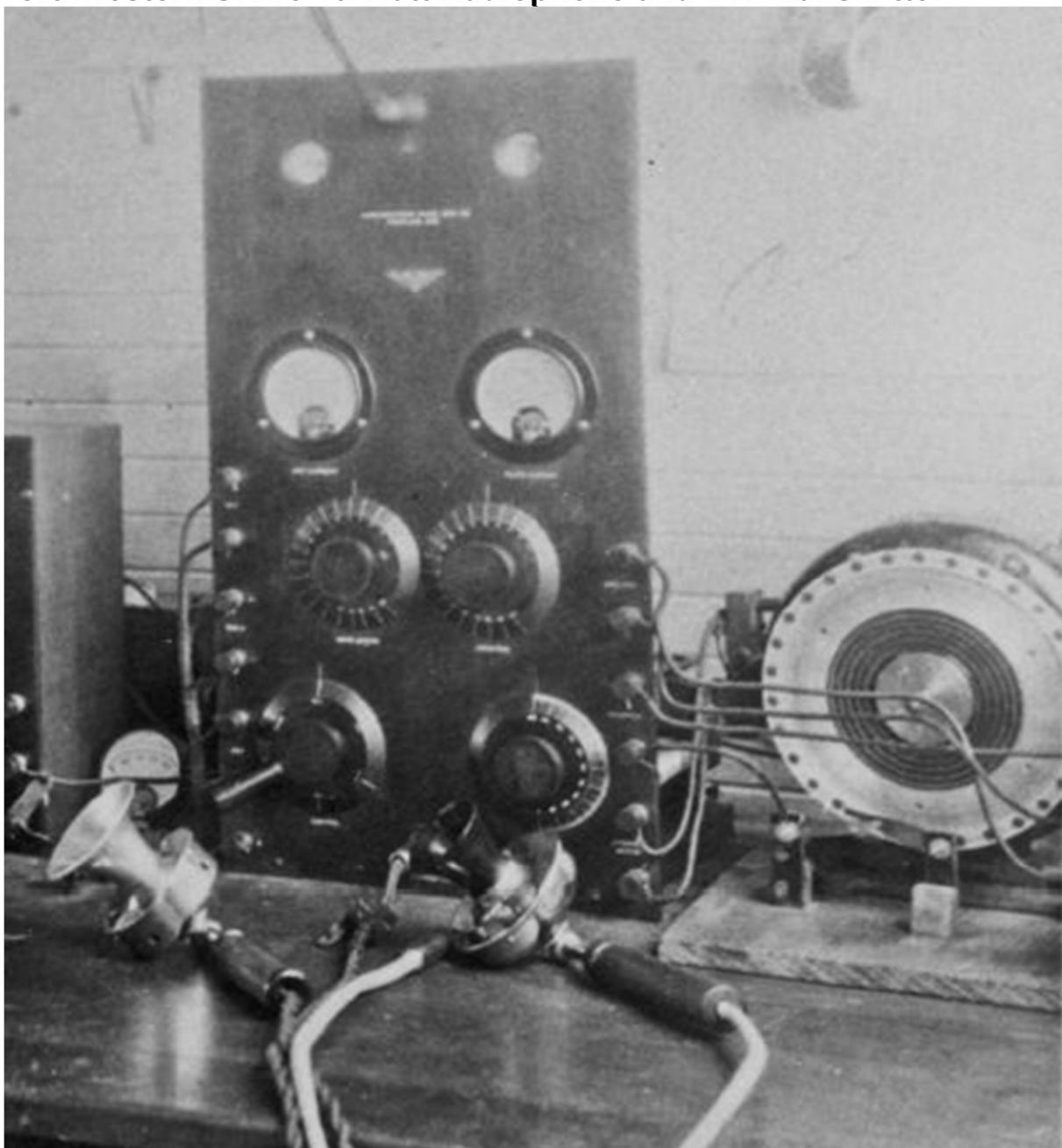


³⁷ Gould Battery & Service Co ad (*The Oregonian* October 25, 1925).

SR-14 inside view



Northwestern SR-15 10-Watt Radiophone and CW Transmitter



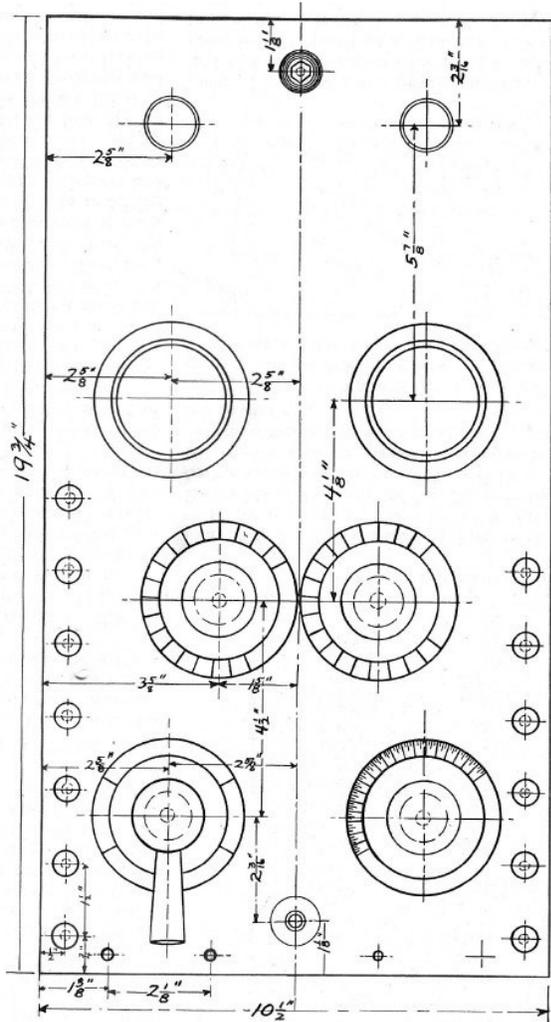
SR-15 10-Watt Transmitter at 7XF. (Image courtesy of CHR/SOWP)

This image shows an SR-15 10-watt transmitter at Northwestern's broadcast station, 7XF / KGN. The transmitter's design allowed it to be used for 'phone, CW, and modulated CW. The device to the right of the transmitter is a chopper that is used when transmitting modulated CW. The transmitter uses four UV-202 5-watt tubes. When in 'phone mode, two tubes are used for oscillation and two for modulation. In CW mode, the modulator tubes are not needed and are disconnected to lengthen filament life.

A Colpitts oscillator circuit was used with a Heising modulator circuit.

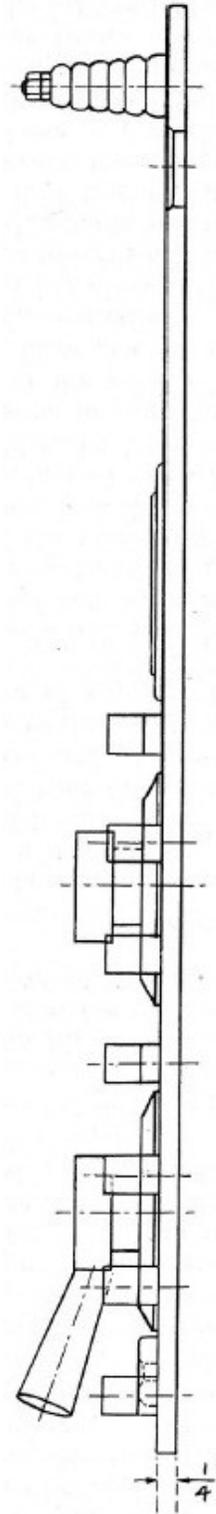
SR-15 10-Watt Radiophone and CW Transmitter

Plans published in the September 1922 issue of *Radio Waves*

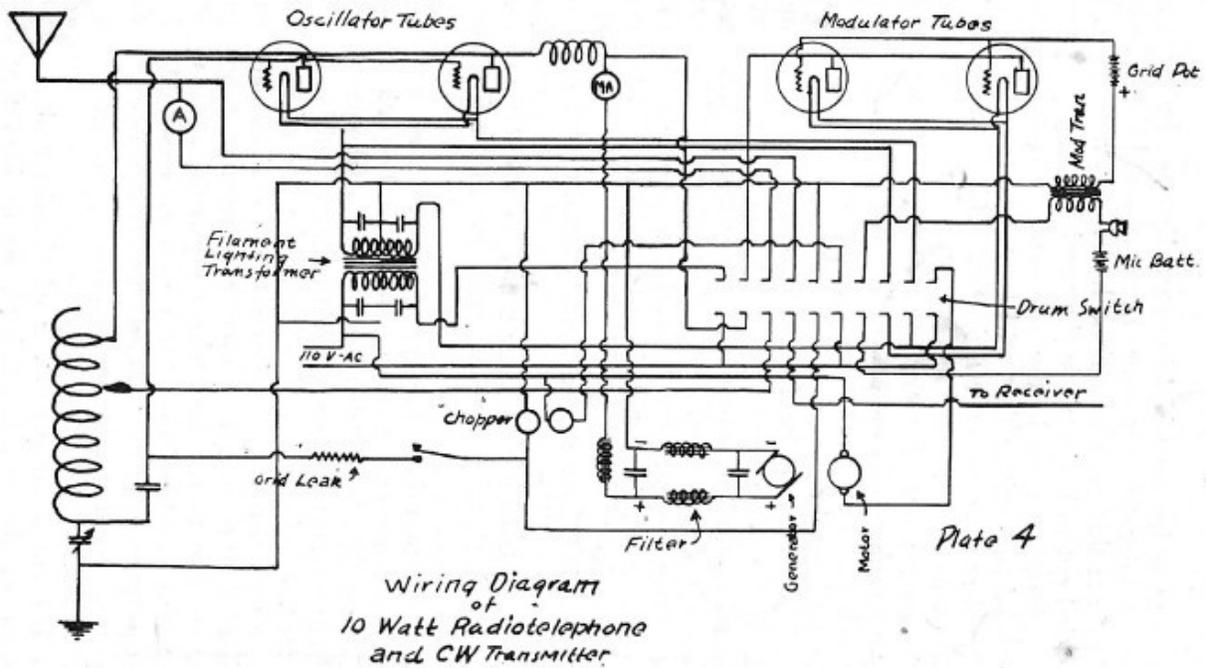


Panel Design
of
10 Watt radiotelephone and
C-W transmitter
Type SR-15

No.	Description	Mark	Mat'l
Panel Design			
NORTHWESTERN RADIO MFG. CO. PORTLAND, ORE.			
Scale 6"=1'	Date 9-26-21	Drawing No.	
Drawn R. L. Tracer	Checked R. L. Tracer	101	
Checked G. L. A.	Apr 1922 G. L. A.		



Side View



No	Description	Mark	Mat'l
Diagrams.			
NORTHWESTERN RADIO MFG. CO. PORTLAND, ORE			
Scale —	Date 9-26-21	Drawing No.	
Drawn Russ	Traced Russ	102	
checked R.A.	Apr 16 62		

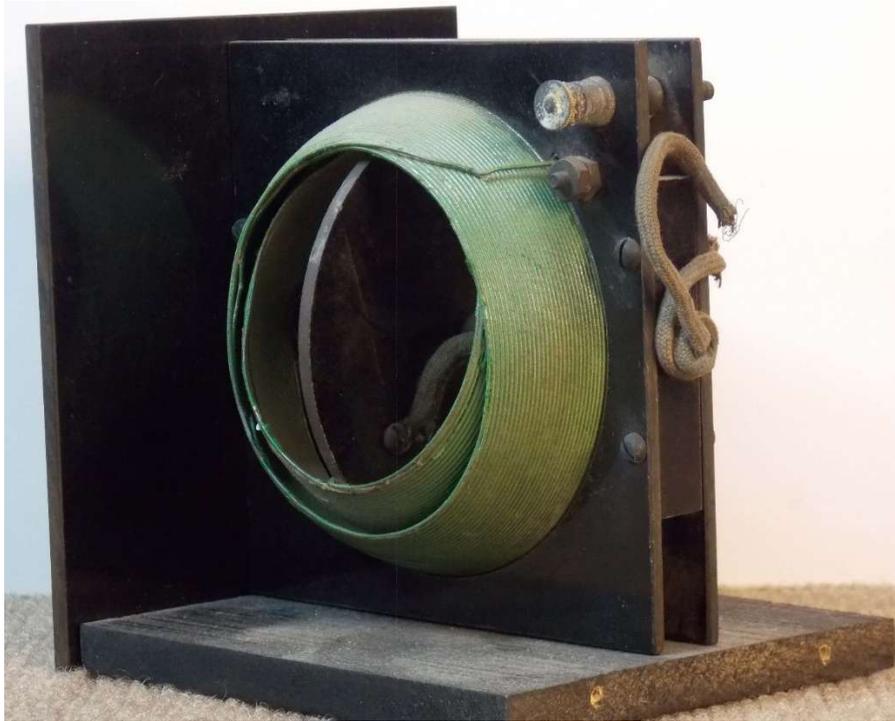
According to the plan legends, they were checked and approved by Charley Austin. "Russ" drew and traced the plans. "Russ" may be the moniker of Northwestern employee Walter V Russ (W7DE).

Northwestern SR-16 Variometer

SR-16 front view



SR-16 rear view



QST QSP All Amateurs QSQ QSL

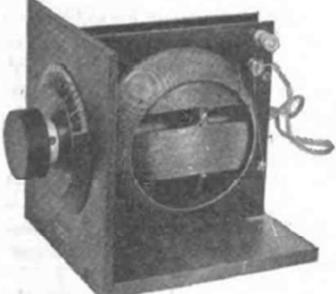
HALLOCK & WATSON RADIO SERVICE Announce

THE OPENING OF THEIR RADIO SUPPLY STORE IN PORTLAND, OREGON, WITH A COMPLETE STOCK OF RADIO TELEPHONE AND TELEGRAPH EQUIPMENT OF STANDARD MAKES.

PERSONNEL

<p>J. H. HALLOCK Formerly Radio Construction Engineer, U. S. Navy Dept. and Federal Telegraph Co.</p>	<p>C. H. WATSON Formerly in charge U. S. Naval Radio Laboratory, Mare Island, California.</p>
--	--

We believe we have the **MOST EFFICIENT** short wave receiving equipment on the market today and would like you to prove that statement to your own satisfaction.



Northwestern Variometer Mounted \$10.00

We refer to the new **UNIT VARIOMETER and VARIOCOUPLER** built by the Northwestern Radio Mfg. Co. of Portland, with whom we are co-operating in design work and whom we also represent as exclusive distributors.

Here are a few points of design that make the efficiency of the set apparent:

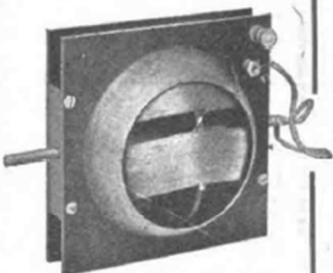
NO DIELECTRIC WHATEVER in or around the field of the coils, thereby reducing the dielectric hysteresis to a minimum—"NOTHING THERE BUT THE WIRE."

NO SPRING OR BEARING CONTACTS between stator and rotor. Flexible conductors permanently connected to binding posts in rear.

NO moulded material to warp or chip. Panel, knobs and dials machined from XX bakelite.

NO small, high resistance wire; No. 20 double SILK thruout.

NO binding posts or switch points on fronts of panels.



Northwestern Variometer Unmounted \$6.50

AND FURTHERMORE—NO TROUBLE getting that distant fone station. We're putting Avalon on the Magnavox with an indoor antenna in a first story flat!

INCIDENTALLY our 100 watt fone will be in operation the latter part of March. Drop us a line and get acquainted.

HALLOCK & WATSON RADIO SERVICE
192 Park Street Portland, Oregon

Hallock & Watson ad for the SR-16 Variometer (*Radio* April, 1922)

Northwestern SR-18 Variable Condenser

SR-18 front view



SR-18 rear view



The SR-21 Three-tube Regenerative Receiver - 1921

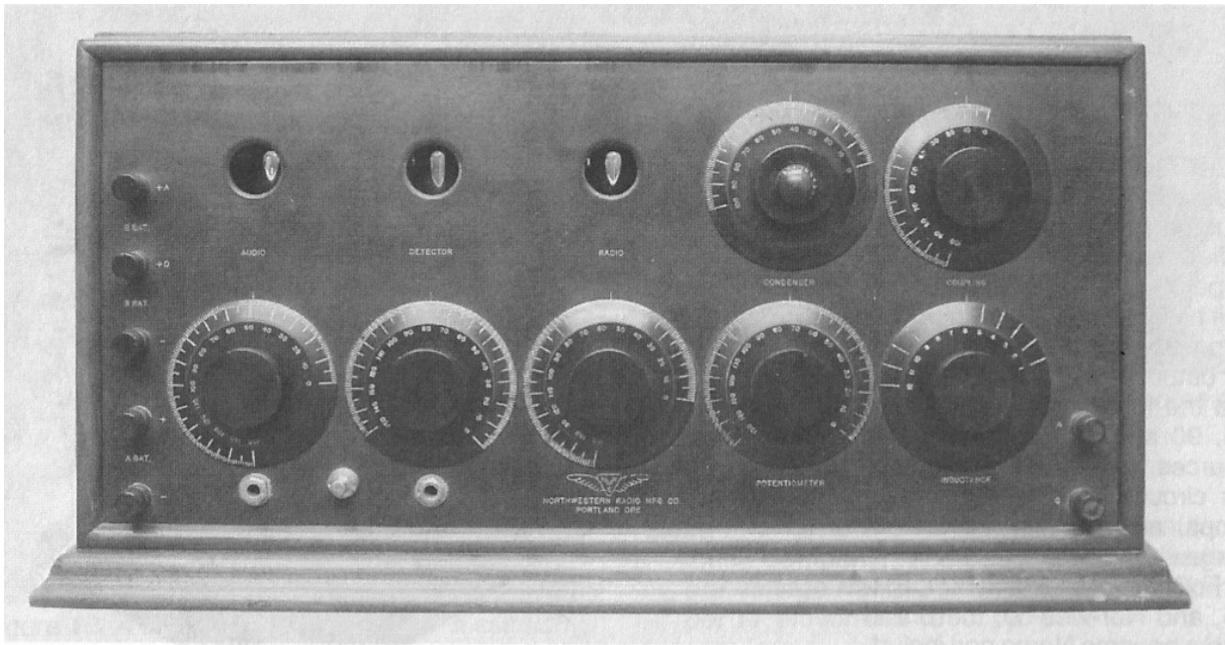
The SR-21 was one of Northwestern's first complete receivers. Except for the SR-14, prior radios had been panel-style; the SR-21 placed all components behind a single front panel and was enclosed in a stylish cabinet.

Binding posts dot the black front panel and viewing holes are provided for keeping an eye on the tube filaments.

The SR-21 used three type 01-A tubes – one as a detector and two for amplification. The set used a Federal-brand snap-in RF transformer and a Northwestern AF transformer.

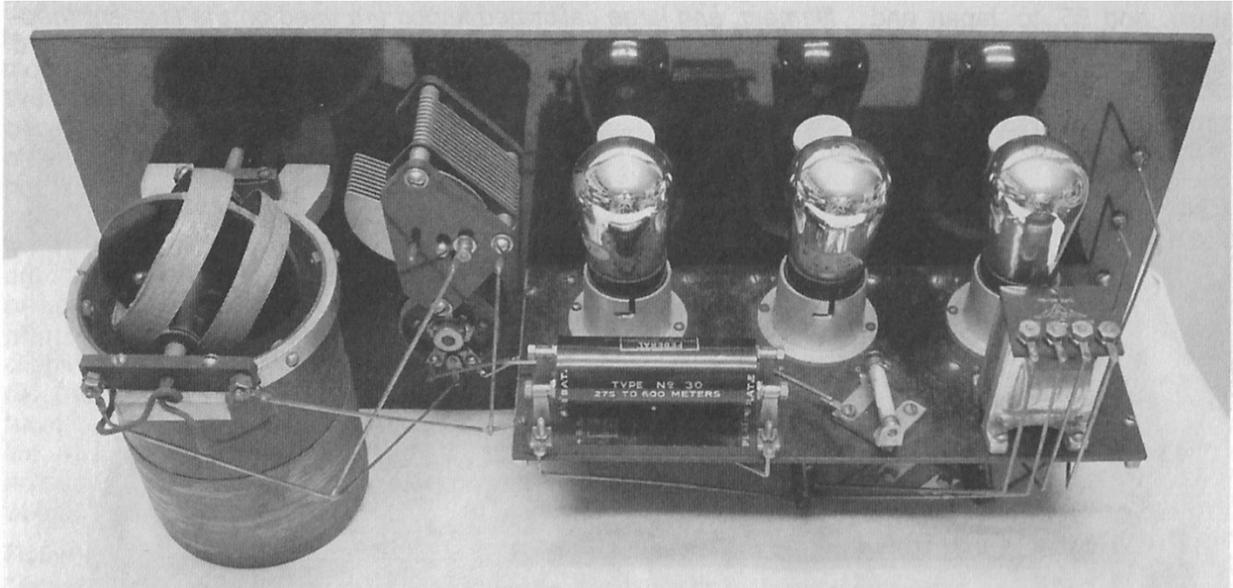
Northwestern SR-21 3-tube Regenerative Receiver - 1921

SR-21 front view



Sonny Clutter photo (*Antique Radio Classified* September 2005)

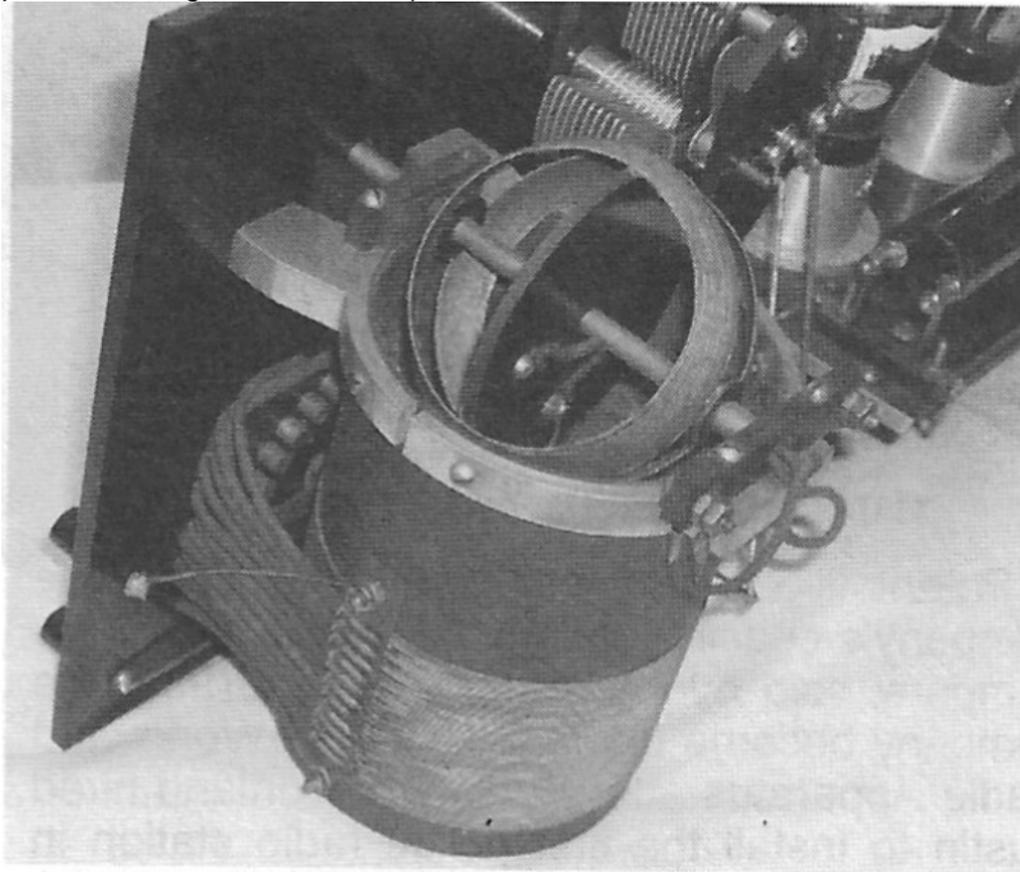
SR-21 inside view



Sonny Clutter photo (*Antique Radio Classified* September 2005)

SR-21 inside detail

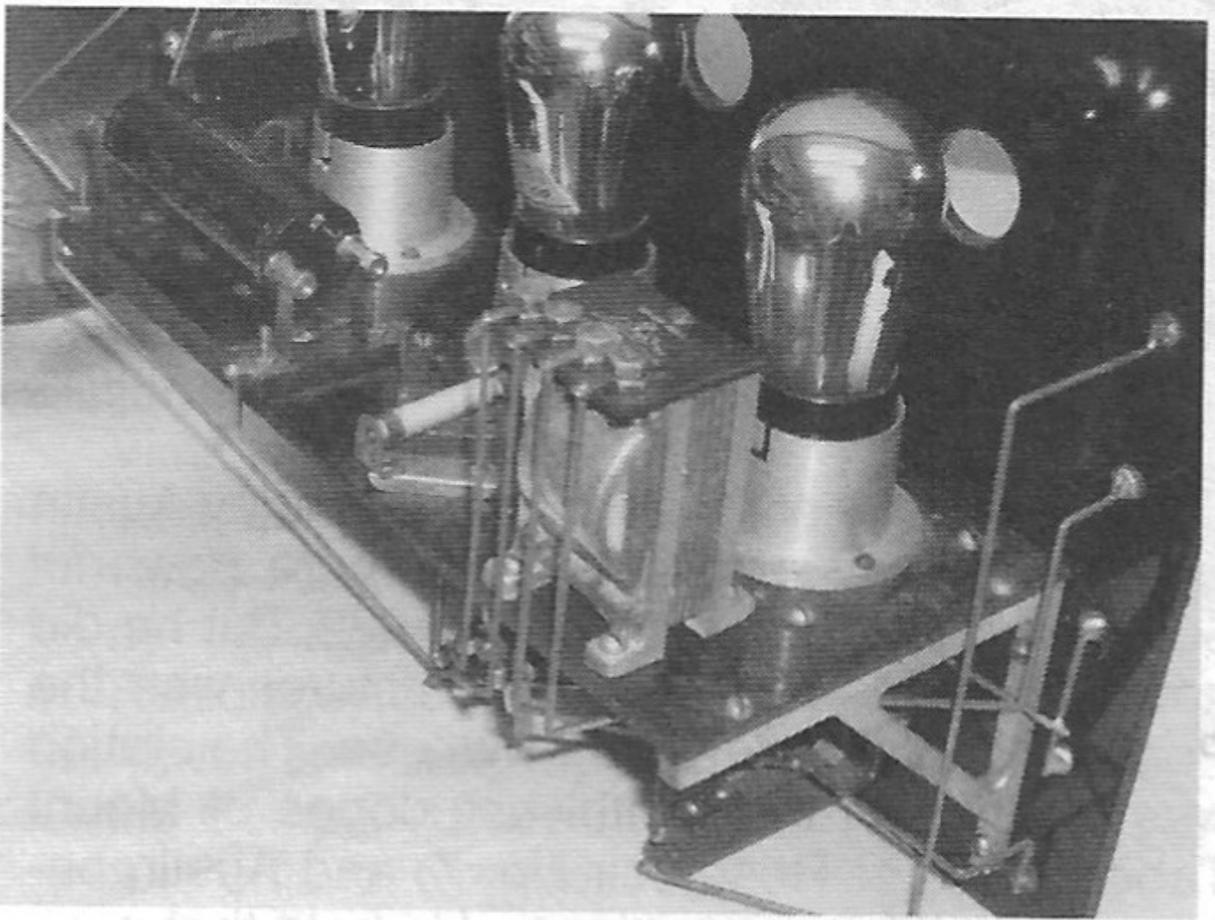
Close up of the tuning coil and the tap switch for the inductance



Sonny Clutter photo (*Antique Radio Classified* September 2005)

SR-21 inside detail

Close up of the Federal radio frequency transformer, the grid leak detector, and the Northwestern SR-28 audio frequency transformer



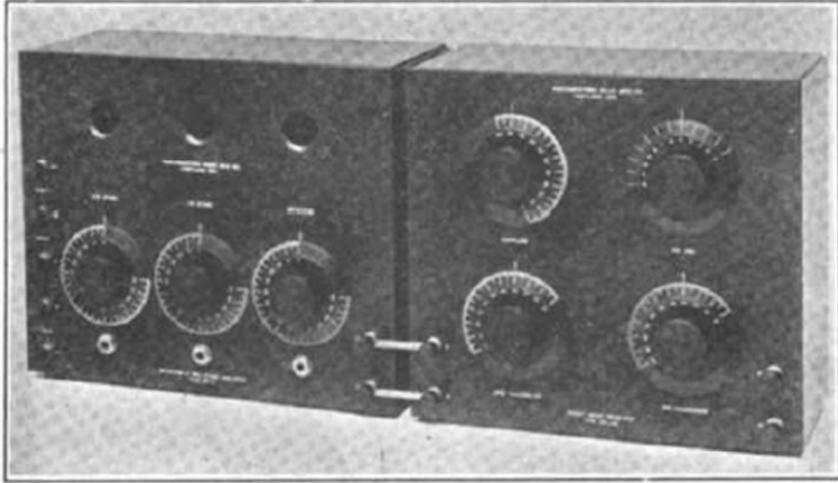
Sonny Clutter photo (*Antique Radio Classified* September 2005)

Northwestern SR-22 Non-Regenerative Tuner - 1922

INVESTIGATE
Our
**NON-REGENERATIVE
RECEIVER**
SR22—\$47.50
AN OREGON PRODUCT
Hallock & Watson
Radio Service
192 PARK STREET
Portland - - - Oregon
Broadcasting Station KGG
Experimental Station 7XI

Hallock & Watson ad for the Northwestern SR-22 (*The Oregonian* 9/10/1922)

IT'S HERE!

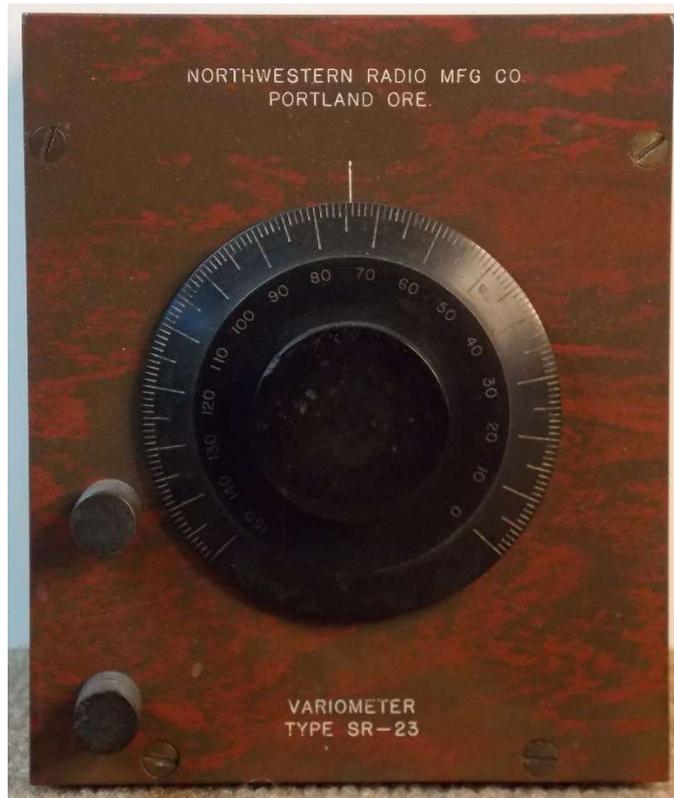


THE NON-REGENERATIVE RECEIVER DE LUXE
FOR BROADCASTING RECEPTION—NEAR OR FAR
Hallock & Watson Radio Service
192 Park Street "KGG" Portland, Ore.

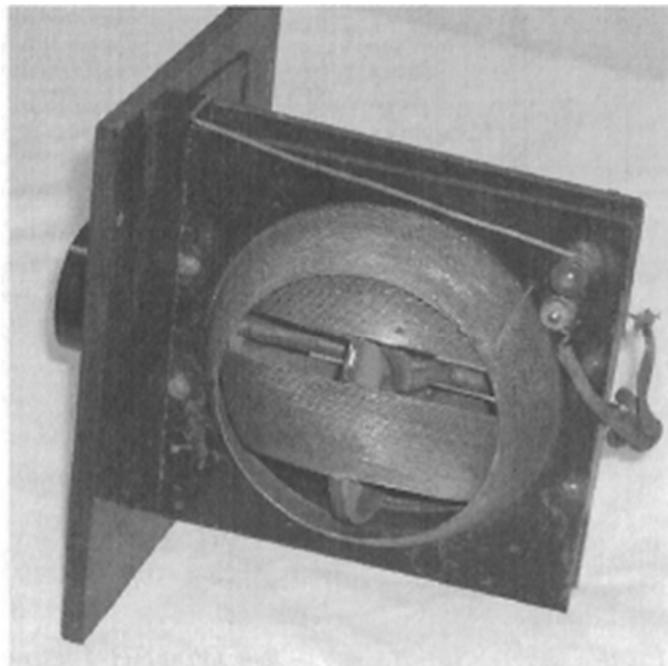
Hallock & Watson ad for the Northwestern SR-2 detector amplifier (left) and the SR-22 (right). (*Radio* October, 1922)

Northwestern SR-23 Variometer (regeneration control)– 1922

SR-23 front view



SR-23 inside view



Sonny Clutter photo

The Northwestern SR-25

The Northwestern SR-25's came in at least two similar versions. The early version, advertised in 1922 still had binding posts on the front panel. When the second version was released in 1923, the binding posts had been moved to the back of the chassis, projecting a somewhat more refined outward appearance. However, the second version still had a dizzying number of controls and tube viewing holes which harkened back to earlier designs.

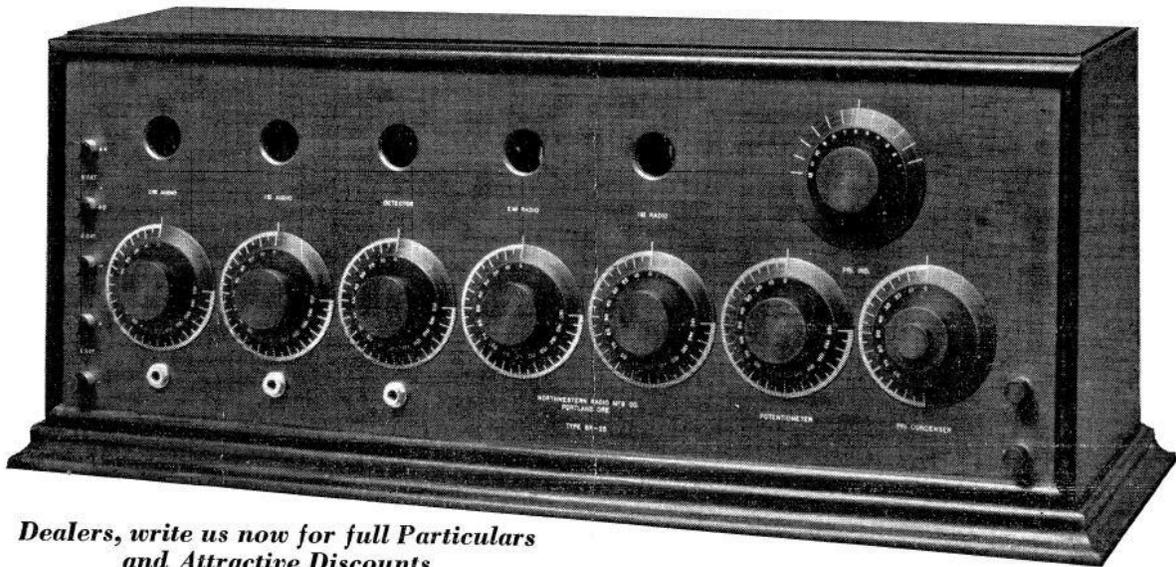
An ad for the SR-25 in the October, 1922 issue of *Radio Waves* shows the early version without the upper right-hand dial. As we only have the ad to go by, we don't know if this version of the SR-25 was actually produced or if this artwork was a conceptual design. All three variations are illustrated in the Product Compendium.

It appears that the SR-25 may have been the last product in the SR-series of part numbers. Later products were named instead of carrying "SR" numbers.

Northwestern SR-25 Receiver (8 knobs) – 1922

AN INSTRUMENT THAT WILL INTEREST YOU

A complete receiver employing both Radio and Audio Frequency Amplification. Designed to accomplish long-distance reception from Broadcasting Stations. Is EASY TO OPERATE AND NOT OVERLY CRITICAL IN OPERATION, a feature not to be overlooked.



*Dealers, write us now for full Particulars
and Attractive Discounts*

NORTHWESTERN RADIO MFG. CO.

1556 East Taylor Street

Phone Tabor 2686

Portland, Oregon

SR-25 ad from the inside rear cover for *Radio Waves* October, 1922. This version has binding posts on the front of the panel but only has a single knob in the upper row. It is also missing the winged triangle logo that is found on later versions. (Image used by permission from RadioMuseum.org)

Northwestern SR-25 Receiver (early version – 9 knobs) – 1922

SR-25 front view



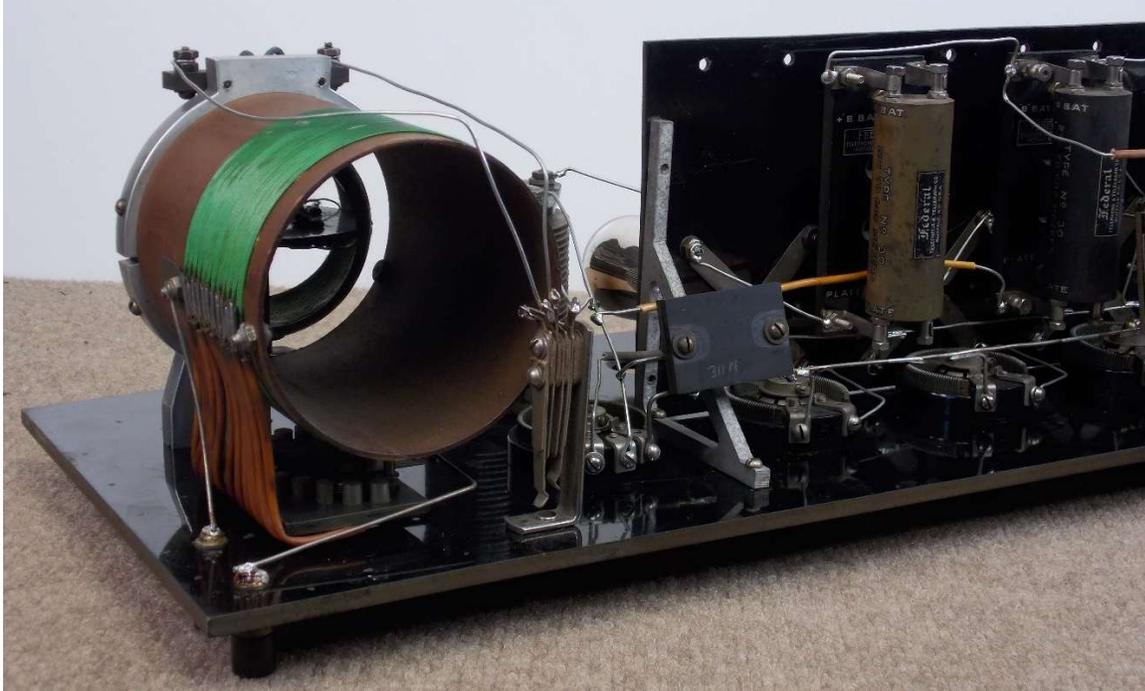
SR-25 inside view



Notes on the inside view:

- the variable condenser lacks the antenna trimmer found on the later version.
- this set uses Federal radio frequency transformers and Northwestern SR-28 audio frequency transformers

SR-25 detail of the variocoupler and tap switch



The cabinet of the early SR-25 is a solid wooden box - the front panel and chassis lift up-and-out for removal.

The early version of the SR-25 has binding posts on the front panel. However, the chassis has holes along the rear edge for binding posts (like the later version). The Northwestern-made cast aluminum chassis support shows well here.

This example had been partially assembled when it was acquired from the Austin estate. The authors completed it.

Northwestern SR-25 Receiver (later version) – 1923

SR-25 front view



SR-25 inside view

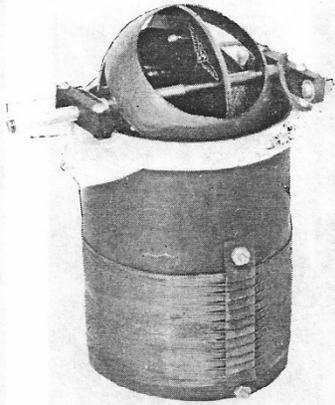


The later version of the Northwestern SR-25 finds several design changes:

- the binding posts are inside the cabinet on the rear apron of the chassis
- the ¼" jack for the loop antenna was moved to the top of the panel
- the condenser control in the top row has a smaller concentric control shaft for an antenna-trimming capacitor
- the cabinet has a hinged lid. The chain is seen in several models.

This example was acquired from the McCracken estate. It appears to have been restored.

Northwestern SR-26 Variocoupler - 1923



Price \$7.50

FOR

Radio Frequency

We have found that in order to obtain satisfactory selectivity, together with high amplification, it becomes necessary to use more than ordinarily loose coupling between the antenna and amplifier circuits. To secure this result we have designed a variocoupler for use in the Type SR-25 receiving set. The demand for this special coupler has become so great that we now offer you the

TYPE SR-26 VARIOCOUPLER

Built like our regular SR-8 model; but with additional spacing between the windings. Almost entire freedom of insulation in contact with the windings, thus very low dielectric losses. Supplied with $\frac{1}{4}$ -inch shaft, and no bearing contacts.

Northwestern Radio Manufacturing Co.

1556 East Taylor Street

KGN—7XF

Portland, Oregon

Radio Waves April, 1923

Northwestern SR-28 Audio Transformer – 1923



Introducing the
Type SR-28 Audio-frequency Transformer

An Oregon Product

Ratio 1-6

Price \$5.50

Dealers—write for discounts

Northwestern Radio Manufacturing Co.

KGN—7XF

1556 E. Taylor Street

Portland, Oregon

SR-28 audio frequency transformer (*Radio Waves* February, 1923)

The Northwestern Type D - 1925

The Northwestern Type D five-tube TRF has some interesting features.

Appearance-wise, the Type D receiver was the first to use molded swirled-brown Bakelite knobs in place of Northwestern's distinctive black knobs. They manufactured and sold these new knobs in three sizes: 2.25", 3", and 4".

Unlike their other receivers, the Type D uses Kellogg AF transformers and a unique style of Northwestern RF transformers.

Previous models typically used commercially-available RF transformers such as Federals. In this case, the production team apparently decided to use the factory's Bakelite casting equipment to create their own RF transformers.

The RF transformer windings are wrapped on a length of Bakelite tubing. The factory molded and machined Bakelite end caps. As shown in the Product Compendium, the Type D transformers had simple flat caps on both ends with the connections coming out the top. However, we've seen some bottom caps with an angled and tapped mounting lug that would have allowed mounting the transformers at an angle. This indicates that Northwestern may have contemplated using them in a Neutrodyne circuit where angled mounting was used to minimize interstage coupling.

This is the only model that we've seen that uses these Bakelite transformers. One of the top caps is shown here with its "Flying N" logo, another feature that seems unique to the Type D.



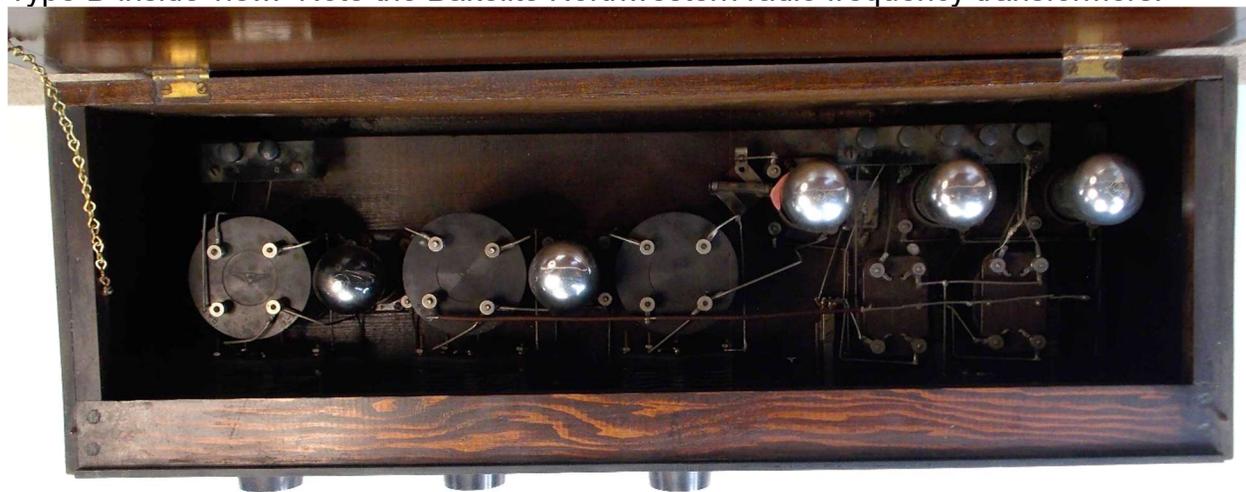
RF transformer top cap as used in a Type D receiver.

Northwestern Type D receiver - 1925

Type D front view



Type D inside view. Note the Bakelite Northwestern radio frequency transformers.



Type D rear view



NORCO Telomonic Receiver – 1925

While the NORCO Telomonic was outwardly similar to the Northwestern Type D, internally it was radically different and very interesting.

Danziger-Jones Inc, of New York City, developed the “Acmedyne” circuit in 1923. Their design utilized a proprietary style of “Telos Vario-Formers” to tune the RF section. From there, a grid leak detector lead into two stages of audio amplification using standard AF transformers. Several companies³⁸, including NORCO, built sets using versions of the Acmedyne design. Some variations used six or seven type 99 tubes. Others, like the NORCO’s, used four or five 01-As.

Popular Radio’s reviewers complimented the Acmedyne’s extremely sharp tuning and selectivity. They also liked the design’s sensitivity for DX reception and clarity of signals. However, they said that operation is “rather complicated for the beginner but the correct method can be acquired in a month’s practice in tuning.”³⁹

Sell the KIT that experienced fans want—Telos!

Where the experienced radio fan buys—others follow!
What he buys, others buy!

And to-day, fans who *know* radio, who have built scores of circuits, are enthusiastically buying the new Telos Kit. It is rightly called “The KIT of a thousand possibilities”—for it opens up new accomplishments in radio by the thousand! It makes *three stages* of tuned R.F. amplification entirely practical! It combines tuned R.F. with super-imposed (reflexed) A.F. It can be run on dry cell tubes throughout! The simplified charts that come with every KIT show how to construct six and seven tube sets that are unequalled for distance and selectivity, and that are nevertheless amazingly economical to operate.

The Telos KIT, listing for \$60, is a big money’s worth, and is a mighty profitable dealer investment. Telos is consistently advertised, month after month in leading radio publications.

Write, to-day, for the complete details of the KIT, and learn the profit and prestige for you in selling Telos.

Telos Radio
Danziger-Jones, Inc., Dept. D
25 Waverly Place, NEW YORK, N. Y.

Danziger-Jones ad for Telos radio kits. The Vario-Formers are the large square devices. The Radio Trade Directory November, 1924.

³⁸ Telos sold several versions of the Acmedyne under the Telomonic name. And Cockaday also made an Acmedyne. The Melco Supreme Acmedyne may have stayed on the market longer than most until the fall of 1925.

³⁹ *Popular Radio* December, 1923.

In October, 1924, Telos⁴⁰ announced the results of a contest to replace the name “Acmedyne.” The judges chose “Telomonic”⁴¹ as the winner.

Consumers who wished to purchase Telomonics directly from Danziger-Jones received a kit of parts that they had to assemble themselves.

In 1924, NORCO acquired a license to build sets using the Acmedyne system and with it was able to acquire kits of parts that included the Telos Vario-Formers. NORCO assembled the kits in standard wooden cabinets with their own engraved panels and their own knobs.

At the time, Lectro Mfg & Sales Co was retailing Norco products and advertised NORCO’s Telomonics in the fall of 1924. Despite multiple testimonials in Lectro’s ads, the Telomonics were actively marketed for only about six months. A November, 1924 Lectro ad lists the Telomonic at \$135 against only \$65 for The NORCO TRF. Their vaunted performance aside, the Telomonic’s higher price, and complicated tuning system, might have motivated consumers to consider other options.

Telomonic front view



⁴⁰ Telos is an ancient Greek word that was frequently used in Aristotle’s writings. It refers to the ultimate purpose or goal of an object. In this case, it apparently speaks to Danziger-Jones’ belief in the ultimate superiority of their product. In some ways “Telos” is similar in meaning to “Acme.” Several other radio companies used the word Acme in their product names and one or more likely pressured Danziger-Jones to choose a different brand name.

⁴¹ Sometimes Telomonic is spelled Telemonic (with an E) in ads. However NORCO used the Telomonic spelling.

Telomonic rear view

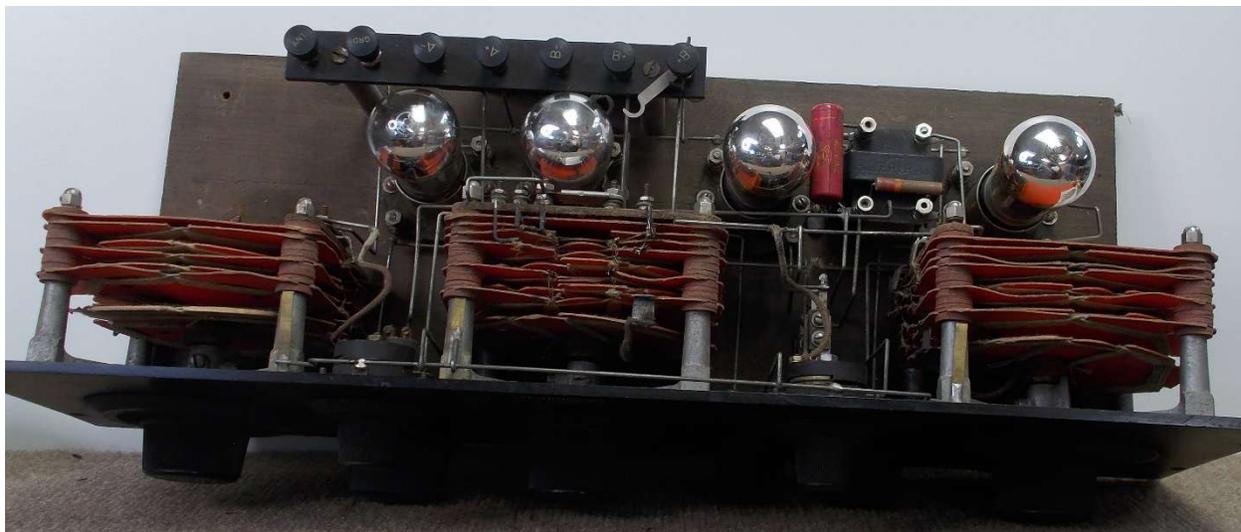


Telomonic inside view



We would have liked to shared better photos of the Telomonic's unique Telos Varioformers. However, it was not possible to remove the NORCO's chassis from the cabinet without unsoldering multiple connections. We felt that it was imperative to maintain the originality of this rare example and so chose not to unsolder the chassis.

Fortunately, Art Redman has a Melco Supreme TRF that was made by Amsco Products (New York City). Although it's a four-tube set, the Melco was built using the same kit of parts from Telos that the NORCO Telomonic was built from. Art kindly allowed us to remove his Melco from its cabinet and take the photos shown below.



*Melco Supreme chassis showing the unique Telos Vario-Formers.
(Art Redman collection)*



Close up of Telos Vario-Former showing the guarantee notice dated 1924.
(Art Redman collection)

NORCO “The NORCO” TRF Receiver – 1925

Some ads for “The NORCO” list it as “The NORCO standard receiver.” With regular dials, it listed for \$65. It was also available with “Micrometer Dials” (verniers) for \$72.50.

The NORCO front view



The NORCO inside view



Portable NORCO - 1925

A portable version of The NORCO was advertised. But, we've not seen one, yet.

As shown below, the Portable NORCO was advertised in Spring 1925, just in time for the Pacific Northwest camping season.

The Portable NORCO is a five-tube, three-dial TRF receiver, same as the other versions. We don't know if it's a standard table model with an added carrying case, or if the Portable used a different, purpose-built cabinet. The advertised black leatherette-covered carrying case had space for batteries and a speaker. At \$125, the Portable with its accessories was more than twice the price of the table-version.

Like similar portables of the day, the Portable NORCO used Type 99 "dry cell" tubes. Type 99 tubes were smaller, had a 3-volt filament, and drew only .06 amps, making them easier on batteries.

Though they did custom work, this may be the only portable that NORCO advertised. And it is the only known NORCO to use 99's.

NOW READY, THE NEW
NORCO PORTABLE RADIO
Complete with 5 tubes, batteries, loud speaker, handsome black carrying case. Weight 32 pounds **\$125.00**
Lectro Mfg. & Sales Co.
JIM McNAUGHTEN NYE KERN
68 Sixth Street, Portland, Oregon

NORCO Portable ad from Lectro Mfg.
(*The Oregonian March, 29, 1925*)

Norco Portable.
Five-tube tuned radio frequency outfit with three controls. Non-oscillating Leatherette carrying case. For outdoor antenna. Separate loud speaker. Dry cell tubes.

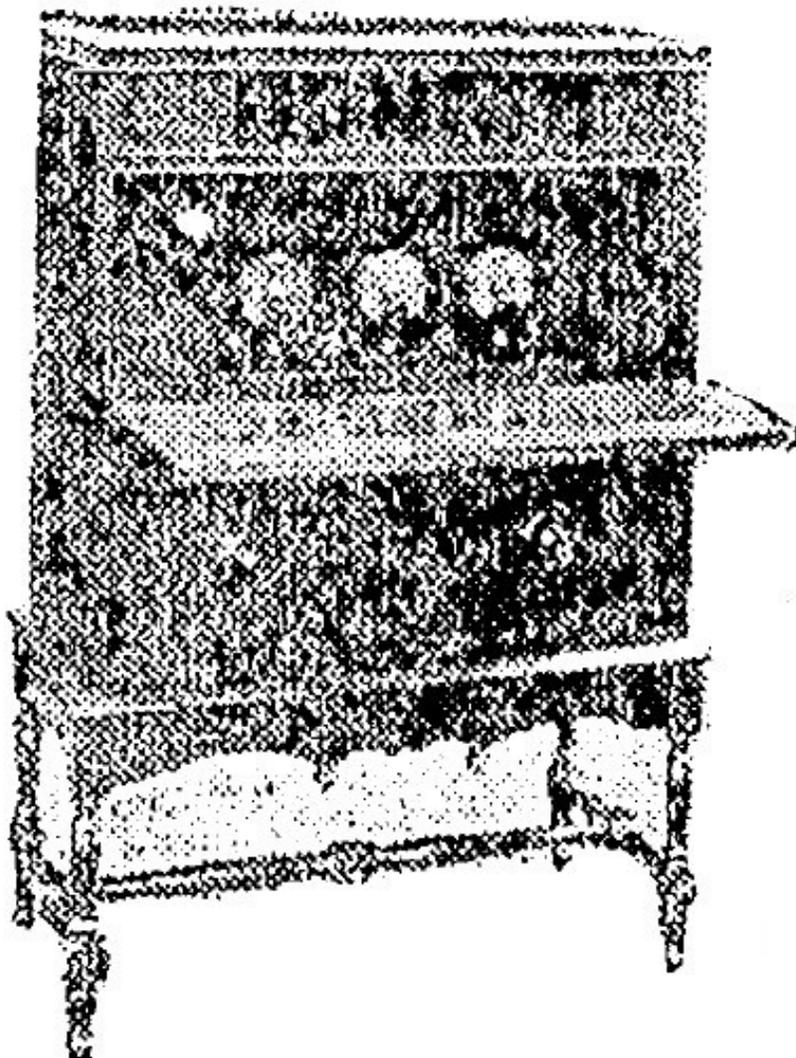
(*The Oregonian May 3, 1925*)

Enjoy a RADIO set this
Spring and Summer
At home, camping, touring, anywhere—
Choose the one to fit your particular need.
GREBE—
FADA—
MAGNAVOX—
FRESHMAN—
RADIOLA—
OPERADIO— Portable
NORCO— Portable
DEMONSTRATION GLADLY EASY TERMS
Lipman Wolfe & Co.
"Merchandise of Merit Only"
RADIO DEPARTMENT—MAIN FLOOR.

NORCO Portable ad from Portland department store Lipman Wolfe & Co.⁴³
(*Oregon Journal April 12, 1925*)

⁴³ At the time, Lectro operated the radio department at Lipman's downtown Portland store. (*The Oregonian March 14, 1926*).

NORCO Type BC Cabinet Receiver (The NORCO console model) - 1925



Gould Battery ad for the NORCO console (*The Oregonian October 25, 1925*)

Gould Battery & Service Co⁴⁴, one of NORCO's Portland-area retailers, published this cut of a NORCO Type BC Cabinet Receiver. The chassis appears to be a NORCO TRF although there may have been a similar console with a NORCO 55 chassis. The console includes a built-in loudspeaker and likely has space for battery storage or a power supply.

The BC console listed for \$165. Micrometer dials added another \$10 to the price. The console stood 45" high, was 25-1/2" wide, and was 14" deep.

⁴⁴ In addition to their retail activities, Gould manufactured "Multnomah" brand batteries. They were located in downtown Portland at NW 10th and Flanders St. Lectro had an exclusive distribution agreement for The NORCO. Thus, Gould must have been one of their retailers for this model.

NORCO 55 Receiver - table version – 1926

The NORCO 55 is a slope-front five-tube TRF receiver. Our example utilizes verniers to control the tuning. Ads say that verniers were available for an additional cost. An example with standard NORCO knobs is shown on the following page.

The NORCO 55 uses five 01-A tubes. The instruction sheet says that a type UX-112 tube can be used in the last audio frequency stage for greater volume.

NORCO 55 front view



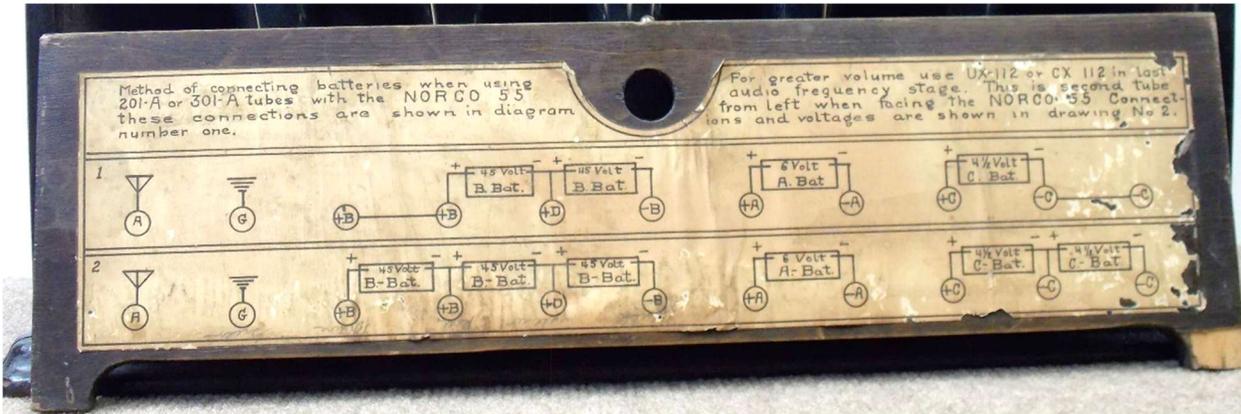
NORCO 55 inside view



NORCO 55 rear view



NORCO 55 instruction sheet



The NORCO 55 – console version - 1925

[not pictured]

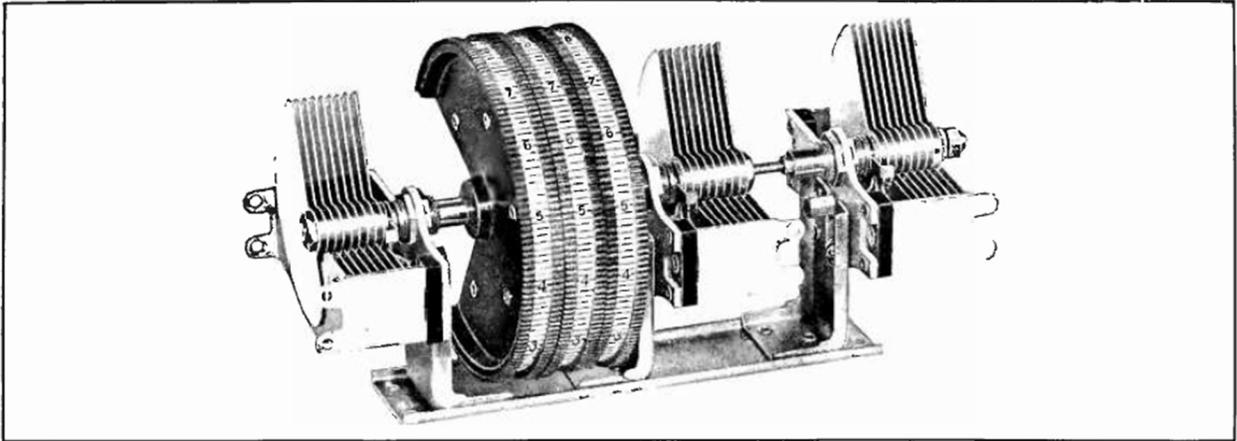
According to a product listing in the August, 1926 issue of *Radio Retailing*, there was a console version of The NORCO 55 with a built-in speaker. We are hoping to see one someday.

NORCO 66 and NORCO 77 – “The Na-Ald sets” - 1926

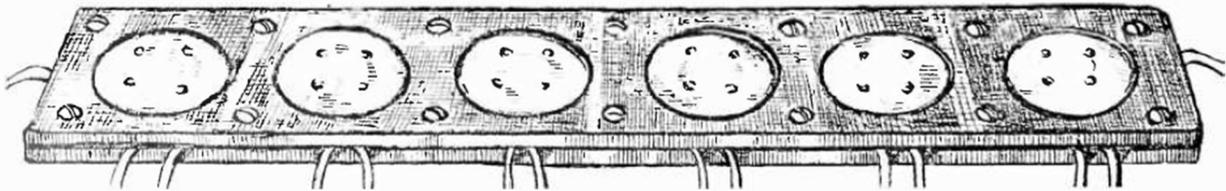
NORCO’s final two production sets, the NORCO 66 and the NORCO 77, were housed in stylish sloped-front cabinets that bear a resemblance to RCA’s Radiola 28. Tuning is controlled by thumbwheel dials that were advertised to be simpler to tune than the three separate dials seen in previous versions of the TRF.

Similar to the Northwestern Telomonic, the “66” and “77” incorporate a larger share of “off the shelf” components than most of NORCO’s other offerings.

To accomplish the look that they wanted, NORCO sourced a number of “Na-Ald” brand components from Alden Manufacturing Company of Springfield, MA. The most obvious parts are the flashy Na-Ald escutcheons surrounding the thumbwheel dials. Behind this, Na-Ald thumbwheels control up to four variable condensers. Sickels brand shielded diamond-weave coils, designed to be compatible with the Na-Ald condensers, are also used. Finally, the NORCO 66 also uses a Na-Ald brand six-tube gang-socket mounting.



The Na-Ald Localized Control Unit features 2, 3, or 4 separately-controlled variable condensers on concentric shafts. (Radio Broadcasting June, 1925)



The compact Na-Ald Gang Socket Mounting featured sockets that would accept short-pin or long-pin tubes. (Radio Broadcasting June, 1925)

NORCO 66 six-tube TRF Receiver – “The Country Set”

The NORCO 66 used six 01A tubes – two in the RF stage, one as a detector, and three in the audio output.

According to NWVRS past president George Kirkiwood, the NORCO 66 used one more RF tube than the NORCO 55 which helped with reception in fringe areas. Thus, in his words, it was dubbed NORCO’s “Country Set.”

Stylistically, the set marked a radical departure from earlier offerings. Though it still used multiple tuning controls, the 3-dial layout of the NORCO and the NORCO 55 was replaced with sloped front cabinet with a cluster of thumbwheels. Its cabinet measured 18.5” long, 13.5” deep, and 8.5” high.

A product review⁴⁵, says that the list price for the NORCO 66 table radio was \$160. The review says that a console version with a built-in loudspeaker was available for \$250.

NORCO 66 six-tube TRF Receiver (table version) -1926

NORCO 66 front view (George Kirkwood collection)

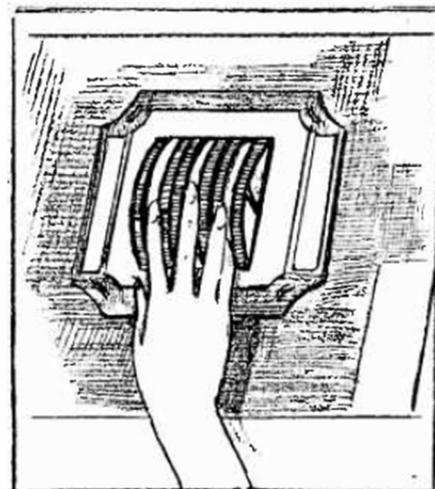


⁴⁵ *Radio Broadcast* August, 1927



Close-up view of the NORCO 66 stamped-bronze three-dial Na-Ald escutcheon. A group of musical instruments appears at the top. At the bottom, there is a stylized symbol of world-wide broadcasting with a carbon microphone sitting atop a globe. Lightning bolts stream from the microphone in all directions. Large wireless transmitting towers in the lower corners complete the picture. (George Kirkwood collection)

Ad text for the Na-Ald Local Control Unit says the Localized Control Unit... "permits sharp tuning. The diameter of the drums is 4.5" made purposely large to facilitate exact tuning. This large size also makes it possible to swing from the highest to the lowest wave lengths instantly, almost without physical effort, by a finger or two."⁴⁶



*Localized Control Unit
(Radio Broadcast June, 1925)*

⁴⁶ *Radio Broadcast* June, 1925

NORCO 66 inside view (George Kirkwood collection)



NORCO 66 rear view (George Kirkwood collection)



NORCO 66 six-tube TRF Receiver (console version) -1926

[not pictured]

According to a product listing in the August, 1927 issue of *Radio Broadcast*, the NORCO 66 was available in a console version with a built-in loudspeaker. The console's list price was \$250 versus the \$160 price for the table version.

NORCO 77 Receiver – 1926

What is known to us as the “NORCO 77” is stylistically similar to the NORCO 66. The “77” uses seven tubes and has four thumbwheel tuners.

The 77 has four tuned stages, three RF amplifiers plus a vacuum tube detector, all using 01-A tubes. The audio circuit has two audio frequency amplifiers using 01-A's plus a type 71-A for final audio output.

The proper name of this set is yet to be determined. It is not labeled and we've found no ads for it. In fact, the chassis says “NORCO 66.” However, it is clearly different from the 66. So, for now, it is the “NORCO 77.”

NORCO 77 front view



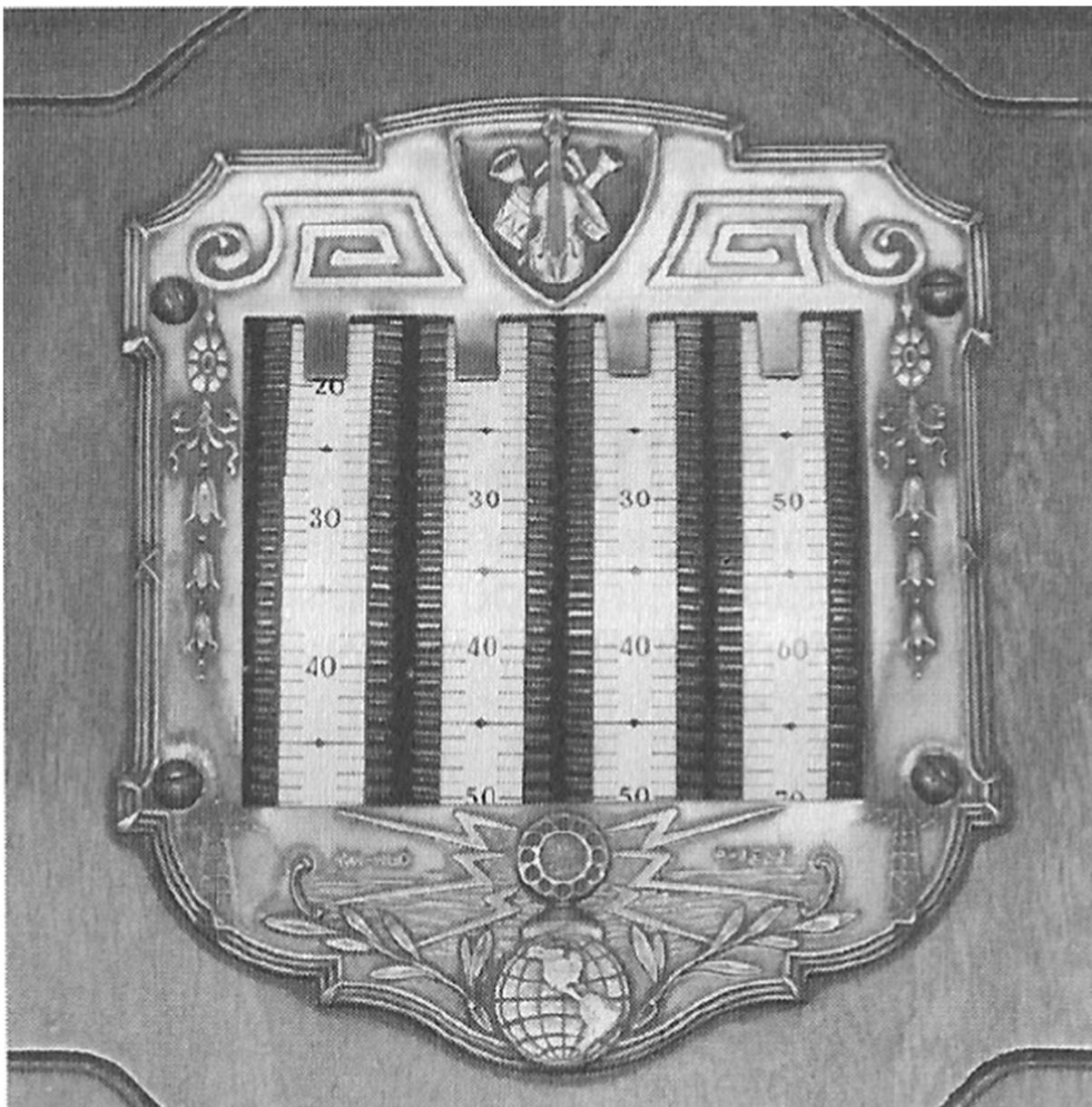
NORCO 77 inside view



Note: The NORCO 77 chassis is clearly labeled "NORCO 66" in the right rear corner. However, the NORCO 77 has four dials instead of the 3 on the NORCO 66. And the staggered seven-tube layout is completely different.

NORCO 77 rear view





A close-up view of the NORCO 77's highly-ornamental stamped-bronze four-dial Na-Ald escutcheon. Except for the number of dials, the NORCO 66 used a very similar dial plate. (Sonny Clutter photo)

NORCO Jack Box - 1922



As detailed in the description of the Hawley station⁴⁷, Northwestern produced a special “Jack Box” that allowed listeners to simultaneously connect three different pairs of headphones to a receiver. Quarter-inch “phone jacks” were used so that devices with plugs could be easily connected and disconnected.

This example is from the Austin estate. It is not engraved or marked with a product number. Since the Hawley station predates the use of the round NORCO decal, this example may have been produced later. Or, the decal may have been applied later.

⁴⁷ Appendix F

NORCO Speakers

The three NORCO speakers that we know of are described here.

NORCO Horn Speaker



Gould Battery ad (*The Oregonian* October 25, 1925) (*Image retouched using AI*).

The NORCO Horn speaker was shown in Gould Battery & Service ads in late 1925. The list price was \$25. No NORCO-branded horns have been reported and none is listed in Floyd Paul's [Horn Speaker Encyclopedia](#) or other trusted references. Its production would have required specialized tooling. So, it seems likely that the NORCO Horn was possibly manufactured for Northwestern by another company and may not have carried the NORCO (or any) brand name. Even so, the cut in Gould's ad appeared under a "Made in Oregon NORCO Radio Products" banner head and some listings for used equipment mention them. Another item that we'd like to see someday.

NORCO Cabinet Speaker



Gould Battery ad (*The Oregonian* October 25, 1925)

The NORCO Cabinet Speaker is another cut from Gould Battery & Service ads from late 1925. It listed for \$32.50. By its design and age, the ornate wooden cabinet likely contained a small horn speaker. Like the NORCO Horn, it was probably made by another company and may not have carried the NORCO brand. Again, no examples have been reported and the NORCO Cabinet Speaker is not listed in Floyd Paul's [Horn Speaker Encyclopedia](#). (We're looking for a better image to replace this place-holder).

NORCO Mini Cone Speaker

There was a stash of unused cone-shaped horn speakers and drivers in the Austin estate. They have small, straight, black metal horns. The drivers indicate that they were not manufactured by NORCO. After further research, we believe that they were likely built into the Portable NORCOs or possibly into the NORCO Cabinet Speakers. A NORCO Mini Cone Speaker is in the foreground of the display pictured below.



Author's Note: The Other "NORCOs"

We've endeavored to present the most complete and accurate information currently available about the products of Portland's Northwestern Radio Manufacturing Company. However, we're anxious to learn more.

Respected secondary references such as McMahon's Radio Collector's Guide, The Radio Trade Directory, and others list models of NORCO radios which we've not encountered and have been unable to learn about.

These include:

- Norco DeLuxe
- Norco Jr
- Norco Sr
- NOR WES CO (Nor-Wes-Co) [see page 16]

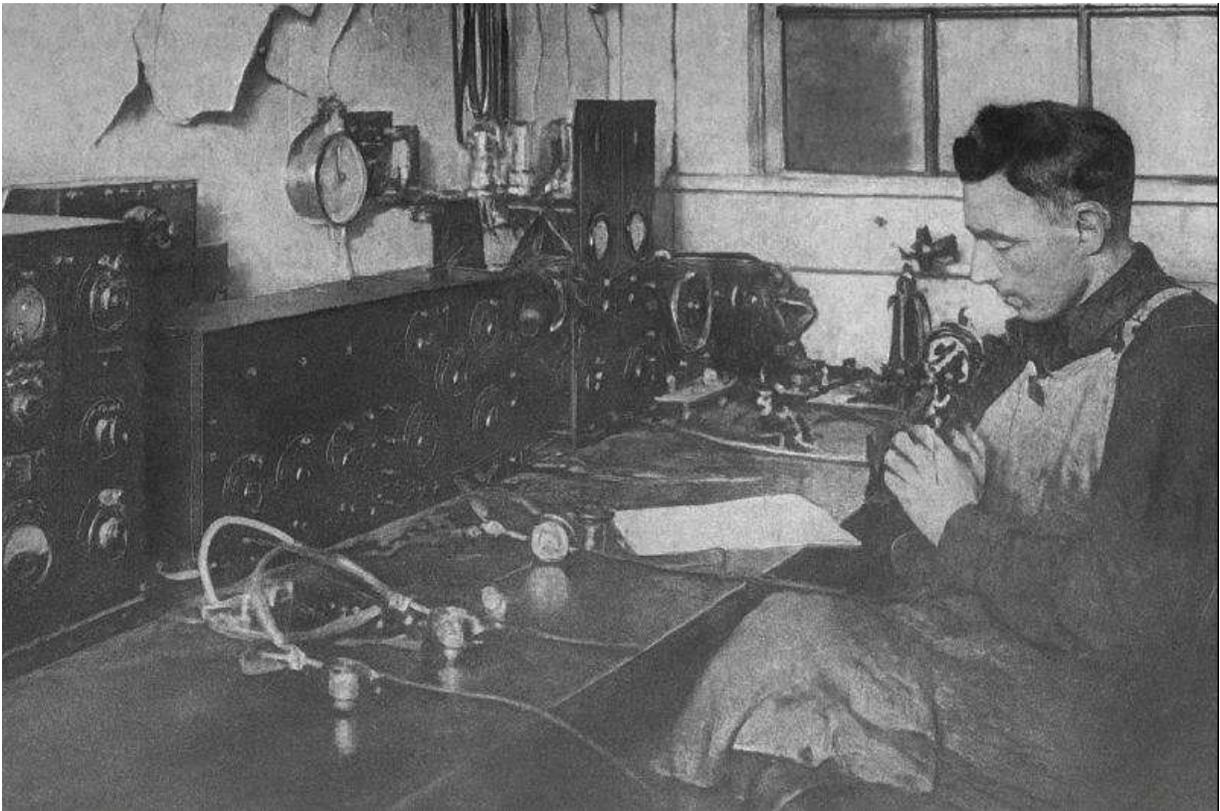
We're mentioning them here in the interest of completeness and in hopes that other collectors will share photos or ads so that we can update our files.

A subsidiary of The Remler Company of San Francisco used the NORCO brand name in the mid to late 1930's for a line of AC table radios. Such sets may have an orange decal reading "Manufactured by NORCO RADIO MFG Co San Francisco, Calif" or something similar. Plastic NORCO radios (also made by Remler) have been seen, as well.

There is no connection between the radios made in San Francisco and the Northwestern Radio Mfg Co and so they are beyond our scope.

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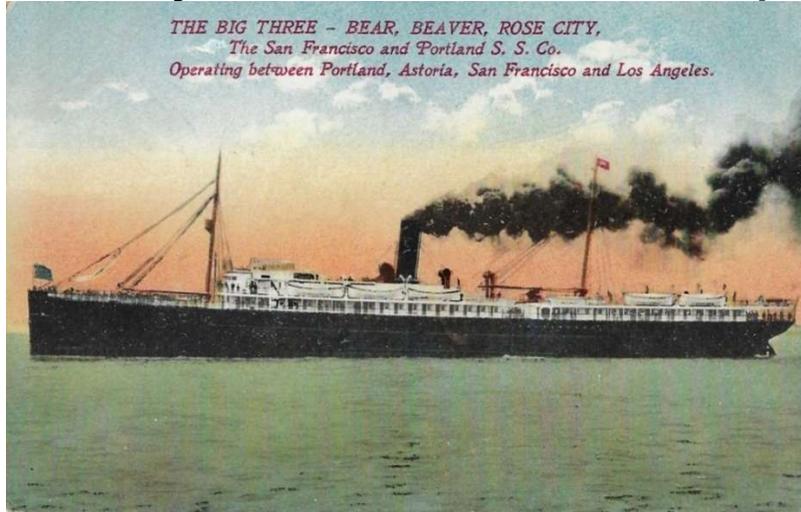
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Charles Austin – 7XG / KDP. (*Oregon Journal* March 12, 1922)
(Image retouched using AI).

Appendix A

SS Rose City Wireless Officer / Radio Inspector



The SS Rose City under steam

SS Rose City Wireless Officer

In March 1911, Charles Austin was hired by the San Francisco and Portland Steamship Company. The company's steamships, *SS Bear*, *SS Beaver*, and *SS Rose City* carried passengers and freight between Portland and Los Angeles with many stops in between. Charley sailed aboard the *Rose City*⁴⁸ which had a 3-KW Massie Telegraph Company⁴⁹ wireless station, operating on 400 meters. Her sister ships carried 1-KW United Wireless sets. He served as her wireless officer for about two years. The *Rose City* was scrapped in 1930.

SS Beaver

In November 1912, *The Oregonian* reported that the *SS Beaver* was tied-up in Portland for repairs to her wireless. As she was crossing the Columbia River bar, waves hit her stern causing minor damage to the staterooms (and apparently the wireless cabin). Following the needed maintenance, Charley Austin used his home station to communicate with the ship and verify that the wireless had been repaired and was fully operational, allowing the ship to return to duty. Charley "quit the sea" about this time and resumed shore-side activities. Though his amateur activities stopped in 1914 on account of World War 1, he continued communicating with ships using KDP.

SS Bear

The *SS Bear* ran aground near Eureka, California on June 14, 1916. The first distress calls from the *Bear* were picked up at the Eureka Marconi Station. Operators on the steamer *Grace Dollar* and the *USS Oregon* (BB-3) also heard the call for assistance and headed for the scene.

⁴⁸ Callsign H2 1911-12 and WWR 1912-13. The Beaver used WB/WWB. The Bear used WD/WWD.

⁴⁹ Massie Telegraph Company became part of Marconi and then RCA.

Salvage efforts lasted for three months culminating with the ship still firmly beached. The *Bear's* United Wireless station was removed during initial salvage operations. Although water flooded the lower parts of the ship, auxiliary power was still available, and the ship's wireless equipment was reinstalled and used throughout the salvage operation.

Radio Inspector

Charley enlisted in the US Navy in April, 1917 with a rating of Chief Electrician Radio. On April 17, 1917 he was assigned to the Federal Wireless Telegraph Station in Lents, Oregon. Its 30 KW Arc transmitter was used for communication with Alaska and for general government communication.

On October 5, 1918, he was transferred to Portland as the Assistant District Communication Superintendent. In this position, his duties included:

- inspecting the radio equipment on all ships entering or leaving Portland
- instructing Naval operators in the use of Naval communication codes
- teaching operators to use and operate the various types of radio equipment on the vessels
- selecting and supervising the civilian radio operators
- inspecting and adjusting radio equipment on all United States Shipping Board⁵⁰ vessels and US Navy vessels built or operated in the Portland district.

Charles Austin was discharged from the US Navy on March 11, 1920. In early 1921, he was hired by the United States Shipping Board and was placed in charge of radio for the Portland Division. His duties were similar to his work for the Navy; he inspected the radio equipment on vessels and made any necessary repairs. Charley assigned the radio operators to the ships and the operators were directly responsible to him in the performance of their duties. Fifty or more vessels with various types of radio equipment were under his supervision.

His employment with the Shipping Board lasted until the Portland office closed in 1928 following the disposition of the last ships to private owners.



The SS Bear beached near Eureka California. Pacific Radio News January, 1917.

⁵⁰ The US Shipping Board built and managed a large fleet of government-owned freight ships during World War 1. Following the war, The Board managed the operation and disposition of the surplus ships.

Appendix B

Oregon's School of Radio – YMCA / OIT

The Young Men's Christian Association (YMCA) of Portland Oregon began offering night classes in 1897 in various vocational subjects. By 1920, the YMCA's training programs were organized as "Oregon Institute of Technology," a degree-granting school.

In 1909, the YMCA moved to a building at SW 6th and Taylor St. The school added electrician and radio classes in 1912 followed by accounting and auto repair before opening an engineering department in 1919. Charley Austin and other members of the Oregon State Wireless Association helped build the YMCA radio station "PSN"⁵¹ in December, 1912. From January 1, 1913 – December 15, 1914, Austin was a radio instructor in charge of their radio classes and teaching Morse Code.

The YMCA radio station operating room was in the basement of the building. "The transmitter, with the exception of the helix, was part of the old Clark 5 kw system which was used here some months ago. The receiver is that of the old United Wireless system⁵² which was located on Council Crest, several years ago. While practically all of the apparatus is used, the instruments have been refurbished."⁵³

"The operating table is built on a mezzanine floor in the electrical laboratory. The room has been arranged so that 12 people can sit at the table and listen to the messages as they are received."⁵⁴

⁵¹ PSN per Craig Adams 2006.

⁵² The United Wireless station on Council Crest operated from September, 1907 thru March 25, 1912 on 425 meters (705.3 kc) using call letters PE and DZ (Craig Adams)

⁵³ Wireless Equipment Installed at YMCA

⁵⁴ Ibid

“On the roofs of the YMCA and the YWCA are located the aerial towers⁵⁵ which are about 60 feet high. The masts are part of the old United equipment and were once located on top of the Swetland building.”⁵⁶



View of the YMCA building ca. 1939 showing the 7YG antenna. The postcard also shows Portland landmarks: The Oregon Journal clock tower, the central bus depot, The Portland Hotel, and The Meier & Frank Department store.

The call sign 7YG was issued to the YMCA in June, 1920. It was transferred to OIT in January, 1923 and later became W7YG.

Starting on May 9, 1922, the school also operated station KDYQ⁵⁷ on 681 kc. KDYQ's slogan was "The Radio School." Programs included: weather reports, market and stock information, news bulletins and radio club broadcasts.

On November 6, 1922, KDYQ moved to 833 kc. The station ceased broadcasting in 1925.⁵⁸ The amateur callsign, 7YG, lasted much longer.

⁵⁵ Per the February, 1923 story in *Radio Waves*, when Hallock & Watson's KGG station went on the air, one end of their antennas was supported by 7YG's westerly tower.

⁵⁶ Wireless Equipment Installed at YMCA. The Swetland Building is located on the NE corner of SW 5th and Washington.

⁵⁷ Designed and assembled by Wilbur Jerman.

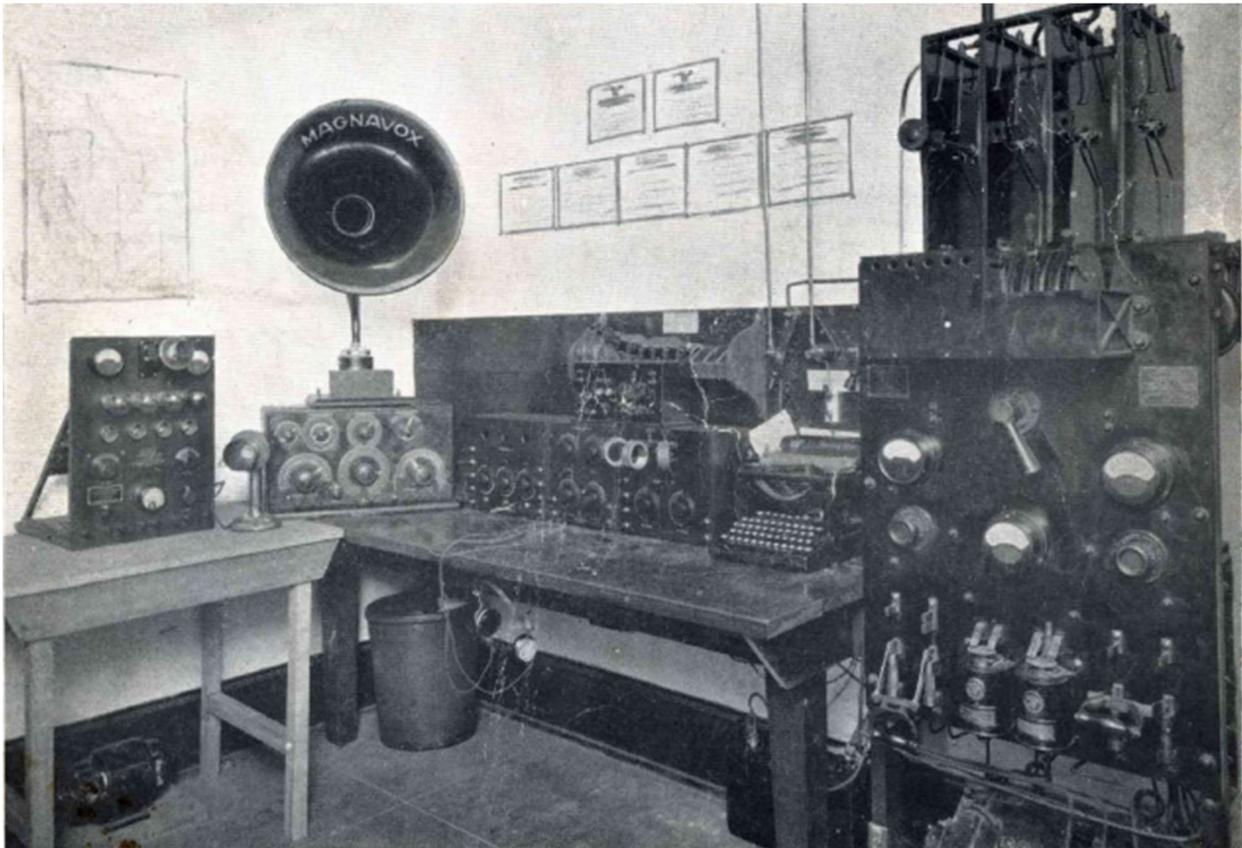
⁵⁸ Oregon Radio History

When this photo was taken in 1923, W7YG had four receivers:

- Northwestern SR-22 3-circuit non-regenerative receiver, detector, and 2-stage amplifier for 200-600 meters [1922]
- Kilbourne & Clark Type E dual-crystal receiver [1918]
- American Marconi 106 receiver for 200-3500 meters⁵⁹ [1915]
- “Honey-Comb” set for listening to high-power CW stations

The station had two transmitters:

- Kilbourne & Clark 2 kw panel quenched gap spark set [1919]
- DeForest Type OT-20 CW and phone set [1920]



Station 7YG / KDYQ ca. 1923. The equipment (from the left) consists of a DeForest OT-20 transmitter, a Marconi 106 receiver, Magnavox horn speaker, NORCO SR-22 Non-Regenerative Receiver, Kilbourne and Clark type E dual crystal receiver (atop the NORCO), Honey-Comb coil rack and coils (on wall), Honey-Comb receiver, and a Kilbourne and Clark 2 KW spark transmitter. (Radio Waves February, 1923)

In 1931, OIT formed a liberal arts junior college along with a four-year college of engineering. Multnomah College was formed in 1937 and, following World War 2, the former OIT schools were merged into it. In 1946, Multnomah College separated from the YMCA, becoming a separate non-profit with its own board of regents. Because of

⁵⁹ Broadcasters monitored 600 meters (500 kc) for distress calls.

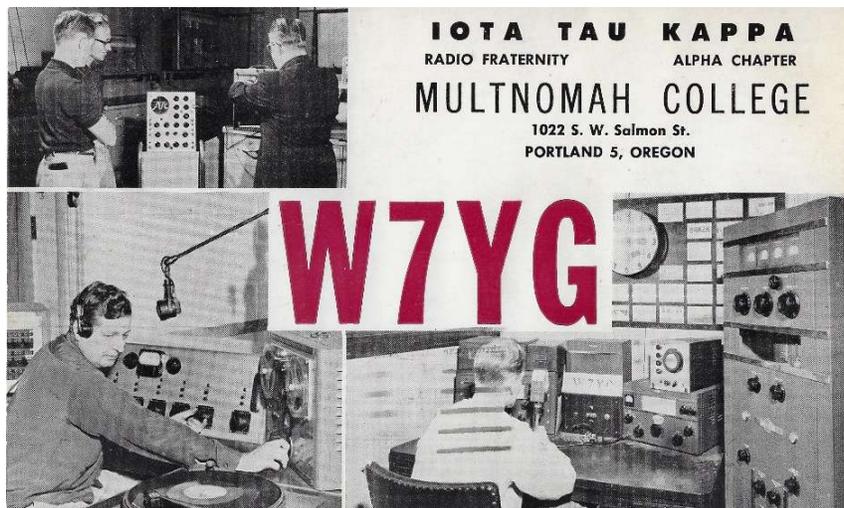
its accreditation, many World War 2 veterans were able to attend Multnomah College on the GI Bill and learn skills that led to employment.

By the late 1960's the board of Multnomah College determined that the educational needs the school had been created to fulfill were being met by Oregon's community colleges. So, in 1969, Multnomah College was merged into the University of Portland.

Charley Austin retired from the City of Portland in 1955 but he continued to teach Morse Code classes at the YMCA as he first did in 1912



W7YG Oregon Institute of Technology QSL card from 1940. The card refers back to the school's founding in 1912.

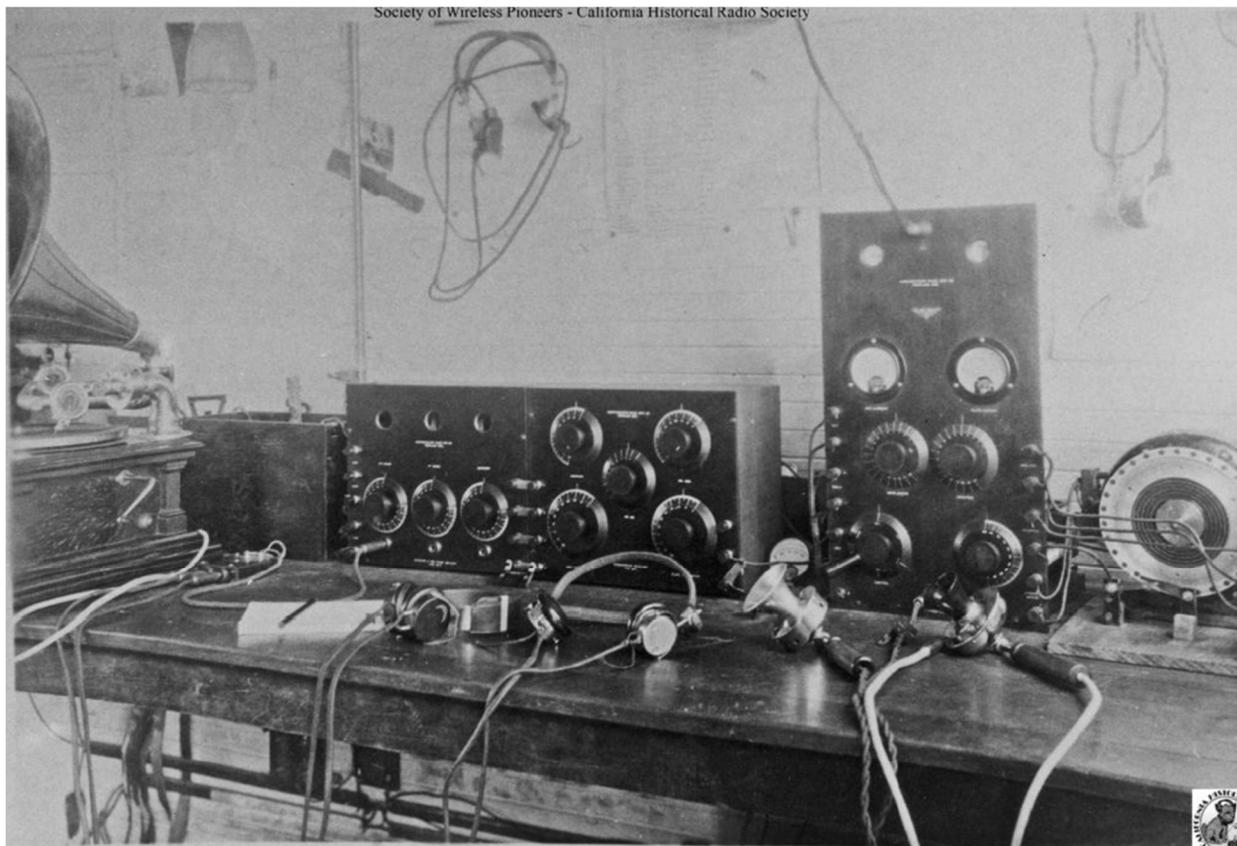


W7YG Multnomah College QSL card from 1957 showing that the school taught courses in electronics and broadcasting. The card also includes a photo of the school's ham radio station. By this time, the curriculum also included television.

Appendix C

Charles Austin's Broadcast Station - 7XF / KGN

“With better broadcasting, more people wish to hear programs; therefore, more radio receiving sets are sold.” A. Atwater Kent (*National Radio News* July, 1929)



Charley Austin's broadcast station. The receiver is a Northwestern SR-2-SR-1 regen. The transmitter is a Northwestern SR-15. When playing records, a microphone was suspended in front of the phonograph bell. (image courtesy CHR/SOWP)

“In the 1920's, Austin decided that the best way to sell Northwestern radios was to start broadcasting programs and create demand.”⁶⁰

In the spring of 1920, Charley applied for a Special Amateur class license from the Department of Commerce. He was issued the call sign 7ZI assigned to 200 meters (1498.9 kc). By March, 1921, his broadcasts were being heard as far away as Los Angeles. That same month his broadcasted music was played at a school dance at nearby Glencoe School with George Criteser operating the receiver.⁶¹

⁶⁰ Northwestern Radio Manufacturing Company pg. 6

⁶¹ *The Oregon Journal* 3/13/1921

In May 1921, Charley changed from a Special Amateur license to an Experimental license so that he could play phonograph music over the air on a regular basis. His new call sign was 7XF. The following month, Northwestern Radio Manufacturing Company began making regular evening broadcasts that included phonograph music. This made Charles Austin Oregon's first disk jockey.^{62 63}

August 1921 – 7XF became Oregon's first station to accept commercial advertising when Clyde Freeman, manager of Remick's Song & Gift Shop, approached Charley with a proposition. He replaced 7XF's old phonograph with a newer model and began providing the station with the latest jazz dance records and classics. In return, Charley would announce the name of the song and tell listeners to head down to Remick's store to purchase their own copy.

On March 13, 1922, 7XF began a collaboration with *The Oregon Journal* newspaper and inaugurated Oregon's first regularly scheduled newscast, broadcasting evenings at 7:45. This made Charles Austin Oregon's first newscaster.

On March 31, 1922, Northwestern was granted a Limited Commercial license with the call sign KGN, replacing their experimental call sign 7XF. They were authorized to broadcast with 100 watts. KGN broadcast its last program on May 31, 1923.⁶⁴

On May 31, 1923, KGN suspended operations. In February 1924, the KGN apparatus was sold to Eric Chambers. It was put back on the air as KFOH on March 23, 1924. [Appendix E].

On August 13, 1923, Charley was licensed as 7ZK⁶⁵, a special amateur radio station. As usual for amateurs at the time, he was limited to 1 kw input and restricted to frequencies below 200 meters. We don't know how much he operated in the ham bands (if at all). It appears that the license was not renewed when it expired in 1925.

⁶² Charles Austin: Father of Oregon Radio

⁶³ In his blog postings, Craig Adams credited Charles Austin for several broadcasting firsts. For the sake of conversation (and because they're interesting), we reiterated some of Craig's claims. We don't take issue with them, ourselves. But, to quote Ron Kramer, "Portland had spawned five stations by the end of 1922. Each station – depending upon how one might credit time spent broadcasting under an amateur call sign, the date of the first broadcast under a professional call sign or the issuing date of the station's license – might variously claim being first." (Pioneer Mikes pg. 19)

⁶⁴ Ibid

⁶⁵ W7ZK was later issued to Dr. Vernon Bird of Vancouver, Washington (see Voices of Vanport)

Appendix D

Austin's Amateur, Experimental, and Broadcast Licenses

A few of Charles Austin's radio licenses appear on the following pages. The portfolio contains examples of his Amateur Radio licenses, Commercial Broadcasting licenses, and some licenses used for experimental broadcasting. Special thanks to Craig Adams for providing background on these callsigns.⁶⁶

Austin's Licenses

KDP – October 1, 1919 - Provisional Commercial License

The KDP license was originally issued in August, 1915 for communicating with ships entering and leaving the Port of Portland. Wavelengths were limited to the emergency calling frequencies (300 and 600 meters) and 550 for business. In August, 1916, 425 meters and 200 meters were added along with privileges to communicate with ships on the Columbia River and Amateurs. Privileges expired during World War 1.

7DK - December 22, 1919 - General Amateur Radio Station License

7DK was licensed for General Amateur Radio purposes (200 meters and down).

7ZI - June 7, 1920 - Special Amateur License for a Land Radio Station

In addition to the distress frequencies (300 and 600 meters) privileges were granted for the amateur frequencies (200 meters and down) and on 375 meters for radio relays. By March, 1921 Austin was using 7ZI for broadcasting, being heard as far away as Los Angeles, making **7ZI Oregon's first broadcasting station**, as we know radio today.

KGN – March 31, 1922 - Limited Commercial License for Land Radio Station

KGN was granted for regular commercial broadcasting, replacing experimental license 7XF (though Austin continued to maintain his experimental license, as well).

7XF – December 11, 1922 - Provisional Experimental License for Land Radio Station

In order to broadcast phonograph music, Austin applied for an Experimental license, 7XF. By June 25, 1921, 7XF was broadcasting music, making Austin **Oregon's first disk jockey**. In August, 1921, 7XF became **the first Oregon station to accept commercial advertising**.

7ZK - August 13, 1923 - Special Amateur Radio Station

This was most likely a hobby station since it wasn't licensed to Austin's company. 7ZK was for the amateur frequencies only.

⁶⁶ Craig Adams – "Charles Austin – Father of Oregon Radio"

KDP - October 1, 1919 - Provisional Commercial License - page 1

Form 761
 Copyright 2025 NWVRS
 KDP

APPLICANT'S DESCRIPTION OF APPARATUS

DEPARTMENT OF COMMERCE
 BUREAU OF NAVIGATION
 RADIO SERVICE

The following form of description of apparatus will be filled out in duplicate and forwarded to the radio inspector by each applicant for a license for apparatus for radio communication of any class (ship or land), except amateur stations (general or restricted) for which Form 762 is provided. The inspector, if necessary, will then arrange for an inspection of the station, or, when feasible, the inspector may accompany the applicant and make the inspection during the filling of this form.

Where the form calls for a statement of details of apparatus with which the station is not equipped, the applicant will please draw a line through the space provided for the appropriate answer.

The information is desired primarily as the basis of the description of the apparatus to be inserted in the license, but many of the details are desired to facilitate the classification and particularly the inspection of stations, and will not, of course, be incorporated in the license. This form when filled will not be open to public inspection.

NOTICE.—This Form Must be Submitted in Duplicate to the Proper Radio Inspector.

GENERAL SPECIFICATIONS OF STATION.

Name of applicant: Chas. L. Austin
 Address: 651 East Salmon St. Portland Oregon.
 A citizen of the State of Oregon. Or a company incorporated in the State of _____
 Name and address of owner of radio apparatus: Chas. L. Austin, 651 East Salmon St. Portland, Ore.

If SHIP STATION—Name of ship: _____ Owner of ship: _____
 Type of vessel: _____ Official number: _____ International signal code letters: _____
 Home port (where permanent document issues): _____ Average speed of vessel (nautical miles): _____
 Number of persons in crew: _____ Number of passengers vessel is licensed to carry: _____
 Is vessel subject to the Act of June 24, 1910, as amended by the Act of July 23, 1912? _____

If LAND STATION—Coast or inland? Coast Location—State: Oregon
 County: Multnomah City or Town: Portland Street: East Salmon No. 651
 Exact Latitude, North: 45° 50' 54.4"; Longitude, West: 122° 58' 46.7"
 Class of license desired (see regulations): General Public Nature of service: General Public
 Specific hours open to public service: 7.30 to 8.30 AM. 7.30 to 8.30 PM and all other hours
when business warrants
 If limited station—Corresponds only with (state names of land stations, names of ships or lines of ships): _____

Transformer input (normal conditions): two K. W.
 Approximate day-transmitting range (nautical miles) with average ship: 150 to 350; with similar land station: 350

PRIMARY SOURCE OF POWER SUPPLY.

Engine Type and horsepower: _____
 Electric power—Source and available K. W.: City service 5 KW Is power continuously available? Yes

SHIP OR COAST CHARGES.
 (State class of service, such as North and South American or Transoceanic.)

North and South per word: _____; minimum per radiogram: _____
American to and from per word: _____; minimum per radiogram: No Minimum cable
ships per word: .06; minimum per radiogram: count.

Relay charges Same
 Make and type of radio system to be used: Composite
 Type of spark gap (plain, rotary synchronous, quenched, etc.): non-synchronous
 Approximate spark frequency (pitch of note) per second: Variable
 Type and make of receiving apparatus (conductive or inductive coupling, etc.): Composite inductive Coupling
 Type of detector: Crystal and audio
 Wave length range of receiving system: From 150 meters to 15,000 meters.

ANTENNA.

Type of antenna (T, T, umbrella, fan, etc.): Inverted L
 Masts—Number: Two Sted or wood? Wood Other supports: None
 Essential dimensions—Maximum height above ground or water: 110 ft. Length of horizontal part: 250 ft.
 Length of vertical part (including lead-in): 108 ft. Total length measured from apparatus: 558 ft.
 Length of ground connection: 5 ft. Fundamental wave length: _____ meters.
 Other essential dimensions: _____

Number of wires: two Size and kind of wire used: 7 # 20 Copper Spacing between wires: about 8"
 Insulators—Material: Electrose Sizes: 8 and 12 inch
 Location: in each wire and in halyards
 Ground connection: Buried copper plates and copper wire also city water mains
 Lightning protective switch—Type: single pole knife Location: Outside station
 How operated: By hand
 Remarks: _____

¹ Person, company, or corporation controlling and operating station and responsible, under the law, for operation and radio accounts.
² Show address of office to which should be sent communications concerning radio accounts and operation of station.
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KDP - October 1, 1919 - Provisional Commercial License - page 2

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AUXILIARY APPARATUS (IF SHIP STATION).

Type and make: _____ Wave length: _____ meters.
 Source of power: _____ Normal day range (nautical miles) with ships: _____
 Plain aerial or coupled circuits? _____ Condenser in aerial circuit? _____

NORMAL WAVE LENGTH AND OTHER WAVE LENGTHS APPLIED FOR.
 (UNDERScore NORMAL.)

SENDING WAVE LENGTH.	ANTENNA CURRENT.	LOGARITHMIC DECREMENT.
300 meters	2	.20
600 meters	6.0	.153
<u>500</u> meters	5.5	.15
425 meters	5.0	.15
200 meters	3.0	.18
_____ meters	_____	_____

If public service coast station, the station insures rapid exchange with land wire stations as follows:
 Company: **Western Union** Place: **Portland** By direct wire or telephone? **Telephone**
 Company: **Postal Telegraph Co** Place: **Portland** By direct wire or telephone? **Telephone**
 Number of operators required—First grade: **1** Second grade: _____ Others: _____

POWER SUPPLY TO TRANSMITTER.

(a) Motor generator: _____
 Motor. _____ Generator. _____
 Voltage—A. C. or D. C. and cycles: _____ Volts (rated) and cycles: _____
 H. P. (rated): _____ Speed: _____ K. W. (rated): _____
 Location: _____ K. V. A. (rated): _____
 Remarks: **Power supplied by Portland RR Light and Power Co.**

(b) Power-measuring instruments: _____
 Type, make, range, etc. _____
 Motor starter—Direct or distant control? _____ Are motor field rheostat and generator field rheostat provided? _____

(c) Storage battery: _____
 Make: _____ Type: _____
 Capacity (ampere hours): _____ Number of cells: _____ Location: _____

(d) Internal-combustion engine: _____
 Make: _____ Type: _____
 K. W. of generator (rated): _____ Location: _____

RADIO APPARATUS.

(a) Transmitter: _____
 Is proper means provided for reducing the range of the station as required by the London Convention? **Yes**
 Condenser in aerial circuit for **no antenna condenser 200 and 300** meters.
 Coupling—Inductive or conductive? **Inductive** Type of primary condenser: **Glass Plate**

(b) Receiver: _____
 Is secondary circuit tuned or untuned? **Both** Are complete duplicate receivers installed? **Yes**
 Are tuning positions for 300 meters and 600 meters plainly marked on apparatus? **Yes**
 Method used for disconnecting receiver when transmitting (hand switch or automatic "break"): **Hand Switch**
 Was the station in actual operation on or prior to August 13, 1912? **yes**

Signature of applicant: *Chas. J. Austin*
 By: _____

INSTRUCTIONS TO RADIO INSPECTORS.

Send out this form in triplicate—one for the applicant's files if he desires it. When received back, fill in the following, preserve one copy for your records and forward the original to the Commissioner of Navigation with report and recommendation.
 Received by (inspector): *BW* at *Seattle* Date: *Oct 1-19*
 Date of inspection of station: _____ Inspected by: _____

REPORT AND RECOMMENDATION.

*Provisional license as applied for recommended
 this station is of considerable service to
 ships entering and departing from Portland
 Benjamin
 A.S.*

The license, when approved by the Secretary of Commerce, will be forwarded to the inspector for delivery to the applicant. The inspector will then fill in from the license the following on his file copy:
 Class of license: _____ Serial No.: _____ Date of delivery to applicant: _____

7DK - December 22, 1919 - General Amateur Radio Station License

Form 765

ORIGINAL

Official call 7DK Number 89

LICENSE FOR GENERAL AMATEUR RADIO STATION
(General or restricted.)

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DEPARTMENT OF COMMERCE
BUREAU OF NAVIGATION
RADIO SERVICE

CANCELED
Signed W. F. Sweet
JUN 25 1920

Pursuant to the act to regulate radio communication, approved August 13, 1912, -----
Chas. L. Austin, age 29, a citizen of the State
of Maine, county Oregon,
city or town Portland, street East Salmon, No. 651,
having applied therefor, is hereby granted by the Secretary of Commerce, for a period of two years,
on and subject to the restrictions and conditions hereinafter stated and revocable for cause by him, this
License to use or operate the apparatus for radio communication (identified in the Schedule hereinafter) for
the purpose of transmitting private radiograms or signals, notwithstanding the effect thereof extends beyond
the jurisdiction of the State or Territory in which the said station is located: *Provided*, That no interference
other than may result under the restrictions contained in this License shall be caused with the radio com-
munication of stations of the Government of the United States or licensed stations.

2. The use or operation of apparatus for radio communication pursuant to this License shall be subject
also to the articles and regulations established by the International Radiotelegraphic Convention, ratified by
the Senate of the United States and caused to be made public by the President, and shall be subject also to
such regulations as may be established from time to time by authority of subsequent acts and treaties of the
United States.

3. The apparatus shall at all times while in use and operation be in charge of a person or persons licensed
for that purpose by the Secretary of Commerce, and the operator of the apparatus shall not willfully or
maliciously interfere with any other radio communication.

4. The station shall give absolute priority to signals or radiograms relating to ships in distress; shall
cease all sending on hearing a distress signal; and shall refrain from sending until all the signals and radio-
grams relating thereto are completed.

5. The station shall use the minimum amount of energy necessary to carry out any communication
desired, and the transformer input shall not exceed one kilowatt.¹

6. The station shall not use a transmitting wave length exceeding 200 meters.

7. The station shall not use a transmitter during the first 15 minutes of each hour, local standard time,
whenever the Secretary of Commerce by notice in writing shall require it to observe a division of the time,
pursuant to the Twelfth Regulation of the act of August 13, 1912.

8. The President of the United States in time of war or public peril or disaster is authorized by law to
close the station and cause the removal therefrom of all radio apparatus, or may authorize the use or control
of the station or apparatus by any department of the Government upon just compensation to the owners.

9. The Secretary of Commerce and Collectors of Customs or other officers of the Government authorized
by him may at all reasonable times enter upon the station for the purpose of inspecting and may inspect any
apparatus for radio communication of such station and the operation and operators of such apparatus.

10. The apparatus shall not be altered or modified in respect of any of the particulars mentioned in the
following Schedule except with the approval of a radio inspector, or other duly authorized officer of the
Government.

Name of naval or military station, if within 5 nautical miles, -----
Power: Transformer input, 1000 W.² Antenna: Type (T, T, etc.) Unbalanced T
Height, 75' (Above ground); horizontal length, 60'
Wires: Number in vertical part, 4; in horizontal part, 4
The normal sending and receiving wave length shall be 200 meters and the station is
authorized to use the following additional wave lengths, not exceeding 200 meters:
meters, ----- meters.

This License expires on December 21, 1919.

EDWIN F. SWEET,
Assistant Secretary of Commerce.

E. T. CHAMBERLAIN,
Commissioner of Navigation.
E. T. Chamberlain

Delivered by W. F. Sweet (Radio Inspector.)

Place Seattle, Wash. Date December 22, 1919.

¹ Strike out "one" if the station be within 5 nautical miles of a naval or military station; otherwise strike out "one-half."
² Not to exceed 1,000; or if the station be within 5 nautical miles of a naval or military station, not to exceed 500. 11-4800

7ZI - June 7, 1920 - Special Amateur License for a Land Radio Station – page 1

COPY

No. 147

LICENSE FOR LAND RADIO STATION

CLASS SPECIAL AMATEUR

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DEPARTMENT OF COMMERCE
BUREAU OF NAVIGATION
RADIO SERVICE

RADIO SERVICE
SEATTLE, WASHINGTON
JUN 15 1920
RECEIVED
DEPARTMENT OF COMMERCE

Pursuant to the act to regulate radio communication, approved August 13, 1912,
CHARLES L. AUSTIN

Oregon

a citizen of the State of _____, a company incorporated under the laws of the State of _____, having applied therefor, is hereby granted by the Secretary of Commerce for a period of _____ ^{and year} on and subject to the restrictions and conditions hereinafter stated and revocable for cause by him, this License to use or operate the apparatus for radio communication (identified in the schedule hereinafter) for the purpose of transmitting to and receiving from ship stations and other land stations public correspondence, Government and service correspondence, and distress signals and messages, at rates of compensation not in excess of those fixed by the international agreement to which the Government of the United States has adhered, which have been submitted to and approved by the Secretary of Commerce, as included in the schedule hereinafter, or for the purpose of conducting experiments for the development of the science of radio communication or the apparatus pertaining thereto, to carry on special tests, using any amount of power or any wave lengths, at such hours and under such conditions as will insure the least interference with the sending or receipt of commercial or Government radiograms, of distress signals and radiograms, or with the work of other stations, the purpose of the station being designated by the classification at the head of this License.

2. Public correspondence or limited commercial correspondence authorized by this License shall be limited to certain stations, ships or lines of ships named hereinafter, which designation is authorized in view of the nature of the service and is independent of the radio system employed.

3. The use or operation of apparatus for radio communication pursuant to this License shall be subject also to the articles and regulations established by the International Radiotelegraphic Convention, ratified by the Senate of the United States and caused to be made public by the President, and shall be subject also to such regulations as may be established from time to time by authority of subsequent acts and treaties of the United States, in so far as they apply to the class of station indicated by this License.

11-5011
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7ZI - June 7, 1920 - Special Amateur License for a Land Radio Station – page 2

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2

4. The authority conferred by this License is subject to the provisions of the act of February 4, 1887, entitled "An Act to regulate commerce," as amended by the act of June 18, 1910, so far as the Licensee may be within the operation of said act, and except as provided in the act of August 13, 1912, or in the International Radiotelegraphic Convention and regulations made part thereof, the station shall transmit all messages offered by those who tender lawful rates on equal terms without discrimination, whether as regards rates, order of transmission, or otherwise.

5. The Licensee shall render to the Secretary of Commerce such accounts as the Secretary of Commerce shall direct in respect of all charges due or payable under the International Radiotelegraphic Convention in respect of messages exchanged between the station hereby licensed and other stations and shall pay to the Secretary of Commerce, at such times and in such manner as the Secretary of Commerce shall direct, all sums which shall be due from the Licensee under such accounts.

6. The apparatus shall at all times while in use and operation be in charge or under the supervision of a person or persons licensed for that purpose by the Secretary of Commerce, and the operator of the apparatus shall not willfully or maliciously interfere with any other radio communication.

7. The station shall give absolute priority to signals and radiograms relating to ships in distress; shall cease all sending on hearing a distress signal; and, except when engaged in answering or aiding the ships in distress, shall refrain from sending until all signals and radiograms relating thereto are completed.

8. The station shall use the minimum amount of energy necessary to carry out any communication desired, except in case of signals or radiograms relating to vessels in distress.

9. The station shall not use a transmitter during the first 15 minutes of each hour, local standard time, except for distress signals, whenever the Secretary of Commerce by notice in writing shall require it to observe a division of time, pursuant to the Twelfth Regulation of the act of August 13, 1912.

10. The President of the United States in time of war or public peril or disaster is authorized by law to close the station and cause the removal therefrom of all radio apparatus or may authorize the use or control of the station or apparatus by any department of the Government upon just compensation to the owners.

11. The Secretary of Commerce and Collectors of Customs or other officers of the Government authorized by him may at all reasonable times enter upon the station for the purpose of inspecting and may inspect any apparatus for radio communication of such station and the operation and operators of such apparatus.

12. The apparatus shall not be altered or modified in respect of any of the particulars mentioned in the following schedule, except with the approval of the Secretary of Commerce.

11-5071

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7ZI - June 7, 1920 - Special Amateur License for a Land Radio Station - page 3

Copyright 2025 NWVRS SCHEDULE OF STATION AND APPARATUS

Name of owner, Charles L. Austin
Location: State, Oregon; County, Multnomah
City or town, Portland; Street, E. Taylor; No. 1556

Geographical location: Latitude, N. 45° 30' 54"; Longitude, W. 122° 38' 46"
This station is licensed for communication only with the following land stations, ships, or lines of ships:

Special Amateur

Specific hours during which the station ^{must} be open to service (local standard time):
_{may}
No specific hours

Power: Transformer input, .25 to 1 KW.
Normal day range in nautical miles, 100 to 250
Time and method, if any, of sending time signals and hydrographic and meteorological radiograms:

Call letters, 7 Z I

Coast charges: per word _____, minimum per radiogram _____
Coast charges: per word _____, minimum per radiogram _____
Coast charges: per word _____, minimum per radiogram _____

Radiotelegraphic system employed, Composite
Characteristics of transmitting system:

Type of spark gap, Rotary & non-synchronous
Approximate spark frequency, Variable

Composite inductive, crystal & Audion detectors.

Wave length range of receiving system: From 150 meters to 15000 meters.

Antenna: Number of masts 2; Height, _____

Type of aerial, 7, also small Fan type.

Wires: Number, 4; Size and kind, 7/20 copper

Essential dimensions: Maximum height above water, 90 to 100 feet; Length of horizontal part, 7-150 feet; Length of vertical part, 85 feet; Total length measured from apparatus, 240 feet; Length of ground connection, 5 feet; Fundamental wave length - - meters.

WAVE LENGTHS

The normal sending and receiving wave length shall be 200 meters.

If the station be classified as a coast station it shall be prepared to transmit or relay distress calls

7ZI - June 7, 1920 - Special Amateur License for a Land Radio Station - page 4

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or messages using the distress wave length as provided by the International Radiotelegraphic Convention in force.

In view of special conditions the station is authorized to use for communication exclusively with stations licensed by the United States the following additional wave lengths under 600 or over 1,600 meters:

Meters, 200; Meters, 300; Meters, 375; Meters, _____

The energy, if radiated by the transmitter in two or more wave lengths as indicated by a sensitive wave meter, shall not in any one of the lesser waves exceed 10 per cent of that in the greatest; and the logarithmic decrement per complete oscillation in the wave trains shall not exceed two-tenths, except when sending signals or messages relating to vessels in distress.

SENDING WAVE LENGTH	ANTENNA CURRENT (AMPERES)	LOGARITHMIC DECREMENT	READING OF WAVE METER INDICATING INSTRUMENT*	
			PRINCIPAL WAVE	WAVE NEXT IN ENERGY
300 meters . . .	300 & 600 to be used as required in Regulations 43 & 44.			
600 meters . . .				
200 meters . . .	200 for ordinary communication. 375 for relay or other communications.			
375 meters . . .	Transmitter to be used at such time and under such conditions as to minimize interference with other stations.			
_____ meters . . .				
_____ meters . . .				

* Type of indicating instrument, _____

The station insures rapid exchange with land wire stations at _____

(Company) _____

(Location telegraph office) _____

(Company) _____

(Location telegraph office) _____

in the following manner: _____

Satisfactory proof has been furnished that the station was actually operating August 13, 1912.

This License will expire on the 5th day of June, 1921.

(Signed) Sam L. Rogers

Secretary of Commerce.



E. T. Chamberlain

Commissioner of Navigation.

June 7, 1920.

Washington, D. C., _____

INSPECTIONS

DATE	INSPECTOR	REMARKS

MEP.

KGN – March 31, 1922 - Limited Commercial License for Land Radio Station – page 1

7

PROVISIONAL

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key file

No. 591

LICENSE FOR LAND RADIO STATION

CLASS Limited Commercial

DEPARTMENT OF COMMERCE
BUREAU OF NAVIGATION
RADIO SERVICE

RECEIVED
APR 7 - 1922
DEPARTMENT OF COMMERCE

Pursuant to the act to regulate radio communication, approved August 13, 1912,
Northwestern Radio Mfr. Co. (Charles L. Austin)
a citizen of the State of Oregon, a company incorporated under the laws of the State of _____, having applied therefor, is hereby granted by the Secretary of Commerce for a period of three months on and subject to the restrictions and conditions hereinafter stated and revocable for cause by him, this License to use or operate the apparatus for radio communication (identified in the schedule hereinafter) for the purpose of transmitting to and receiving from ship stations and other land stations public correspondence, Government and service correspondence, and distress signals and messages, at rates of compensation not in excess of those fixed by the international agreement to which the Government of the United States has adhered, which have been submitted to and approved by the Secretary of Commerce, as included in the schedule hereinafter, or for the purpose of conducting experiments for the development of the science of radio communication or the apparatus pertaining thereto, to carry on special tests, using any amount of power or any wave lengths, at such hours and under such conditions as will insure the least interference with the sending or receipt of commercial or Government radiograms, of distress signals and radiograms, or with the work of other stations, the purpose of the station being designated by the classification at the head of this License.

2. Public correspondence or limited commercial correspondence authorized by this License shall be limited to certain stations, ships or lines of ships named hereinafter, which designation is authorized in view of the nature of the service and is independent of the radio system employed.

3. The use or operation of apparatus for radio communication pursuant to this License shall be subject also to the articles and regulations established by the International Radiotelegraphic Convention, ratified by the Senate of the United States and caused to be made public by the President, and shall be subject also to such regulations as may be established from time to time by authority of subsequent acts and treaties of the United States, in so far as they apply to the class of station indicated by this License.

11-5971
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**KGJ – March 31, 1922 - Limited Commercial License for Land Radio Station –
page 2**

2

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4. The authority conferred by this License is subject to the provisions of the act of February 4, 1887, entitled "An Act to regulate commerce," as amended by the act of June 18, 1910, so far as the Licensee may be within the operation of said act, and except as provided in the act of August 13, 1912, or in the International Radiotelegraphic Convention and regulations made part thereof, the station shall transmit all messages offered by those who tender lawful rates on equal terms without discrimination, whether as regards rates, order of transmission, or otherwise.

5. The Licensee shall render to the Secretary of Commerce such accounts as the Secretary of Commerce shall direct in respect of all charges due or payable under the International Radiotelegraphic Convention in respect of messages exchanged between the station hereby licensed and other stations and shall pay to the Secretary of Commerce, at such times and in such manner as the Secretary of Commerce shall direct, all sums which shall be due from the Licensee under such accounts.

6. The apparatus shall at all times while in use and operation be in charge or under the supervision of a person or persons licensed for that purpose by the Secretary of Commerce, and the operator of the apparatus shall not willfully or maliciously interfere with any other radio communication.

7. The station shall give absolute priority to signals and radiograms relating to ships in distress; shall cease all sending on hearing a distress signal; and, except when engaged in answering or aiding the ship in distress, shall refrain from sending until all signals and radiograms relating thereto are completed.

8. The station shall use the minimum amount of energy necessary to carry out any communication desired, except in case of signals or radiograms relating to vessels in distress.

9. The station shall not use a transmitter during the first 45 minutes of each hour, local standard time, except for distress signals, whenever the Secretary of Commerce by notice in writing shall require it to observe a division of time, pursuant to the Twelfth Regulation of the act of August 13, 1912.

10. The President of the United States in time of war or public peril or disaster is authorized by law to close the station and cause the removal therefrom of all radio apparatus or may authorize the use or control of the station or apparatus by any department of the Government upon just compensation to the owners.

11. The Secretary of Commerce and Collectors of Customs or other officers of the Government authorized by him may at all reasonable times enter upon the station for the purpose of inspecting and may inspect any apparatus for radio communication of such station and the operation and operators of such apparatus.

12. The apparatus shall not be altered or modified in respect of any of the particulars mentioned in the following schedule, except with the approval of the Secretary of Commerce.

11-5071
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KG N – March 31, 1922 - Limited Commercial License for Land Radio Station – page 3

3

Copyright 2025 NWVRS SCHEDULE OF STATION AND APPARATUS

Name of owner, Northwestern Radio Mfr. Co.

Location: State, Oregon; County, Multnomah

City or town, Portland; Street, East Taylor; No. 1556

Geographical location: Latitude, N. 45° 15' 00"; Longitude, W. 122° 45' 00"

This station is licensed for communication only with the following land stations, ships, or lines of ships:
Broadcasting entertainment and like matter only. One commercial second class operator or higher required.

This station is licensed for the specific service shown, on the wave length indicated, no other service permitted.

Should this station interfere with another station performing similar service or another station performing similar service interfere with this station it may be necessary to require a division of time between the stations affected.

Specific hours during which the station ^{must} _{may} be open to service (local standard time):

4:00 PM to 6:30 PM, 7:00 PM to 10:00 PM daily.

Power: Transformer input, 250 watts to VTS AC

Normal day range in nautical miles, 150

Time and method, if any, of sending time signals and hydrographic and meteorological radiograms:

Call letters, KG N

Coast charges: per word _____, minimum per radiogram _____

Coast charges: per word _____, minimum per radiogram _____

Coast charges: per word _____, minimum per radiogram _____

Radiotelegraphic system employed, Composite VT telephone

Characteristics of transmitting system:

Type of spark gap, -----

Approximate spark frequency, -- CW

Wave length range of receiving system: From 150 meters to 25,000 meters.

Antenna: Number of masts 1, Height, _____, _____, _____

Type of aerial, Inverted L. Cage type

Wires: Number, 6; Size and kind, 7/20 Bronze

Essential dimensions: Maximum height above water, 60 feet; Length of horizontal part,

60 feet; Length of vertical part, 30 feet; Total length measured from apparatus,

85 feet; Length of ground connection, 5 feet; Fundamental wave length 150 meters.

WAVE LENGTHS

The normal sending and receiving wave length shall be 600 meters Copyright 2025 NWVRS

If the station be classified as a coast station it shall be prepared to transmit or relay distress calls

11-8071

KGJN – March 31, 1922 - Limited Commercial License for Land Radio Station – page 4

4

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or messages using the distress wave length as provided by the International Radiotelegraphic Convention in force.

In view of special conditions the station is authorized to use for communication exclusively with stations licensed by the United States the following additional wave lengths under 600 or over 1,500 meters:

Meters, 300; Meters, 350; Meters, _____; Meters, _____

The energy, if radiated by the transmitter in two or more wave lengths as indicated by a sensitive wave meter, shall not in any one of the lesser waves exceed 10 per cent of that in the greatest; and the logarithmic decrement per complete oscillation in the wave trains shall not exceed two-tenths, except when sending signals or messages relating to vessels in distress.

SENDING WAVE LENGTH	ANTENNA CURRENT (AMPERES)	LOGARITHMIC DECREMENT	READING OF WAVE METER INDICATING INSTRUMENT*	
			PRINCIPAL WAVE	WAVE NEXT IN ENERGY
300 meters . . .		300 & 600 meters to be used as required in regulations 42 & 44.		
600 meters75			
350 meters . . .	2.	350 meters to be used for broadcasting entertainment and like matter only, by radio telephone.		
_____ meters . . .				
_____ meters . . .				
_____ meters . . .				

* Type of indicating instrument, _____

The station incurs rapid exchange with land wire stations at

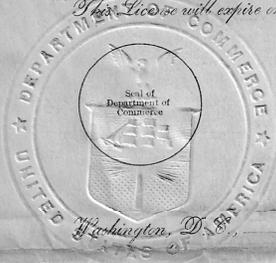
(Company) _____ (Location telegraph office) _____

(Company) _____ (Location telegraph office) _____

in the following manner _____

Satisfactory proof has been furnished that the station was actually operating August 13, 1912.

This License will expire on the 30th day of June, 1922.



[Signature]
Acting Secretary of Commerce.

[Signature]
Commissioner of Navigation.

March 31st, 1922.

INSPECTIONS

DATE	INSPECTOR	REMARKS
February 12, 1922	A. R. Redfern	

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EBB

7XF – December 11, 1922 - Provisional Experimental License for Land Radio Station – page 1

PROVISIONAL

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No. 366

LICENSE FOR LAND RADIO STATION

CLASS 3 - EXPERIMENTAL

DEPARTMENT OF COMMERCE
BUREAU OF NAVIGATION
RADIO SERVICE

RADIO OFFICE
PROVIDED
★ DEC 21 1922 ★
SEATTLE WASH.

Pursuant to the act to regulate radio communication, approved August 13, 1912,
Northwestern Radio Manufacturing Company
a citizen of the State of *****, a company incorporated under the
laws of the State of Oregon, having applied therefor, is hereby granted
by the Secretary of Commerce for a period of Three Months on and subject to the
restrictions and conditions hereinafter stated and revocable for cause by him, this License
to use or operate the apparatus for radio communication (identified in the schedule
hereinafter) for the purpose of transmitting to and receiving from ship stations and
other land stations public correspondence, Government and service correspondence, and
distress signals and messages, at rates of compensation not in excess of those fixed by
the international agreement to which the Government of the United States has adhered,
which have been submitted to and approved by the Secretary of Commerce, as included
in the schedule hereinafter, or for the purpose of conducting experiments for the develop-
ment of the science of radio communication or the apparatus pertaining thereto, to carry
on special tests, using any amount of power or any wave lengths, at such hours and
under such conditions as will insure the least interference with the sending or receipt
of commercial or Government radiograms, of distress signals and radiograms, or with
the work of other stations, the purpose of the station being designated by the classi-
fication at the head of this License.

2. Public correspondence or limited commercial correspondence authorized by this
License shall be limited to certain stations, ships or lines of ships named hereinafter,
which designation is authorized in view of the nature of the service and is independent
of the radio system employed.

3. The use or operation of apparatus for radio communication pursuant to this License
shall be subject also to the articles and regulations established by the International
Radiotelegraphic Convention, ratified by the Senate of the United States and caused
to be made public by the President, and shall be subject also to such regulations as may be
established from time to time by authority of subsequent acts and treaties of the United
States, in so far as they apply to the class of station indicated by this License.

11-6071
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7XF – December 11, 1922 - Provisional Experimental License for Land Radio Station – page 2

Copyright 2025 NWVRS

4. The authority conferred by this License is subject to the provisions of the act of February 4, 1887, entitled "An Act to regulate commerce," as amended by the act of June 18, 1910, so far as the Licensee may be within the operation of said act, and except as provided in the act of August 13, 1912, or in the International Radiotelegraphic Convention and regulations made part thereof, the station shall transmit all messages offered by those who tender lawful rates on equal terms without discrimination, whether as regards rates, order of transmission, or otherwise.

5. The Licensee shall render to the Secretary of Commerce such accounts as the Secretary of Commerce shall direct in respect of all charges due or payable under the International Radiotelegraphic Convention in respect of messages exchanged between the station hereby licensed and other stations and shall pay to the Secretary of Commerce, at such times and in such manner as the Secretary of Commerce shall direct, all sums which shall be due from the Licensee under such accounts.

6. The apparatus shall at all times while in use and operation be in charge or under the supervision of a person or persons licensed for that purpose by the Secretary of Commerce, and the operator of the apparatus shall not willfully or maliciously interfere with any other radio communication.

7. The station shall give absolute priority to signals and radiograms relating to ships in distress; shall cease all sending on hearing a distress signal; and, except when engaged in answering or aiding the ship in distress, shall refrain from sending until all signals and radiograms relating thereto are completed.

8. The station shall use the minimum amount of energy necessary to carry out any communication desired, except in case of signals or radiograms relating to vessels in distress.

9. The station shall not use a transmitter during the first 15 minutes of each hour, local standard time, except for distress signals, whenever the Secretary of Commerce by notice in writing shall require it to observe a division of time, pursuant to the Twelfth Regulation of the act of August 13, 1912.

10. The President of the United States in time of war or public peril or disaster is authorized by law to close the station and cause the removal therefrom of all radio apparatus or may authorize the use or control of the station or apparatus by any department of the Government upon just compensation to the owners.

11. The Secretary of Commerce and Collectors of Customs or other officers of the Government authorized by him may at all reasonable times enter upon the station for the purpose of inspecting and may inspect any apparatus for radio communication of such station and the operation and operators of such apparatus.

12. The apparatus shall not be altered or modified in respect of any of the particulars mentioned in the following schedule, except with the approval of the Secretary of Commerce.

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7XF – December 11, 1922 - Provisional Experimental License for Land Radio Station – page 4

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 or messages using the distress wave length as provided by the International Radiotelegraphic Convention in force.

In view of special conditions the station is authorized to use for communication exclusively with stations licensed by the United States the following additional wave lengths under 600 or over 1,600 meters:
 Meters, Variable from Meters, 200 to 550; Meters, _____; Meters, _____

The energy, if radiated by the transmitter in two or more wave lengths as indicated by a sensitive wave meter, shall not in any one of the lesser waves exceed 10 per cent of that in the greatest; and the logarithmic decrement per complete oscillation in the wave trains shall not exceed two-tenths, except when sending signals or messages relating to vessels in distress.

SENDING WAVE LENGTH	ANTENNA CURRENT (AMPERES)	LOGARITHMIC DECREMENT	READING OF WAVE METER INDICATING INSTRUMENT*	
			PRINCIPAL WAVE	WAVE NEXT IN ENERGY
300 meters	Not ascertained.	300 and 600	meters to be used as required in	
600 meters	.75	Regulations 42 and 44.		
Variable from 200 to 550 meters	Variable	Transmitter to be used for experimental work only, at such times and under such conditions as to minimize interference with other stations.		
meters		Artificial antenna to be used whenever possible for experiments requiring high power and long wave length.		
meters				

* Type of indicating instrument, _____

The station insures rapid exchange with land wire stations at

(Company) _____ (Location telegraph office) _____
 (Company) _____ (Location telegraph office) _____

in the following manner: _____

This License will expire on the 10th day of March, 1923.



Julius Klein
 Acting Secretary of Commerce.
J. P. Carson
 Commissioner of Navigation.

December 11, 1922.

INSPECTIONS

DATE	INSPECTOR	REMARKS
November 22, 1922	O. R. Redfern	

NVC

11-5071
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7ZK - August 13, 1923 - Special Amateur Radio Station

Form 765A Copyright 2025 NWVRS

ORIGINAL

Official call 7 Z K

Number 10

LICENSE FOR SPECIAL AMATEUR RADIO STATION

DEPARTMENT OF COMMERCE
BUREAU OF NAVIGATION
RADIO SERVICE

Pursuant to the act to regulate radio communication, approved August 13, 1912,

Charles L. Austin, age 33, a citizen of the State of Oregon, county of Multnomah, city or town Portland, street E. Taylor, No. 1556

having applied therefor, is hereby granted by the Secretary of Commerce, for a period of two years, on and subject to the restrictions and conditions hereinafter stated and revocable for cause by him, this License to use or operate the apparatus for radio communication (identified in the Schedule hereinafter) for the purpose of transmitting private radiograms or signals, notwithstanding the effect thereof extends beyond the jurisdiction of the State or Territory in which the said station is located: Provided, That no interference other than may result under the restrictions contained in this License shall be caused with the radio communication of stations of the Government of the United States or licensed stations.

2. The use or operation of apparatus for radio communication pursuant to this License shall be subject also to the articles and regulations established by the International Radiotelegraphic Convention, ratified by the Senate of the United States and caused to be made public by the President, and shall be subject also to such regulations as may be established from time to time by authority of subsequent acts and treaties of the United States.

3. The apparatus shall at all times while in use and operation be in charge of a person or persons licensed for that purpose by the Secretary of Commerce, and the operator of the apparatus shall not wilfully or maliciously interfere with any other radio communication.

4. The station shall give absolute priority to signals or radiograms relating to ships in distress; shall cease all sending on hearing a distress signal; and shall refrain from sending until all the signals and radiograms relating thereto are completed.

5. The station shall use the minimum amount of energy necessary to carry out any communication desired, and the ~~output shall not exceed 500 watts in the antenna.~~ input to the oscillator shall not exceed 1000 watts.

6. The station shall not use a transmitting wave length exceeding 220 meters.

7. The station shall not use a transmitter during the first 15 minutes of each hour, local standard time, whenever the Secretary of Commerce by notice in writing shall require it to observe a division of the time, pursuant to the Twelfth Regulation of the act of August 13, 1912.

8. The President of the United States in time of war or public peril or disaster is authorized by law to close the station and cause the removal therefrom of all radio apparatus, or may authorize the use or control of the station or apparatus by any department of the Government upon just compensation to the owners.

9. The Secretary of Commerce and Collectors of Customs or other officers of the Government authorized by him may at all reasonable times enter upon the station for the purpose of inspecting and may inspect any apparatus for radio communication of such station and the operation and operators of such apparatus.

10. The apparatus shall not be altered or modified in respect of any of the particulars mentioned in the following Schedule except with the approval of a radio inspector, or other duly authorized officer of the Government.

Name of naval or military station, if within 5 nautical miles, --
Power: Tube ~~output~~ input 20 to 500 W. Antenna: Type (T, J, etc.) Inverted L
Height, 30'; horizontal length, 60'
(Above ground.)
Wires: Number in vertical part, 4; in horizontal part, 4
The sending wave lengths shall be 150 to 220 meters and the station is authorized to use any wave length within this band.

This License expires on August 12, 1925, 192

D. B. CARSON, Commissioner of Navigation.

HERBERT HOOVER, Secretary of Commerce.

Delivered by [Signature] Supervisor of Radio.

Copyright 2025 NWVRS

Place Seattle, Wash Date AUG 13 1923, 192

This station is not licensed to transmit between the hours of 8:00 and 10:30 p. m. local standard time, nor Sunday mornings during local church services, and is not authorized to broadcast news, music, lectures, sermons, and any other form of entertainment.

Appendix E

KFOH - The Radio Bungalow



Photograph of KFOH studio at the Radio Bungalow 1209 Taggart St. EH Chambers, owner and operator, is shown at the controls. Vera Beatrice Frank is at the piano and Harriett Averys is playing the violin. An upright phonograph sits on the right side. The station's Northwestern SR-25 receiver is shown in the center of the photo. It's not clear why there were so many horn speakers. Perhaps they were related to Chambers' Radio Doctor business. (Oregon Journal March 30, 1924). (Image retouched using AI).

KFOH

KFOH was one of Portland's shortest-lived radio stations, operating for just two months.

On May 31, 1923, Northwestern's broadcasting station, KGN, suspended operations. In February, 1924, Eric H Chambers purchased the KGN apparatus and moved it to his home-based radio business. It was relicensed and put back on the air as KFOH on March 23, 1924.

Eric H Chambers, operated "The Radio Doctor," a radio sales/repair business from a room in his house at 1209 Taggart St (41st and SE Taggart St) just a few blocks from Northwestern's building on SE Division St. He created a broadcast studio in the house's parlor and equipped it with microphones, a piano, and a wind-up phonograph. He operated the transmitter from a table in the corner of the room.

According to the KFOH license (shown below), the former KGN transmitter had been upgraded and was using six UV-202 tubes with an estimated fifteen watts output instead of the original ten. KFOH used an inverted L antenna 60 feet high. The station monitor was a Northwestern SR-25.

KFOH used the on-air slogan "The Radio Bungalow" and offered regular programming in March and April 1924. The precedent set by the AT&T Toll Broadcasting settlement, meant that Chambers faced paying potential licensing fees to continue broadcasting.⁶⁷ So, when the station's license routinely expired on May 27, 1924, Chambers did not seek its renewal.⁶⁸

**THE
RADIO
DOCTOR**
Please ring TAbor 8236
Antenna Construction
High-Class Radio Equipment
Sold Like Graphophones.
A Little Down—A Little a Month.
Parts Accessories
E. H. CHAMBERS
E. 41st and Taggart St.
Demonstration Room

*Ad for The Radio Doctor
(The Oregonian April 12, 1924)*

**SALE
TO CLEAR STOCK**
Strand Four-Tube Radio Grapho-
phone Combination Console
Cabinet. A Beauty.
**COLIN-KENNEDY NORTH-
WESTERN S. R. 25 AND OTHER
HIGH-CLASS EQUIPMENT AT
GREAT REDUCTION.**
RADIO BUNGALOW
East Forty-first and Taggart,
Three Blocks South of Division St.

*This ad for The Radio Bungalow lists
discounts on various receivers, among
them a Northwestern SR-25.
(The Oregonian May 4, 1924)*

⁶⁷ 2 Radio Stations Quit

⁶⁸ Pioneer Mikes pg. 67.

KFOH – February 21, 1924 Provisional Class A Limited Commercial License - page 3 describing the station's apparatus which included the Northwestern KGN transmitter and a Northwestern SR-25 receiver. (courtesy WSMB)

Reproduced at the National Archives

Form 761

APPLICANT'S DESCRIPTION OF APPARATUS

DEPARTMENT OF COMMERCE
BUREAU OF NAVIGATION
RADIO SERVICE

KFOH

The following form of description of apparatus will be filled out in duplicate and forwarded to the proper local office by each applicant for a license for apparatus for radio communication of any class (ship or land), except amateur stations for which Forms 762 and 762A are provided. The Inspector, if necessary, will then arrange for an inspection of the station, or, when feasible, the Inspector may accompany the applicant and make the inspection during the filling of this form. Where the form calls for a statement of details of apparatus with which the station is not equipped, the applicant will please draw a line through the space provided for the appropriate answer. The information is desired primarily as the basis of the description of the apparatus to be licensed, but many of the details are desired to facilitate the classification and particularly the inspection of stations, and will not, of course, be incorporated in the license. This form when filled will not be open to public inspection.

NOTICE.—This Form Must be Submitted in Duplicate to the Proper Supervisor of Radio.

GENERAL SPECIFICATIONS OF STATION.

Name of applicant: The Radio Bungalow
Address: 1209 Taggart Street
A citizen of the State of Oregon Or a company incorporated in the State of _____
Name and address of owner of radio apparatus: Eric H. Chambers
1209 Taggart Street, Portland, Oregon.

If SHIP STATION—Name of ship: _____ Owner of ship: _____
Type of vessel: _____ Official number: _____ International signal code letters: _____
Home port (where permanent document issues): _____ Average speed of vessel (nautical miles): _____
Number of persons in crew: _____ Number of passengers vessel is licensed to carry: _____
Is vessel subject to the Act of June 21, 1910, as amended by the Act of July 23, 1912? _____

If LAND STATION—Coast or inland? Coast Location—State: Oregon
County: Multnomah City or Town: Portland Street: Taggart No.: 1209
Exact Latitude, North: 45° 20' 54"; Longitude, West: 122° 58' 46"

Class of license desired (see regulations): Limited commercial Nature of service: Broadcasting
Specific hours open to public service: None - To be used for broadcasting

If limited station—Corresponds only with (state names of land stations, names of ships or lines of ships):
Used for broadcasting

SHIP OR COAST CHARGES.
(State class of service, such as North and South American or Transoceanic.)
_____ per word: _____; minimum per radiogram: _____
_____ per word: _____; minimum per radiogram: _____
_____ per word: _____; minimum per radiogram: _____

Relay charges: _____
Approximate day-transmitting range (nautical miles) with average ship: 75; with similar land station: 150

PRIMARY SOURCE OF POWER SUPPLY.

Engine—Type and horsepower: _____
Electric power—Source and available Kw.: City mains Is power continuously available? Yes

POWER.

Sparks: _____ CW, KCW, and Phone: Phone 15 watts
Make and type of apparatus: CW Radiophone for broadcasting Make and type of apparatus: Composite
Prim. volt.: _____ Amp. _____ Sec. volt.: _____ Amp. _____ Elect. tubes: No. 6 Type 4V 202 Power ratings _____
Trans. input, normal condition: _____ Kw. _____ No. of oscillators: 3 No. of modulators: 3
Type of gap: _____ Spark frequency: _____ Plate voltage: 500
Arc: _____ Plate current: _____ Oscillators 75 to 100 mls
Make and type of apparatus: Northwestern Radio Mfg. Co. Plate current: _____ Modulators 5 to 100 (Total)
Power: _____ Kw. _____ Volts _____ Amps. _____ Filament voltage: 8 volts Filament current: 14 amps

Type of coupling Ind. _____ Cond. _____
Remarks: Colpitt's circuit. Noising constant current modulation
Type and make of receiving apparatus (conductive or inductive coupling, etc.): Northwestern Radio Manufacturing Co. SR 25
Type of detector: Vacuum tube
Wave length range of receiving system: From 150 meters to 800 meters.

ANTENNA.

Type of antenna (T, L, umbrella, fan, etc.): Inverted L Insulators, type: 6" porcelain
Masts—Number: 2 Steel or wood? Wood Other supports: _____
Essential dimensions—Maximum height above ground or water: 80 ft. Length of horizontal part: 60 ft.
Length of vertical part (including lead-in): 60 ft. Total length measured from apparatus: 115 ft.
Length of ground connection: 5 ft. Fundamental wave length: unknown meters.
No. of wires: 4 size and kind of wire: #14 bronze Spacing between wires: 3 ft.
Counterpoise: Length: 30 No. of wires: 10 Spacing between wires: 2 ft. Distance from antenna: 57 ft.
Lightning protective switch—Type: Single 8550's pole Location: outside

Remarks: _____

* Person, company, or corporation controlling and operating station and responsible, under the law, for operation and radio accounts. Show address of office to which should be sent communications concerning radio accounts and operation of station.

Appendix F

Willard P Hawley Jr's Northwestern Station - 7XG / KYG

What started with a hobby broadcast station "7XG" in the early 1920's, eventually became the basis for the nation's oldest school-owned station "KBPS." This section describes Willard P Hawley Jr's adventures in broadcasting. Appendix G tells how the Northwestern-built station became KBPS.



Willard P Hawley Jr. (The City at Willamette Falls)
(Image retouched using AI).

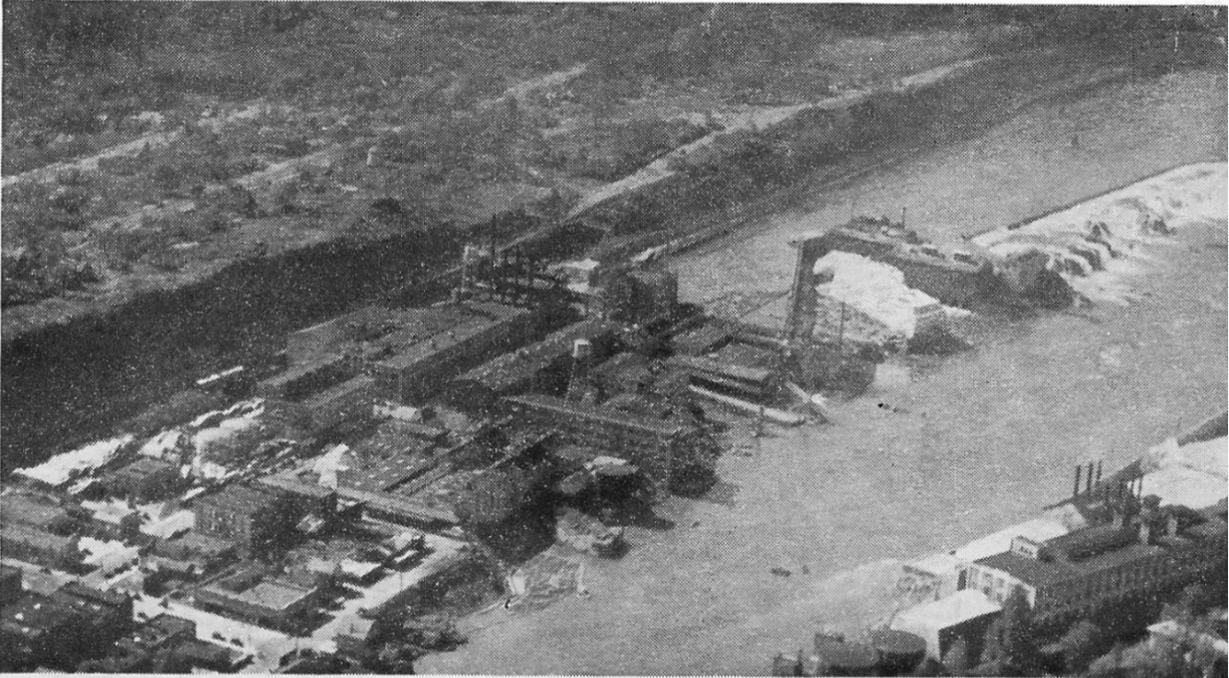
Willard Prescott Hawley Jr. (1890-1960) was a wealthy Portland businessman with an interest in broadcasting. After graduating from Portland's Allen Preparatory school in 1908, he entered business with his father who was building the paper plant on the Oregon City side of Willamette Falls. Later, Hawley Jr. was the vice president and general manager of the mill.

"Willard Hawley Jr. caught the radio bug while serving in World War 1."⁶⁹ Following the war, he commissioned Charles Austin to build a broadcasting station for him at the paper plant.

On April 14, 1921, Hawley Jr. announced that he would open a radio station located in Oregon City, next to the offices of the Hawley Pulp & Paper Co. The transmitter would be located in a new purpose-built structure, and the antenna would be supported on two 120' towers. On May 26, 1921, it was reported that the station was nearly finished and would go on the air on June 20th. An open-air concert with leading vocalists from Portland was planned for the inaugural broadcast. However, proceedings in a

⁶⁹ Before KBPS pg. 1

protracted divorce interfered with Hawley Jr's plans and he did not go on the air from the paper plant.



Aerial view of the Hawley Pulp & Paper Company Plant (looking southeast) ca 1939. This image is from Carl Braun's (W7HRV) QSL card. Carl Braun was the plant manager at the time. The plant bore Hawley's name until 1948, when it was purchased by the Los Angeles Times Mirror and became known as Publishers Paper. The plant was closed in February 2011 and has since been razed to make room for redevelopment.

Speculating here – we believe that Hawley Jr's initial decision to locate the transmitter at the paper plant, instead of at his home, was based on aesthetics and practicality. There was plenty of room for the transmitter and antenna at the paper plant. And, installing the station with its tall towers in a residential neighborhood could have been disruptive.

On the other hand, the relatively distant location of the Oregon City paper plant would have required Hawley Jr. to be away from home in the evenings. The plant environment would have been noisy, smelly, and a lousy place for parties. And Oregon City was too far for his broadcast performers and party guests to comfortably travel.

In the end, we believe that proximity to the city and the gracious environment of the Hawley mansion overcame aesthetic concerns about the towers. So, the move to Irvington took place.

7XG – the low-power experimental station

In November, 1921, Charley Austin began moving the broadcast station to Hawley Jr's elegant 1912 mansion at 400 E 22nd where he lived with his parents.

Before its final delivery to Hawley Jr., the station was used during a sleet storm when communication lines were down in the Columbia River Gorge. Using Austin's experimental call sign 7XF, they were able to connect with a station in Underwood, WA.⁷⁰

The station was eventually completed in February 1922 and was granted experimental license 7XG. Hawley Jr. paid \$6000 for the original, low-power station.

As built by Charley Austin, the transmitter was a five-watter similar in design to the Northwestern SR-15. The transmitter used four UV-202 5-watt tubes – two as modulators in the Heising circuit and two more as oscillators in the Colpitts circuit. Like the transmitter at Northwestern's station KYF, the station could function as a radiophone and could also transmit in CW or modulated CW modes. (This equipment had been replaced by the time the photo of KYG (below) was taken).

The station had two receivers, a short wave receiver made by Northwestern and a Kennedy receiver for long wave reception. The Northwestern receiver was an SR-1 and SR-2 combination - a regenerative tuner with a detector and one-stage amplifier. The SR-1 & SR-2 was used to tune "short" wave lengths from 100-450 meters. A Northwestern SR-5 two-stage audio amplifier was available, as well.⁷¹ In the photo of the KYG operating desk, the SR-1 and SR-2 are shown to the right of the clock. The SR-5 amplifier is pictured just to the right of the horn speaker

"For long waves from 600-20,000 meters, a Colin B Kennedy long wave receiver is used"⁷² The Kennedy⁷³, with its bright skirted knobs, sits to the left of the clock in the KYG photo.

The signal from either receiver could be fed into a large Magnavox horn speaker. If additional audio amplification was needed, a three-step amplifier sat to the left of the speaker. The amplifier used six 5-watt Cunningham transmitting tubes. The tubes were run in pairs and wired in parallel, two for each stage.⁷⁴

A Northwestern-built "jack box" (shown in the Product Compendium) allowed connecting up to three pairs of headphones simultaneously when the speaker was not used.

The KYG transmitting and short-wave receiving antenna was a 40' long and 70' high T-type and consisted of four wires equally spaced on ten foot spruce spreaders. Two 100' poles 70' apart supported the antenna. Each 7,000-pound pole was turned in one piece, tapering from 22" in diameter at the base to 8" at the top. Each pole was bolted to a concrete saddle at its base. No guy wires are used.

⁷⁰ Former KYG Station in New Home

⁷¹ *Radio Topics* April, 1922

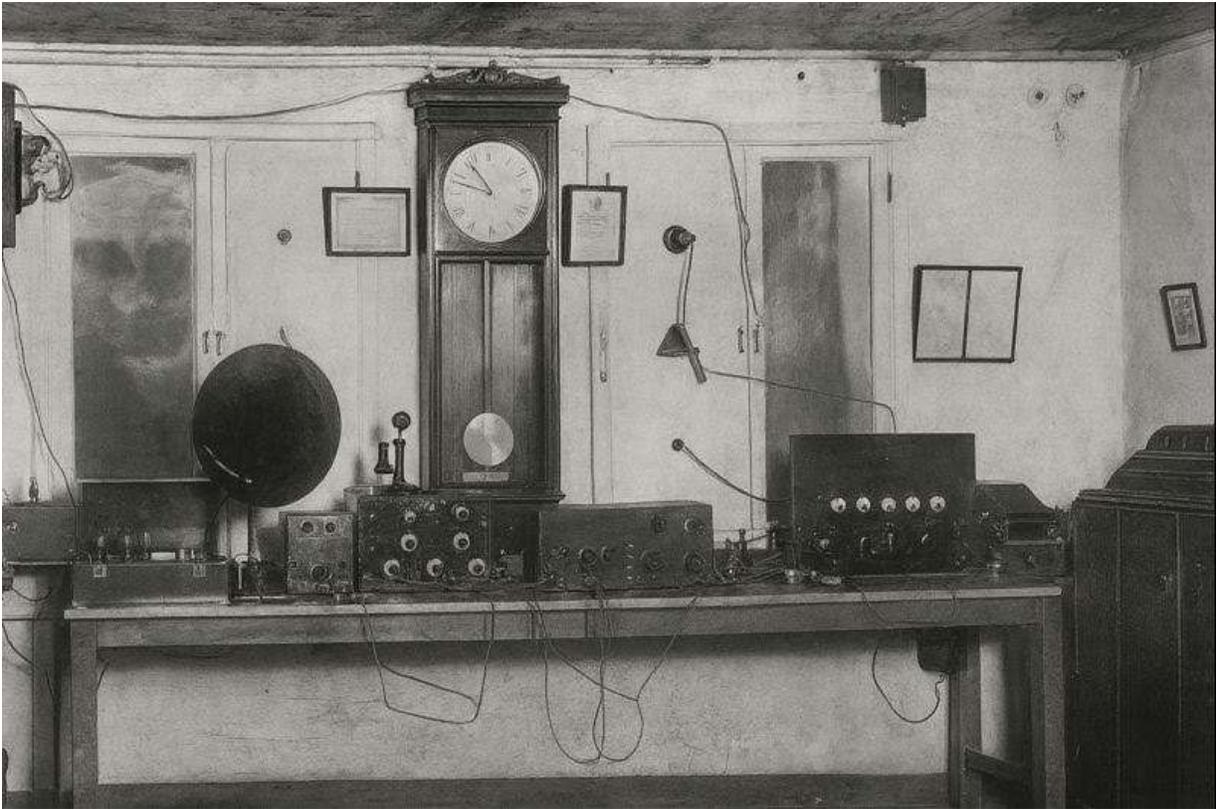
⁷² Ibid

⁷³ Possibly a Kennedy 110 Universal Receiver per Art Redman

⁷⁴ Ibid

As shown in the photo of KYG, a 12' operating desk was placed in the corner of the large 17' x 30' basement ballroom with an 8.5' ceiling.⁷⁵ The clock is a Western Union master clock. The candlestick telephone atop the receiver is a Bell system private line – unusual for the time when shared party lines were very common.

An electrically-driven phonograph was equipped with a Magnavox tonearm that was used for transmitting recorded music. A Steinway grand piano with a specially-designed spruce sound chamber was used for live broadcasts.



*KYG - The 100-watt Hawley Station (Radio Digest Illustrated May 20, 1922)
(Image retouched using AI)*

KYG – a regular broadcast station

“In March, 1922, when 7XG was only a few weeks old, Hawley Jr. applied to elevate his station to professional status. Having already spent \$6000 on 7XG’s construction, he ordered additional equipment costing another \$4000 for improvements. With 7XG’s power increased to 100 watts (from 5 watts), the station was relicensed as KYG on March 28, 1922 and inaugurated broadcasting with great fanfare.”⁷⁶

Hawley Jr. contracted with Stubbs Electric to build KYG and it was Wilbur Jerman, later of KWJJ/KFWV/W7XAO fame, who did the actual construction.⁷⁷ Charles Austin was a good friend of Jerman’s and lived across the street. The two collaborated often.

⁷⁵ *Radio Topics* 4/1922

⁷⁶ *Pioneer Mikes* pg. 8

⁷⁷ *Ibid* pg. 71

The new transmitter used four Radiotron UV-203 50-watt tubes. KYG garnered listener reports from all over the United States and the territories of Alaska and Hawaii.

At the time, radio could not be used for commercial solicitation or product advertisements. So, the purpose of Hawley's station was not to make money by broadcasting. Instead, it was to entertain and help create a party atmosphere by putting guests "on the air."

"In part, Hawley Jr. used the station to amuse his guests, but he also enjoyed announcing, having been trained to speak on the radio by Sgt. Richard C Travers at San Francisco's Presidio-based Signal Corps. Sgt. Travers reportedly possessed the "best carrying and clearest sounding [radio] voice of any man in California" and was known as the "Man with the Million Dollar Voice."⁷⁸

"Hawley Jr. invited teachers from nearby Benson Polytechnic High School and others to talk, sing, and play over the air, after which Hawley would feed them ice cream and cake."⁷⁹

Police Lieutenant Crane and Principal Cleveland

As one of Portland's first broadcasters, KYG served a practical purpose as well.

Though Portland had no official police radio system at the time, there was interest in using radio for crime fighting. Lieutenant Crane of the Portland Police St Johns substation was an enthusiastic radio fan. By the summer of 1922, an antenna had been installed on the roof of the St Johns precinct and the officers were getting good results from a homebuilt receiver with a Magnavox horn speaker..

According to Lieutenant Crane, "The station of Willard P Hawley Jr. has been used a few times to broadcast auto thefts and, due to the information thus broadcasted, the thieves have been captured, in some instances a couple of hundred miles away...."⁸⁰

Besides his advocacy for police radio, Lieutenant Crane organized a radio club for boys in St Johns with the view of teaching them how to build their own sets and giving them instruction on radio in general and with the further view of keeping the boys out of mischief. True or not, this same thought about using radio to bolster morals was later echoed by Benson High School Principal Charles Cleveland in support of purchasing KYG.⁸¹

⁷⁸ Ibid pg. 8

⁷⁹ Pioneer Mikes pg. 8

⁸⁰ *Radio Waves* 6/1922 pg. 43

⁸¹ Per WD Allingham interview as quoted in "Digging in to the Early History of High School Radio Station KBPS."

More Power

A second upgrade to a Northwestern 250-watt transmitter was contemplated but not accomplished prior to the sale of the station. The transmitter would have used a 250-watt tube as an oscillator, another as a modulator, and a 50-watt tube as a speech amplifier.⁸² As part of the unrealized upgrade, Charles Austin planned to construct and install a superheterodyne receiver. No Northwestern superheterodynes have been reported⁸³ and we don't know if one was built for Hawley Jr.

The Sellwood Radio Club

In June, 1922, one hundred radio fans attended a meeting at the Sellwood⁸⁴ Community House for the purpose of organizing a radio club. Ralph T Galyean⁸⁵ was elected President and his brother Charles, Radio Engineer. WS Potts was selected for the First Vice President, Kenneth Brown, Secretary, and Gilbert Charters, Treasurer. Willard P Hawley Jr. was named the Honorary President of the new club.⁸⁶

Winds of Change

On August 2, 1922, The Oregonian announced that KYG would be shut down until August 15th due to Hawley Jr's travel plans. Then, on August 15th, Hawley Jr's engagement to his second wife, Dorothy Metschan, was announced. Hawley Jr. never resumed regular broadcasting and began the process of disposing the station.

Following Hawley Jr.'s wedding, the couple moved to Portland's west hills. His parents remained in the Irvington mansion⁸⁷ for a time. Willard P Hawley Jr. passed in February, 1960.

An Ode to Willard P Hawley Jr

In the early 1920's, we first heard the magic words "radio" and "crystal sets." The passing of Willard Hawley [left me] wondering if we ever received the [same] thrill, from even television, which was ours when his voice would come from the ether:

"Hello, all ships and stations – this is station KYG broadcasting."

Mrs. Ingo B Sturges (*The Oregonian* February 14, 1960)

⁸² *Radio Topics* 4/1922 pg. 12

⁸³ According to a Wilbur Jerman interview, Austin did *purchase* a superhet and the two set it up in Jerman's bedroom and experimented with it. (*Pioneer Mikes* pg. 71)

⁸⁴ The Sellwood community is located in Southeast Portland along the Clackamas County line. Sellwood Community House is located at the corner of 15th & SE Spokane St. It is now on the National Register of Historic Places and the pretty old building still functions as a community gathering place.

⁸⁵ See also *Mount Hood Calling* (listed in the Recommended Reading section)

⁸⁶ Research on the Sellwood Radio Club is continuing. This snippet is presented here as another evidence of Hawley Jr's popularity, and involvement, with the Portland amateur community.

⁸⁷ Today, Hawley's mansion is called "Portland's White House." When Portland's street addresses were revised in 1932, its address became 1914 NE 22nd Ave.

Radio Service Bureau

YOU ARE MISSING

The wonderfully improved radio concerts and other broadcasted programs. The local stations are all installing larger and better broadcasting equipment, and getting away from phonograph music to programs furnished by talented local and visiting artists.

DO YOU KNOW THAT WE WILL SELL YOU A LOUD-SPEAKING RADIO SET ON MONTHLY PAYMENT TERMS?

Write or phone for our new catalogue.

Radio Service Bureau

Gasco Building Main 4534

WE ARE NOW OPERATING KYG **THE FAMOUS HAWLEY STATION**

Radio Service Bureau ad for KYG (The Oregonian 10/22/1922)

After Stubbs Electric decided to shut down its broadcast station, KQY, “Willard Hawley also decided that KYG was something he could do without. Beginning in September, 1922, he briefly allowed a potential purchaser of the station, a company called Radio Service Bureau, to operate KYG from his home. Stories differ as to whether Hawley actually sold KYG to that company, although Hawley acted as though he had completed the purchase....”⁸⁸

“...Radio Service Bureau announced plans to relocate KYG to their offices in suite 710 of the Gasco building⁸⁹ at 11th Ave and Washington St, where it intended to install a ‘high-class station,’ which was supposed to sign-on October 23, 1922. It never did. The Department of Commerce radio inspector, suspicious over apparent misstatements made in the company’s license application, canceled KYG’s license on November 7, 1922, upon determining that the station had never been built at the new location”⁹⁰

“Another version of KYG’s demise holds that Radio Service Bureau initially sought to operate from the *Portland Telegram* building but couldn’t secure city approval to erect the necessary towers on its roof. In any event, KYG was no more.”⁹¹

At this point Hawley Jr’s transmitter was consigned to Stubbs Electric for sale.

The story concludes in Appendix G.

⁸⁸ Pioneer Mikes pg. 12

⁸⁹ Also known as the “Telegram Building” (1101 SW Washington St). KXL leased studio space there in November, 1937, renaming it “The KXL Building.” (“Behind the Mike” *The Oregonian* 3/20/1942) (Craig Adams)

⁹⁰ Ibid

⁹¹ Ibid

Appendix G

Benson Polytechnic High School - KFIF / KBPS / 7XAD / 7YK

The Benson story is dedicated to the *Techmen* we have known and the *Astros* we look forward to meeting. Our thanks go out to: Louie, Art, Bob, Bill, Brian, Jeff, Larry, Rudy, Temple, Warren, Everett, Jacob, Richard, Darryl, et al.

In 1923, Benson Polytechnic High School students purchased the former Hawley broadcast station, KYG. After discussing the acquisition of the KYG, we'll share a detailed description of the station in its early days, followed by a timeline of high points in the station's early history, and the story of Benson's amateur station, 7YK.

KFIF Background

"Students at Portland's Benson Polytechnic High School had a longstanding interest in radio. Initially, Benson had operated...station 7YK for physics and [radio] students. However, as regular radio stations developed in 1922 and early 1923, the operation of this 'spark gap' station became impractical because of the interference that it caused with radio reception."⁹²

"Since Willard Hawley had abandoned KYG in October, 1922 and his successor, the Radio Service Bureau, had quit a month later, an opportunity arose. By February 1923, the KYG transmitting equipment, which had been built by Charles Austin's Northwestern Radio Manufacturing Company, was sitting in Stubbs Electric's display window and was advertised for sale at \$1500."⁹³ Popular legend holds that some Benson students saw the transmitter in Stubb's window and persuaded the school to okay purchasing it with student body funds, to replace 7YK.

From the outset, the idea of purchasing the station seems to have had a lot of promise. First, Benson's mission of exploring technology and teaching the trades made having an on-campus broadcasting station a natural fit for their curriculum. Second, in addition to listening to Hawley's broadcasts, students and

100-Watt
Broadcasting Set

The famous KYG, formerly owned and operated by W. P. Hawley, Jr.

This set uses four 50-watt tubes for either voice or code transmission, complete with motor, generator set, key and chopper wheel; mounted in a beautiful cabinet with bakelite front. Price..... \$1500

STUBBS
ELECTRIC CO

75 Sixth St. - Portland, Or.

*Stubbs ad for station KYG
The Oregonian (1/21/1923)*

⁹² Pioneer Mikes pg. 66

⁹³ Ibid

faculty had been regular guest performers on the nearby station. Thus, many were already familiar with KYG and may have envisioned resuming Hawley Jr.'s fun and entertaining format.

“In reality, the purchase was far less casual. Having acquired the transmitter, Stubbs apparently offered it to Benson’s principal, Charles E Cleveland, who appointed a faculty/student committee to consider the matter. According to William D Allingham⁹⁴ in a 1955 interview, the primary motive for Cleveland...in purchasing the transmitter was the hope that a radio station would help boost school enrollment and build better community relations for the still relatively new school.”⁹⁵



Bill Allingham alongside an early KFIF transmitter. (undated photo)
(*The Oregonian* 3/21/1948)
(Image retouched using AI).

On March 15, 1923, newspapers announced that the Benson student body had purchased Hawley’s station. Instead of the advertised \$1500 price, the students may have paid as little as \$800.⁹⁶

“Since KYG’s license had been abandoned, the school needed to file a new Department of Commerce application in which it requested reinstatement of the KYG call sign. Learning that wasn’t possible, the station signed on as KFIF on May 4, 1923.”⁹⁷

“During the first eight to ten years of operation, all the programs were live programs. [Phonograph] records were too poor to be used in those early days.... Numerous musicians came to perform live over KFIF during its first year and the addition of a grand piano to the station enhanced its appeal to many accomplished pianists, singers, and instrumentalists as well as performers from visiting opera and touring musical companies.”⁹⁸

⁹⁴ William Allingham (1892-1973) (7KY / W7KY) and his wife Lucie (W7FXE) were part of the ham radio network that helped with emergency communications during the 1948 flood. For more information see [Voices of Vanport](#).

⁹⁵ *Ibid*

⁹⁶ *The Oregonian* March 21, 1948

⁹⁷ *Pioneer Mikes* pg. 66

⁹⁸ Dr Patricia Green-Swenson as quoted by Radio Survivor.



Station Manager Dr. Pat Swenson discusses broadcast microphones with KBPS student staff members.
Oregon Historical Society Research Library Coll 822.

“Originally telephone microphones were used. Resources provided by [AT&T] were of great value to the struggling little station. There was even a license⁹⁹ between KBPS [KFIF] and the telephone company at one time which entitled the station to use any patents the company owned or might acquire concerning use of radio tubes and circuits.”¹⁰⁰

At the station’s request, the station’s call letters were changed to KBPS (K-Benson Polytechnic School) on April 22, 1930.

“That it has trained a lot of good radiomen is seen in the list of former Benson student now staffing commercial stations and in federal communications jobs. Allingham says nearly every station in the Northwest has had a graduate of Benson on its staff at some time.”¹⁰¹

⁹⁹ Following the Toll Broadcasting settlement, AT&T sold KBPS a license for \$1. Since the transmitter’s RCA Radiotron type UV-203 tubes were licensed “only for amateur or experimental use,” this agreement may have also helped indemnify the school against potential legal troubles. *The Oregonian* June 6, 1924.

¹⁰⁰ *The Oregonian* March 21, 1948

¹⁰¹ Ibid

“The purchase of KBPS [KYG] back in 1923 was not the idea of the school administration. It was swung by the Benson student body, and principal credit goes to three men: the late Charles Cleveland, principal of Benson, Bill Allingham, then a teacher, who built the station, and Roy T Stephens, teacher, who remains the federal communication agent for KBPS.” (*The Oregonian* March 21, 1948)



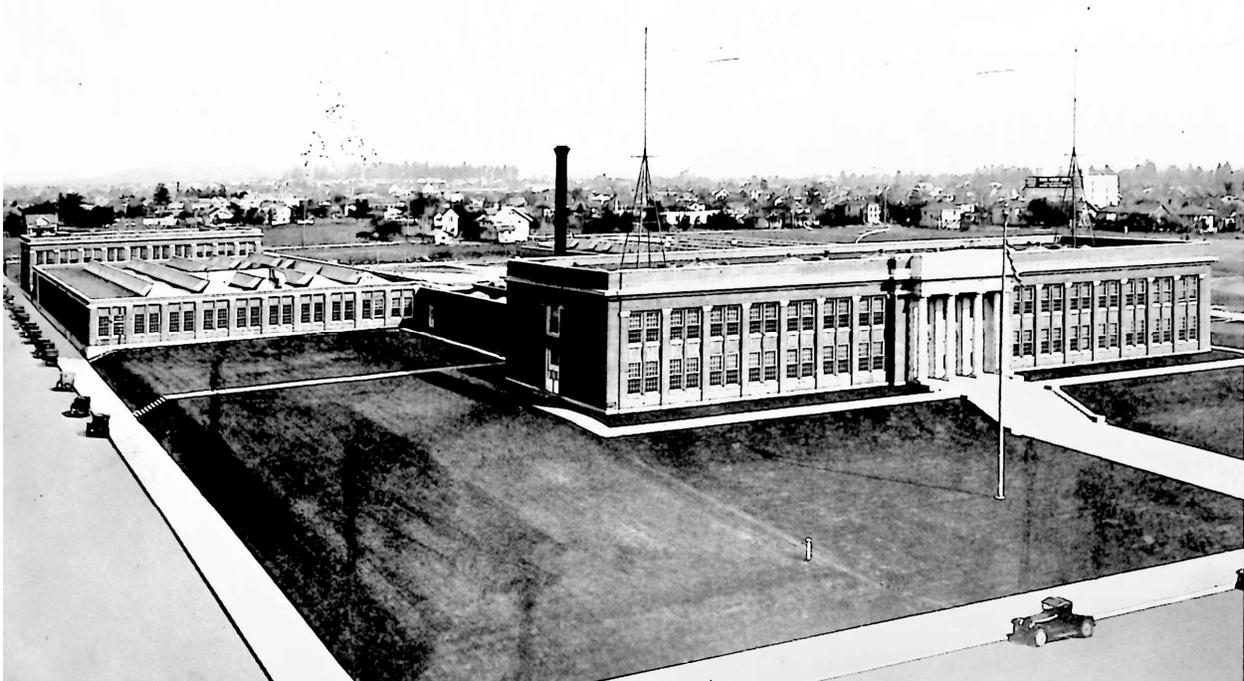
Charles E Cleveland
BS, EE Principal
The Poly Tech Jan, 1930



Roy T Stephens
Physics Teacher
The Poly Tech Jan, 1930



William D Allingham
Drawing Teacher
The Poly Tech Jan, 1930



Benson Polytechnic High School Campus

80' iron masts on the corners of the 1916 Administration Building support KFIF's flat top wire antenna. The Poly Tech January, 1924.

KFIF Station Description ca. 1923

The January, 1924 Poly Tech included a very detailed description of Benson High School's new broadcast station. This section is drawn from that story.

Former KYG in New Home

The past term closes upon a successful period of broadcasting by the student body's station, KFIF. The station owned and operated by the student body, broadcasts every Tuesday between the hours of 9 pm and 10 pm.

The station was originally installed with the view of broadcasting the activities of the school, but programs have been mingled with school business to add to the excitement. Listener reports are pleasing. Vocal and instrumental selections by local artists have been broadcast. Members of the faculty and student body have also presented instrumental pieces.

The station is located at the north end of the Administration building. Adjoining the studio is the operating room where the 100-watt transmitter is located.

The antenna swings between two 80' iron towers. These towers are placed 170' apart at either end of the Administration building. The antenna consists of four wires with a caged lead-in, the whole apparatus forming an inverted "L" type. A counterpoise, considerably larger than the aerial, hangs underneath.

The transmitter was built by the Northwestern Radio Manufacturing Company of Portland. The first owner was Mr. Hawley, who operated the station with the call letters KYG.

In the spring of 1923, the transmitter was purchased by the Student Body of

Benson Polytechnic School. The government issued the call sign KFIF and, after encountering many obstacles, the station was put into operation on a wavelength of 360 meters (834 kc). The modulation and output have been steadily improved by numerous tests.

The circuit used is a Colpitts with Heising modulation. Four fifty-watt tubes are employed, two as oscillators and two as modulators. The power is furnished by a motor generator run from the building's regular lighting circuit.

The set has a large cam switch which controls the starting and stopping of it. Phone, CW and chopper-modulated CW may be used by manipulating the cam switch. To date only phone has been used, due to the fact that the set would not work far below 360 meters. Under the old school call sign of 7YK, the radio regulations required the station to be operated below 200 meters.

The school's first station, 7YK, used a 10 kw spark. The new station uses 1% of the power that the old set took and yet has greater range.

Faculty members, Mr. William D Allingham and Mr. Roy T Stephens, act as observers and announcers both. The operators are Benson students Wesley Mock and Temple Ehmsen. Mr. FA Brainerd is the program manager. Benson student JD Hertz supervised the installation of the station and its operation.

Tech Radio Timeline – The Early Years¹⁰²

1908

Portland School of Trades founded.

November 23 – frequency changed from 833 kc to 1210 kc.

1917

September 4 – The renamed “Benson Polytechnic High School” opens.

1924

August 27 - KFIF licensee was changed from the Benson student body to the school itself.

1918 (World War 1)

Students study in portable classrooms at Washington High School while the Benson campus is used for military training and an Influenza hospital.

1925

Hallock & Watson rebuild the transmitter, changing the Colpitts oscillator to a coupled Hartley circuit.

1921

May – Benson is licensed to operate 7YK as a “Technical and Training School” station.

1926

October 6 – licensed power was increased to 150 watts.

1923 - KFIF

March 15 – Newspapers announce that the Benson student body had purchased Willard Hawley’s station.

November 10 – frequency changed to 1190 kc.

March 23 - KFIF licensed to operate on 360 meters (833 kc) using 200 watts.

1927

April 26 – licensed power was reduced to 100 watts.

April – Equipment tests were conducted using the school’s 7YK call sign.

June 15 – frequency changed from 1210 kc to 1400 kc (shared with KFEC). Licensed power was further reduced to 50 watts.

May 4 – Informal broadcasting began.

1928

March 1 – frequency changed from 1400 kc to 1310 kc (shared with KTBR).

May 9 – KFIF is formally christened at the start of the 5th annual Benson Technical Show. From 9:30-10:30 pm, listeners heard addresses from school director W F Woodward, Benson Principal C E Cleveland, and student body president Bill Norvell. Margeurite Carney sang.

November 11 – frequency changed from 1310 kc to 1420 kc (its own frequency).

June 27 - power was reduced from 200 watts to 100 watts.

1929

January 15 – licensed power was increased to 100 watts.

November 8 – KFIF began sharing 1420 kc with KXL.

¹⁰² Dates come from sources including Education’s Own Stations, PDXradio (Craig Adams), et al.

1930 – KBPS

March 17 – KFIF becomes KBPS (Benson Polytechnic School). “The letters KFIF were difficult to utter over the radio...and they were harder still to understand.”¹⁰³ The school requested, and was granted, the KBPS callsign.

June 7 – KBPS left the air for summer vacation¹⁰⁴, leaving KXL exclusively on 1420 kc.

July - Hallock & Watson built and installed a new transmitter with automatic frequency control on the school roof.

October 6 – KBPS returned to the air following summer vacation.

1932

During the 1932 summer hiatus, Hallock & Watson installed a new crystal control oven and oscillator following problems with frequency drift.

1941

March - frequency changed from 1420 kc to 1450 kc as part of the North American Regional Broadcasting Agreement (NARBA). KBPS no longer had to share time on its frequency with other local stations.

1942

October 5 – Charles M Weagant hired.

1943

March 23 – KBPS marks its 20th anniversary with a special broadcast. Brief talks were given by Mayor R Earl Riley, Benson Principal CE Cleveland,

Roy Stephens and others. Margeurite Carney sang, reprising her performance from the station premier in 1923.

William Allingham retired from Benson as head of the mechanical drawing department and went to work at Kaiser Shipyards training mechanics to read blueprints.

1947

Dr Patricia Green-Swenson (1916-2010) is hired by Portland Public Schools. In her role as “assistant supervisor in charge of radio,” she oversaw the use of radio in classrooms in the district’s sixty-two elementary schools and nine high schools. Dr Swenson served as KBPS’s general manager from 1947 until her retirement in 1994.



Dr Patricia Green-Swenson
(Courtesy Benson.pps.net, Portland Public Schools)

¹⁰³ “Station’s Call Changed” (*Oregonian* 3/18/1930)

¹⁰⁴ During the depression, the school applied for and received permission to go off the air (without

abandoning its license) during summer vacation citing the fact that the teachers were not paid for the summer months. (WSMB)



KBPS Tower ca 1950. [1953 Poly Tech](#)
(Courtesy KBPS, Portland Public
Schools)

1950

KBPS erected a 200' antenna tower and installed a new 250-watt transmitter. The new transmitter was partially student-built under the direction of Charles Weagant, KBPS Engineer. The station was inspected and returned to the air in November. The original KFIF towers from 1923 remained atop the Administration Building for a period after the new tower was put up. (See also the 2023 note below).

1970

Bauer 707 transmitter installed. Licensed daytime power increased to 1,000 watts.

1973

Speakers at the KBPS 50th anniversary celebration include William Allingham, Temple Ehmsen, and Dr. O.M. Heacock.

1983

August 1 – KBPS-FM (KQAC) begins broadcasting on FM 89.9.

2009

KQAC is sold to All Classical Public Media.

2023

KBPS tower remeasured and determined to be only 199' tall. LED aircraft warning beacon removed. Tower repainted from alternating stripes of "aviation orange" (red) and white to solid gray.

"The school's foresight in acquiring KFIF in 1923 propelled Benson Polytechnic into the role of operating one of the nation's first, and most durable, educational radio stations." Ron Kramer - [Pioneer Mikes](#)

Benson's Broadcasting Birthdays

March 23rd, 1923 is KBPS's officially recognized birthday. Throughout the station's history, the anniversaries have been memorialized in big ways. Archives are replete with proclamations from various dignitaries, including several Portland mayors, recognizing March 23rd as "KBPS Day." We think that it's wonderful that the School District and community at large continues to recognize the importance of the 100-year-old station.

Over the weekend of March 21-22, 1998, the Northwest Vintage Radio Society helped KBPS celebrate its 75th anniversary. Members displayed Portland-made radios from the 1920's in the basement ballroom of the Hawley mansion, "Portland's White House," where KYG once broadcasted. Society members Dick Karman and Andy Bell helped celebrate the station's 70th in similar fashion in 1993. In 2023, the Society helped KBPS celebrate its 100th anniversary with a very special day-long reception at the Monarch Hotel (now the Hilton Garden Inn) in Clackamas.

While researching our report, we saw a copy of this photo at the KBPS studios. Older readers and history buffs may recognize the face of radio and TV star comedian Jack Benny. According to station staff, Mr. Benny was in Portland on business and they persuaded him to record a special greeting commemorating KBPS's 45th birthday



Comedian Jack Benny records a birthday greeting for KBPS March 22, 1968. Seventy-four-year-old Benny, who always insisted that he was only 39, quipped "Congratulations to an old station, one that's older than I am."
Courtesy Portland Public Schools Archives.

The Antennas at Benson

When the Benson Student Body purchased the KYG transmitter, a flat top wire antenna was installed on the school's administration building. This antenna was replaced by a tower in 1950. To visitors, the KBPS tower is a campus landmark. The following pages detail the history of the KBPS antennas.

The KFIF Flattop Antenna

The flattop antenna was installed in 1923 under the supervision of Mr. Alison of Benson's Electric Shop. The antenna hung between two 80' towers which consisted of 40' angled bases that were topped with 40' pipe extensions for a total height of 80'. Mr. Kuhns of Benson's Woodworking shop and Mr. Holman of the Blacksmith shop supervised the installation. "It was a risky job to put up the pipe extensions and more than one student was a trifle dizzy looking from the top to the ground."¹⁰⁵

When the 1947-1948 station budget was written, the condition of the 25-year-old wire antenna was decried as justification for its replacement. "The present antenna and supporting structure [are] very old and in poor mechanical condition...It is only half as high as it should be and does not radiate nearly as much power as it should...which makes it impossible to adequately cover School District 1. We also have received complaints from the Forest Service for interfering with their frequency, which is caused by our antenna being cut for their frequency instead of ours. A new tower would greatly increase our signal level to all of this community, eliminate noise in receivers in schools, and cut out interference with the Forest Service."¹⁰⁶

The KBPS Tower

During the late 1940's, Station Engineer Charles Weagant, Mr. Pavia, and Benson students began a multi-year project to build a 250-watt transmitter. They determined that the upgraded station would be served better with an upgraded antenna system. Though only about \$2000 was budgetted for the shop-built transmitter, estimates for a new tower ran as high as \$5000. So, what could be done?

In February, 1937, KALE installed a new 179' self-supported Blaw-Knox vertical radiator atop the 12-story Weatherly Building at the corner of SE Grand Ave and Morrison St. In 1940, the KALE transmitter was moved to KOIN's Sylvan site on Barnes Rd and new towers were purchased. The abandoned Blaw-Knox tower was donated to the Portland Police Department in September, 1941 for use at the main precinct. Plans for the tower apparently stalled during World War 2.

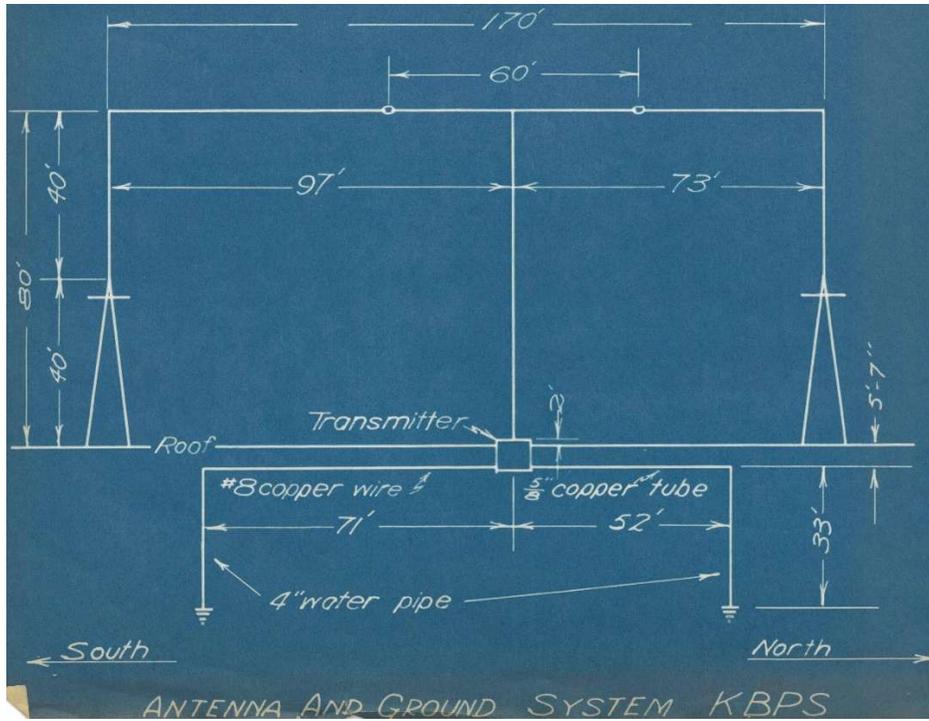
In 1948, Benson purchased the tower from the City of Portland for \$30¹⁰⁷ and moved it to campus from the Weatherly Building. It sat alongside the Aviation Shop pending a siting decision and the completion of the Weagant transmitter.

The Blaw-Knox tower was installed in its present location in 1950.

¹⁰⁵ Construction of Radio Set is Completed

¹⁰⁶ Benson Radio Station 1947-48 Budget

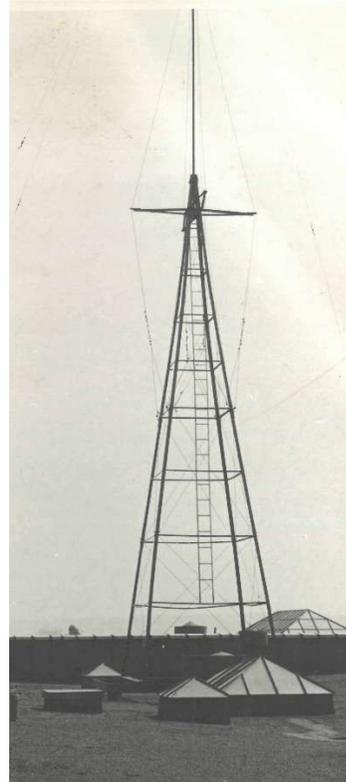
¹⁰⁷ KBPS Will Get New Transmitting Tower



Blueprint of KFIF (KBPS) antenna and ground system February, 1940. Oregon Historical Society Research Library Coll 822.



Antenna lead-in 4/1/1949. Joe Lowe photo. Oregon Historical Society Research Library Coll 822.

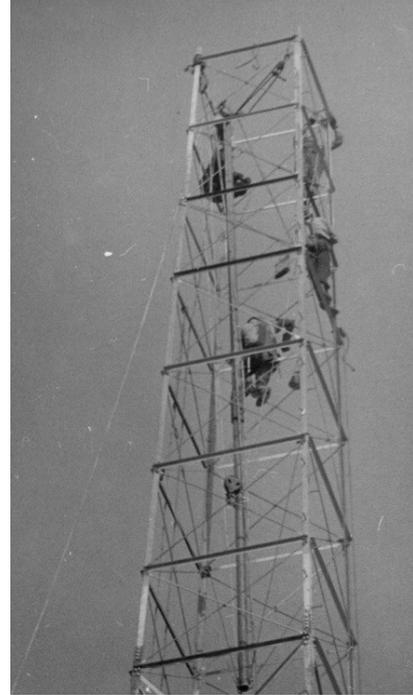


Rooftop tower 6/3/1949. Joe Lowe photo. Oregon Historical Society Research Library Coll 822.

In 1950, KBPS put up a tower to replace the KFIF flat top antenna. Joe Lowe took photos of the build and they appear courtesy of the Oregon Historical Society Research Library Coll 822



Sections of the Blaw-Knox tower await assembly.



Riggers secure an additional section.



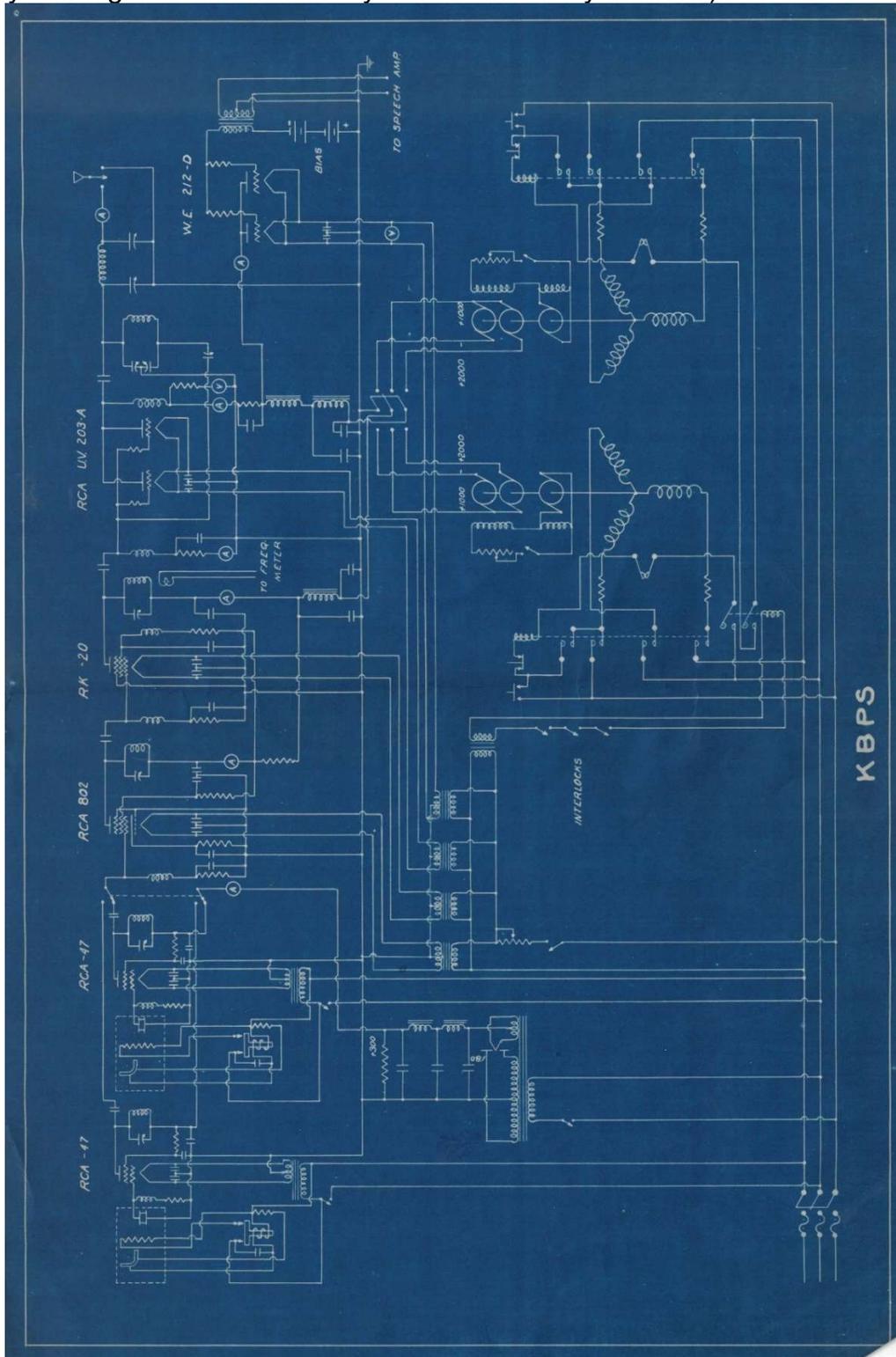
The tower base is set.



The top section being raised with a gin pole.

KBPS Transmitter Pictures

(courtesy of Oregon Historical Society Research Library Coll 822).



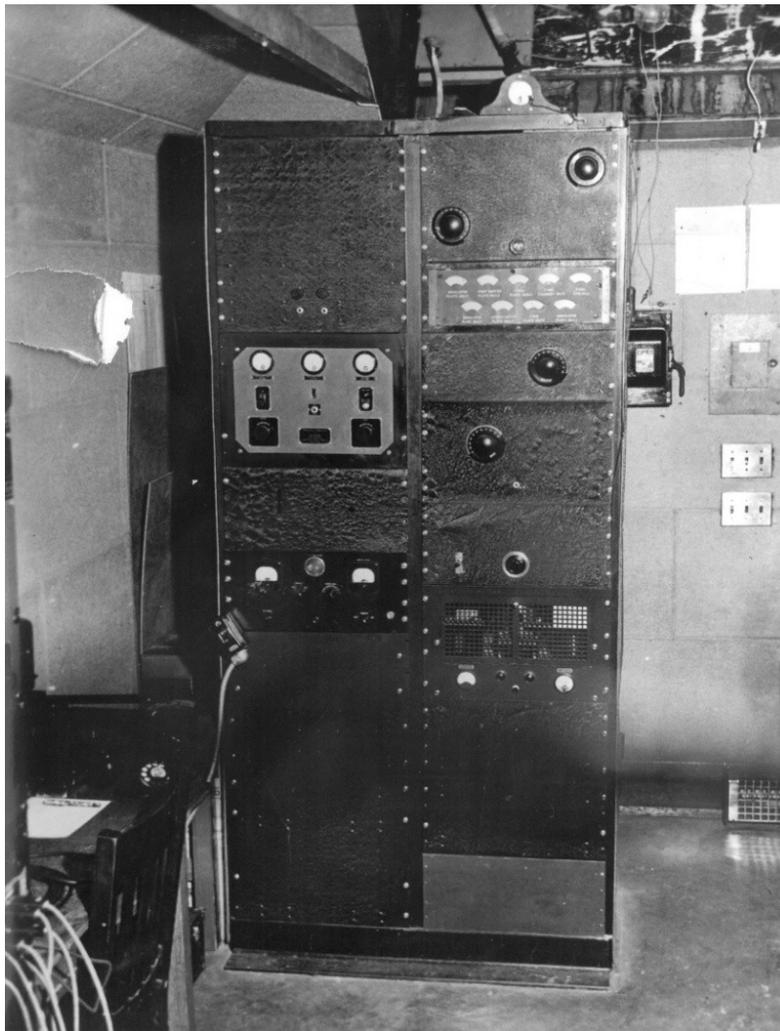
Schematic of KBPS transmitter. Circa 1948.



Early KBPS broadcast studio with turntables in the foreground.



Joe Lowe, KBPS transmitter operator



KBPS Transmitter March 12, 1947.

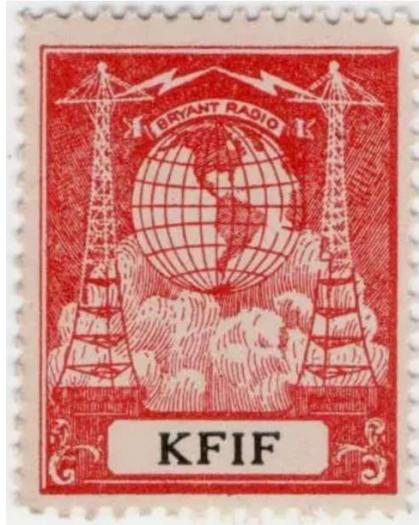


Charles Weagant, KBPS Engineer March 22, 1953. Philip Carrell photo



In this circa 1970 photo, Roy Stephens (left) holds a Western Electric 212D 250-watt amplifier tube from an earlier transmitter. On the right, Hal Potter, KBPS Engineer, holds up a newer tube for comparison. Dick Farris photo.

KFIF and KBPS Listener Confirmations



PM Bryant radio reception confirmation stamp for KFIF ca. 1925. Listeners could receive verification stamps by mailing a reception report to stations. Locally, Stubbs Electric, Lectro Mfg, JK Gill, and others sold albums for saving stamps. The image was enlarged from its original 1.25" x 1" size to show the beautiful engraving details.



KBPS listener confirmation QSL card from 1935. Signed by William Allingham. (Image used by permission of Library of American Broadcasting. George L Glotzbach QSL collection, 0090-MMC. Special Collections and University Archives, Univ of MD).

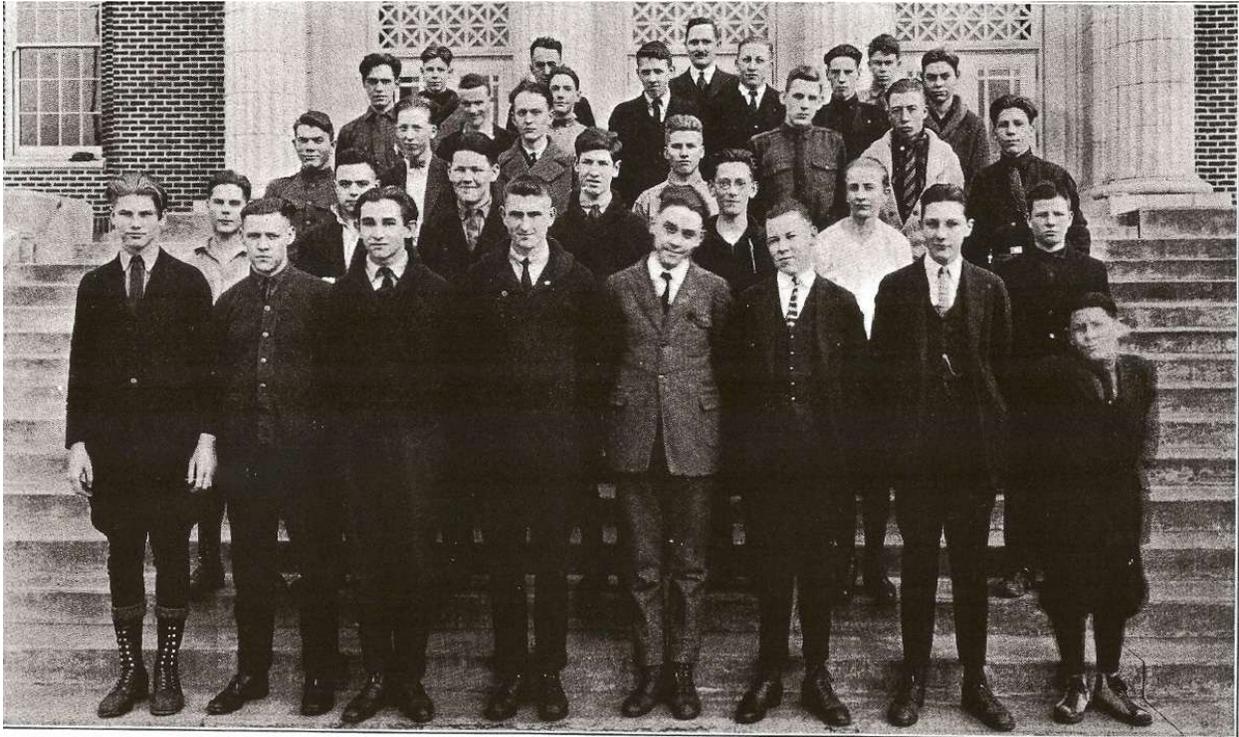
The Benson Amateur Stations

7XAD

The January, 1924 Poly Tech described 7XAD, Benson's experimental radio station.

"Recently the station was issued the call of 7XAD, this being an experimental call sign. The new call sign will entitle the station to use any wavelength between 50 and 1500 meters for running experiments. The license expires every three months. This call places the station on a basis where research work may be conducted. A detailed report of all such work is required every three months by the radio inspector."¹⁰⁸

The Benson Tech Radio Club W7YK



RADIO CLUB

First Row: E. Austin, G. Carr, C. Bushman, F. Blount, H. Oliver, R. Hurd, T. Maysin, R. Freeman.
Second Row: H. Larson, D. Wright, J. Britton, L. Brennan, H. Grutz, C. Taylor, R. Martin.
Third Row: G. Chilson, H. Nelson, W. Mock, L. Cray, R. Carson, T. Ehmsen, W. Stevenson.
Fourth Row: C. Joirg, W. Yost, D. Marrison, A. Lundstrom, R. Setterstrom, W. Morton, M. Hartman.
Fifth Row: R. Weaver, Mr. Allingham, Mr. Stephens, W. Bullis.

The Benson Tech Radio Club members and advisors fall, 1923. KFIF student operators Wesley C Mock Jr. (7LQ, K2BT) and Temple Ehmsen (7AGK, W7VS) are in the third row. Faculty advisors William "Broadcast Bill" Allingham (7KY, W7KY) who was a teacher in the Mechanical Drawing Department and Roy T Stephens, a physics instructor, are in the fifth row. Other notables from Portland's radio history, Ernie Austin and Herb Oliver, are shown in the front row. (Poly Tech January, 1924).

¹⁰⁸ January, 1924 Poly Tech

The first amateur radio club at Benson was organized in 1920 and membership was limited to commercial radio operators¹⁰⁹, of which there were only two. In May, 1921 the club was reorganized as "The Benson Tech Radio Club" and membership was open to any Benson student with an interest in radio.

For the third annual Benson Tech show, the club demonstrated amateur radio using their spark transmitter. Following the Tech Show, the radio club was given space in the Foundry Building to use as a club room.

Club members helped with the installation of KFIF and were involved with station operation. After the installation of KFIF, the radio club stopped using its 10 kw spark transmitter. The spark transmitter was eventually dismantled and replaced with a vacuum tube transmitter.

The "Rose City" PORTLAND, OREGON ARRL
East 12th and Hoyt Streets

RADIO AAZ UR SIGS WORKED HR ON 2/25/28 P.S.T.
RCVR. HR Schneil WID 1 STEP AMPLIFIER
TRANS. HR Split coil pitc WID 5 WATTS INPUT
ANT. HR Hertz Zeppelin out
UR AUD R. 5 QRM, QRN, QSS, QSSS, QSB QRHOK KC.
REMARKS sure gld to qso am hoped to CU
agn. 7A KM sec
PSE QSL OPR. BENSON TECH RADIO CLUB.
R. Anderson

7YK QSL card from 1928

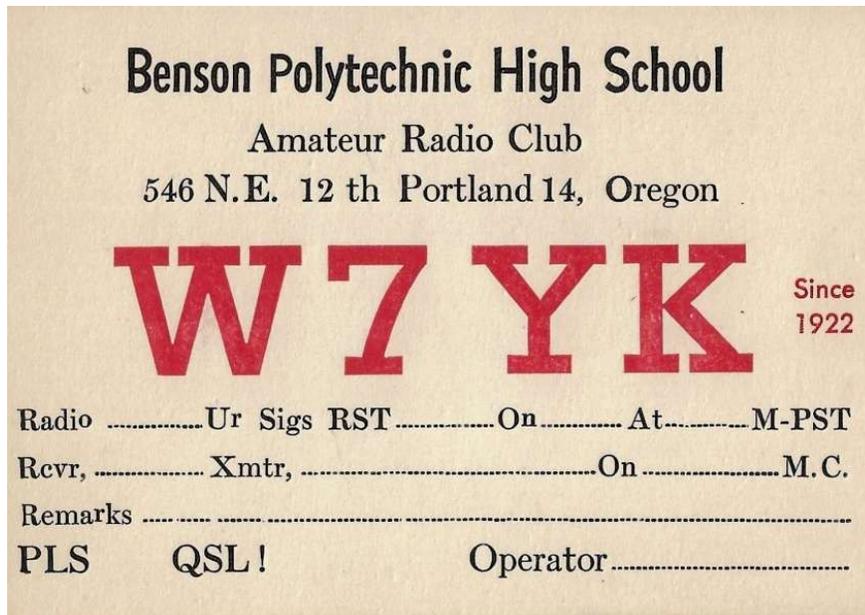
¹⁰⁹ One of the justifications for the purchase of KYG was that it would help educate potential vocational radio operators and provide motivation for them to pursue commercial licensing. In her doctoral thesis, Dr Swenson quotes Roy Stevens as saying "We were vitally interested in giving our students training in radio transmission and broadcasting. We wanted to give them the opportunity to earn more than amateur licenses. In modernizing our curriculum to include the new field of radio communications we could give them the chance to earn commercial broadcast licenses. We saw the chance to start these kids on a life-time career in radio electronics and broadcasting." Throughout its history, KBPS has helped launch the careers of countless radio and TV engineers and on-air personalities.



Unused W7YK QSL card ca. 1930. (Ray White, W7LW collection)



Benson Tech Radio Club membership card issued to Paul Sandberg ca. 1938



Unused W7YK QSL card ca. 1960 (Lowell Loughary, K7LFT)

Appendix H

Benson Broadcasting Licenses

The Portland Public Schools Archives contains copies of some early licenses for Benson High School's broadcast station. The Oregon Historical Society Research Library (collection 822) has some original license applications and official correspondence, as well. Images are also found at the Western States Museum of Broadcasting website.

These are three examples of particular interest.

KFIF – March 23, 1923 – Limited Commercial License for Land Radio Station

Issued to the Benson Tech Student Body. May be the station's first license. (Courtesy Portland Public Schools Archives).

KFIF – June 9, 1923

Issued to the Benson Tech Student Body. Principal CE Cleveland signed the application. Mentions the Northwestern Radio Manufacturing Radio Telephone. (Courtesy Portland Public Schools Archives).

KBPS – March 24, 1941 – Radio Broadcasting Station License

Example of KBPS license from the early 1940's with description of station equipment at the time. (Courtesy Oregon Historical Society Research Library Coll 822).

KFIF – March 23, 1923 - Limited Commercial License for Land Radio Station – page 1

COPY

No. 1688

LICENSE FOR LAND RADIO STATION

CLASS A - LIMITED COMMERCIAL

DEPARTMENT OF COMMERCE
BUREAU OF NAVIGATION
RADIO SERVICE

Pursuant to the act to regulate radio communication, approved August 13, 1912,

~~PERSON FROM STUDENT BODY~~

a citizen of the State of, a company incorporated under the laws of the State of Oregon, having applied therefor, is hereby granted by the Secretary of Commerce for a period of three months on and subject to the restrictions and conditions hereinafter stated and revocable for cause by him, this License to use or operate the apparatus for radio communication (identified in the schedule hereinafter) for the purpose of transmitting to and receiving from ship stations and other land stations public correspondence, Government and service correspondence, and distress signals and messages, at rates of compensation not in excess of those fixed by the international agreement to which the Government of the United States has adhered, which have been submitted to and approved by the Secretary of Commerce, as included in the schedule hereinafter, or for the purpose of conducting experiments for the development of the science of radio communication or the apparatus pertaining thereto, to carry on special tests, using any amount of power or any wave lengths, at such hours and under such conditions as will insure the least interference with the sending or receipt of commercial or Government radiograms, of distress signals and radiograms, or with the work of other stations, the purpose of the station being designated by the classification at the head of this License.

2. Public correspondence or limited commercial correspondence authorized by this License shall be limited to certain stations, ships or lines of ships named hereinafter, which designation is authorized in view of the nature of the service and is independent of the radio system employed.

3. The use or operation of apparatus for radio communication pursuant to this License shall be subject also to the articles and regulations established by the International Radiotelegraphic Convention, ratified by the Senate of the United States and caused to be made public by the President, and shall be subject also to such regulations as may be established from time to time by authority of subsequent acts and treaties of the United States, in so far as they apply to the class of station indicated by this License.

11-5071

**KFIF – March 23, 1923 - Limited Commercial License for Land Radio Station –
page 2**

2

4. The authority conferred by this License is subject to the provisions of the act of February 4, 1887, entitled "An Act to regulate commerce," as amended by the act of June 18, 1910, so far as the Licensee may be within the operation of said act, and except as provided in the act of August 13, 1912, or in the International Radiotelegraphic Convention and regulations made part thereof, the station shall transmit all messages offered by those who tender lawful rates on equal terms without discrimination, whether as regards rates, order of transmission, or otherwise.

5. The Licensee shall render to the Secretary of Commerce such accounts as the Secretary of Commerce shall direct in respect of all charges due or payable under the International Radiotelegraphic Convention in respect of messages exchanged between the station hereby licensed and other stations and shall pay to the Secretary of Commerce, at such times and in such manner as the Secretary of Commerce shall direct, all sums which shall be due from the Licensee under such accounts.

6. The apparatus shall at all times while in use and operation be in charge or under the supervision of a person or persons licensed for that purpose by the Secretary of Commerce, and the operator of the apparatus shall not willfully or maliciously interfere with any other radio communication.

7. The station shall give absolute priority to signals and radiograms relating to ships in distress; shall cease all sending on hearing a distress signal; and, except when engaged in answering or aiding the ship in distress, shall refrain from sending until all signals and radiograms relating thereto are completed.

8. The station shall use the minimum amount of energy necessary to carry out any communication desired, except in case of signals or radiograms relating to vessels in distress.

9. The station shall not use a transmitter during the first 15 minutes of each hour, local standard time, except for distress signals, whenever the Secretary of Commerce by notice in writing shall require it to observe a division of time, pursuant to the Twelfth Regulation of the act of August 13, 1912.

10. The President of the United States in time of war or public pest or disaster is authorized by law to close the station and cause the removal therefrom of all radio apparatus or may authorize the use or control of the station or apparatus by any department of the Government upon just compensation to the owners.

11. The Secretary of Commerce and Collectors of Customs or other officers of the Government authorized by him may at all reasonable times enter upon the station for the purpose of inspecting and may inspect any apparatus for radio communication of such station and the operation and operators of such apparatus.

12. The apparatus shall not be altered or modified in respect of any of the particulars mentioned in the following schedule, except with the approval of the Secretary of Commerce.

KFIF – March 23, 1923 - Limited Commercial License for Land Radio Station – page 3

SCHEDULE OF STATION AND APPARATUS

Name of owner, Benson Tech Student Body
 Location: State, Oregon County, Multnomah
 City or town, Portland Street, 12th & Hoyt No. 36

Geographical location: Latitude, N. _____° _____' _____" Longitude, W. _____° _____' _____"

This station is licensed for communication only with the following land stations, ships, or lines of ships:

Limited Commercial - Class A - Broadcasting entertainment and line matter.
 One commercial second class operator or higher required.
 This station is licensed for the specific service shown, on the wave lengths indicated, no other service permitted.
 The hours of operation specified below may be changed or a division of time may be required whenever in the opinion of the Secretary of Commerce such action is necessary.

Specific hours during which the station ^{must} _{may} be open to service (local standard time):
Unlimited Hours

Power: Transformer input, 200 Watts ~~75-100?~~

Normal day range in nautical miles, 100

Time and method, if any, of sending time signals and hydrographic and meteorological radiograms:

Call letters, KFIF

Cost charges: per word _____ minimum per radiogram _____
 Cost charges: per word _____ minimum per radiogram _____
 Cost charges: per word _____ minimum per radiogram _____

Radiotelegraphic system employed, Composite VT telephones

Characteristics of transmitting system:
 Type of spark gap, _____
 Approximate spark frequency, _____

Wave length range of receiving system: From 150 meters to 2400 meters.

Antenna: Number of masts, 1 Height, _____

Type of aerial, Inverted L

Wires: Number, 4 Size and kind, #6 copper cable

Essential dimensions: Maximum height above water, 80 feet; Length of horizontal part, 80 feet; Length of vertical part, 80 feet; Total length measured from apparatus, 160 feet; Length of ground connection, 10 feet; Fundamental wave length, 280 meters.

WAVE LENGTHS

The normal sending and receiving wave length shall be 600 meters.

If the station be classified as a coast station it shall be prepared to transmit or relay distress calls

KFIF – March 23, 1923 - Limited Commercial License for Land Radio Station – page 4

4

or messages using the distress wave length as provided by the International Radiotelegraphic Convention in force.

In view of special conditions the station is authorized to use for communication exclusively with stations licensed by the United States the following additional wave lengths under 600 or over 1,600 meters:

Meters, 300; Meters, 350; Meters, _____; Meters, _____

The energy, if radiated by the transmitter in two or more wave lengths as indicated by a sensitive wave meter, shall not in any one of the lesser waves exceed 40 per cent of that in the greatest; and the logarithmic decrement per complete oscillation in the wave trains shall not exceed two-tenths, except when sending signals or messages relating to vessels in distress.

SENDING WAVE LENGTH	ANTENNA CURRENT (AMPERES)	LOGARITHMIC DECREMENT	READING OF WAVE METER INDICATING INSTRUMENT*	
			PRINCIPAL WAVE	WAVE NEXT IN ENERGY
300 meters	Not ascertained.		300 and 350 meters to be used as required	
600 meters	" "		in Regulations 42 and 44.	
350 meters	" "		350 meters for broadcasting entertainment	
_____ meters			and like matter.	
_____ meters				
_____ meters				

* Type of indicating instrument, _____

The station insures rapid exchange with land wire stations at _____

(Company) _____

(Location telegraph office) _____

(Company) _____

(Location telegraph office) _____

in the following manner: _____

This License will expire on the 23rd day of June, 19 23.



S. B. Davis, Jr.,
Acting Secretary of Commerce.

D. B. Carson,
Commissioner of Navigation.

Washington, D. C., March 23, 19 23.

INSPECTIONS

DATE	INSPECTOR	REMARKS

KFIF – June 9, 1923 - page 1

Form 794

APPLICANT'S DESCRIPTION OF APPARATUS

DEPARTMENT OF COMMERCE
BUREAU OF NAVIGATION
RADIO SERVICE

KFIF

The following form of description of apparatus will be filled out in duplicate and forwarded to the radio inspector by each applicant for a license for apparatus for radio communication of any class (ship or land), except amateur stations (general or restricted) for which Form 792 is provided. The inspector, if necessary, will then arrange for an inspection of the station, or, when feasible, the inspector may accompany the applicant and make the inspection during the filling of this form.

Where the form calls for a statement of details of apparatus with which the station is not equipped, the applicant will please draw a line through the space provided for the appropriate answer.

The information is desired primarily as the basis of the description of the apparatus to be inserted in the license, but many of the details are desired to facilitate the classification and particularly the inspection of stations, and will not, of course, be incorporated in the license. This form when filled will not be open to public inspection.

NOTICE.—This Form Must be Submitted in Duplicate to the Proper Radio Inspector.

GENERAL SPECIFICATIONS OF STATION.

Name of applicant: Portland High School, Portland, Oregon
 Address: Portland High School, Portland, Oregon
 A citizen of the State of Oregon Or a company incorporated in the State of _____
 Name and address of owner of radio apparatus: Portland High School, Portland, Oregon
 If SHIP STATION—Name of ship: _____ Owner of ship: _____
 Type of vessel: _____ Official number: _____ International signal code letters: _____
 Home port (where permanent document issues): _____ Average speed of vessel (nautical miles): _____
 Number of persons in crew: _____ Number of passengers vessel is licensed to carry: _____
 Is vessel subject to the Act of June 24, 1910, as amended by the Act of July 23, 1912? _____
 If LAND STATION—Coast or inland? Coast Location—State: Oregon
 County: Clatsop City or Town: Portland Street: W. 11th St. No.: _____
 Exact Latitude, North: _____ Longitude, West: _____
 Class of license desired (see regulations): _____ Nature of service: _____
 Specific hours open to public service: XX
 If limited station—Corresponds only with (state names of land stations, names of ships or lines of ships): _____
 Transformer input (normal conditions): if spark, _____ K. W. _____ Power, H. C. W., P. W., or radio telephone 100 W.
 Approximate day-transmitting range (nautical miles) with average ship: 100 with similar land station: 200

PRIMARY SOURCE OF POWER SUPPLY.

Engine—Type and horsepower: _____
 Electric power—Source and available K. W.: City Mains Is power continuously available? Yes

SHIP OR COAST CHARGES.

(State class of service, such as North and South American or Transoceanic.)

_____ per word; _____ minimum per radiogram;
 _____ per word; _____ minimum per radiogram;
 _____ per word; _____ minimum per radiogram;
 Relay charges _____
 Make and type of radio system to be used: Northrup No. 10, 1000 Telephone
 Type of spark gap (plain, rotary synchronous, quenched, etc.): Two 50 watt modulators
 Approximate spark frequency (pitch of note) per second: Two 50 watt oscillators
 Type and make of receiving apparatus (conductive or inductive coupling, etc.): Two coils—Inductive
 Type of detector: _____
 Wave length range of receiving system: From 150 meters to 2400 meters.

ANTENNA.

Type of antenna (T, T, umbrella, fan, etc.): Horizontal
 Mast—Number: 1 Steel or wood? Steel Other supports: _____
 Essential dimensions—Maximum height above ground or water: 117 ft. Length of horizontal part: 65 ft.
 Length of vertical part (including lead-in): 93 ft. Total length measured from apparatus: 168 ft.
 Length of ground connection: 10 ft. Fundamental wave length: 270 meters.
 Other essential dimensions: _____
 Number of wires: _____ Size and kind of wire used: 7/32" galvanized steel Spacing between wires: 4
 Insulators—Material: Porcelain Size: 2 1/2" inch
 Location: On building
 Ground connection—Type: _____
 Lightning protective switch—Type: _____ Location: Opposite door
 How operated: _____
 Remarks: _____

1 Person, company, or corporation controlling and operating station and responsible, under the law, for operation and radio amounts.
 2 Show address of office to which should be sent communications concerning radio accounts and operation of station.
 3 If vacuum tubes are to be used, give model and manufacturer's name.

31-4875 (OVER 5)

KBPS – March 24, 1941 – Radio Broadcasting Station License

F.C.C. Form No. 352 File No. B5-R-84

Official No. 84

Call letters KBPS

UNITED STATES OF AMERICA
FEDERAL COMMUNICATIONS COMMISSION

RADIO BROADCASTING STATION LICENSE

Subject to the provisions of the Communications Act of 1934, subsequent acts, and treaties, and all regulations heretofore or hereafter made by this Commission, and further subject to conditions set forth in this license, the LICENSEE.....

BENSON POLYTECHNIC SCHOOL, R. T. Stephens, Agent.

is hereby authorized to use and operate the radio transmitting apparatus hereinafter described for the purpose of broadcasting for the term beginning March 29, 1941, and ending December 1, 1941.
(3 a. m., Eastern Standard Time) (3 a. m., Eastern Standard Time)

The licensee shall use and operate said apparatus only in accordance with the following terms:

- On a frequency of 1450 kc.
- With power of 100 watts, with an additional XXX watts from local sunrise to local sunset only.
Antenna current 2.13 amperes for 100 watts; XXX amperes for XXX watts.
Antenna resistance 21.9 ohms.
- During the following period or periods of time:
Shares time with Station KXL as follows:
KBPS one-seventh time and KXL six-sevenths time.
- Under the call letters KBPS
- With the main studio of the station located at:
Benson Polytechnic School, East 12th Ave.
and Hoyt St., Portland, Oregon.

The apparatus hereinabove authorized to be used and operated is located at:
Roof of Building, East 12th Ave., and Hoyt St., Lat. 45° 31' 04" North.
Portland, Oregon. Long. 122 39. 06 West.

and is described as follows: COMPOSITE - Broadcasting Transmitter. Direct Crystal Control. Last radio stage: two 75 watt vacuum tubes for high level modulation (RCA 203-A). Maximum rated carrier power output 100 watts. Type of Antenna - T type, height of vertical lead 80', length of flat top 60', overall height 122'. Ground system consists of wires on roof grounded to water mains.

The Commission reserves the right during said license period of terminating this license or making effective any changes or modification of this license which may be necessary to comply with any decision of the Commission rendered as a result of any hearing held under the rules of the Commission prior to the commencement of this license period or any decision rendered as a result of any such hearing which has been designated but not held, prior to the commencement of this license period.

This license is issued on the licensee's representation that the statements contained in licensee's application are true and that the undertakings therein contained so far as they are consistent herewith, will be carried out in good faith. The licensee shall, during the term of this license, render such broadcasting service as will serve public interest, convenience, or necessity to the full extent of the privileges herein conferred.

This license shall not vest in the licensee any right to operate the station nor any right in the use of the frequency designated in the license beyond the term hereof, nor in any other manner than authorized herein. Neither the license nor the right granted hereunder shall be assigned or otherwise transferred in violation of the Communications Act of 1934. This license is subject to the right of use or control by the Government of the United States conferred by section 606 of the Communications Act of 1934.

Dated this 24 day of March, 1941.

[SEAL] By direction of the FEDERAL COMMUNICATIONS COMMISSION,

[Signature]
Secretary.

www

Appendix I

The Armstrong Regeneration Patent

Some of Northwestern's earliest sets incorporated the SR-1 regenerative tuner. In Radio Manufacturers of the 1920's Vol. 1, Alan Douglas's discussion of the Armstrong patent provides noteworthy insights into Northwestern's activities. We've summarized the key points here.

Armstrong Regenerative Sets

In 1920 Howard Armstrong's legal expenses were mounting, while he waited for one of the large...wireless companies to make an offer for his regeneration and superheterodyne patents and applications.

His attorneys hit on the idea of licensing the myriad makers of regenerative receivers for the amateur market, under his patent 1,113,149 (1914) for a royalty of 5% of sales price and were soon signing them up as fast as they could spot their magazine ads. Since the ham market¹¹⁰ was considered negligibly small, issuing these licenses would not endanger the eventual sale of the patents to commercial interests. And the licenses were non-transferable.

For several years, the Armstrong circuit was far and away the best performer of all the standard ones, and the most efficient in its use of tubes (which were very expensive, as were the batteries to run them). So, any company licensed to use this circuit could make radios fully as good as RCA's.

Regenerative radios became less important after 1925, partly because of legal pressures, partly because they were too tricky for the average fan to handle, and caused interference to other sets when misadjusted. Only a few companies continued making them, while most switched to TRF, tuned radio frequency, in 1924.

Northwestern Radio Manufacturing was **not** among the licensees listed by Douglas. And their set labels and advertising did not include a patent license notice. So, we believe that Northwestern either assumed that their regens were not covered by the Armstrong patent or had other rationale for producing regens without a license. Even so, they eventually replaced the SR-1 with the SR-22 non-regenerative tuner.

As narrated by Douglas, Northwestern, like other builders, had abandoned the regenerative circuit in favor of the TRF by the mid-1920's.

Source: Alan Douglas Radio Manufacturers of the 1920's Vol. 1

¹¹⁰ "Amateurs" (hams and hobbyist listeners) were considered the primary consumers at this

time since commercial broadcasting was still in the offing.

Appendix J

Portland Police Radio - KGPP

The story of KGPP, the Portland Police radio system, begins in our earlier volume Hallock and Watson Radios. It continues here with an emphasis on Charles Austin's role as a Radio Technician for the city.

In 1932, the City of Portland hired Charley Austin as a Radio Operator. His first duty was to install the Hallock & Watson 500-watt police transmitter at Mount Tabor. He would become one of two Radio Operators taking care of the transmitter; the other being Temple V Ehmsen.

In July, 1931, the City of Portland began operating a Hallock & Watson 20-watt low power AM transmitter. Hallock & Watson allowed the City to operate the transmitter without charge in an effort to demonstrate its merit. The station was installed at the East Precinct at SE 7th and Alder ST. Meanwhile, space for a dispatching office was created in the detective office at the main precinct downtown.

In September 1931, the Federal Radio Commission gave the City of Portland formal authority for operation of a police emergency broadcasting service. Hoping to see a permanent station built, Chief of Police Jenkins sought approval of funds in the City's 1932 budget.

At the end of January, 1932, bids were opened and Hallock & Watson was awarded the contract to build the 500-watt transmitter. The city hired Radio Operators Charley Austin and Temple Ehmsen. Once the 500-watt transmitter was ready, Austin supervised its installation in the gatehouse at Reservoir 5 on Mount Tabor, just blocks from his residence. Austin and other operators shared duties for maintaining the transmitter around-the-clock.

The Police radio system was upgraded to two-way communication in 1939.



KGPP's new studio. Patrolman Frank H Pratt Sr (back to camera), Seargent William Drapeau, left, and Patrolman RW Beaubelle, right. (The Oregonian December 14, 1941)

After outgrowing a cramped office in the detective division, the dispatchers were moved to a room in the penthouse atop the main precinct. Then, in December, 1941, the Portland Police dispatchers moved into a streamlined studio in a different part of the penthouse. The new space featured a modern dispatching console with multiple operating positions (shown above), air conditioning, soundproofing, and good lighting. "Planned since early in 1941, the \$4000 [project] suffered several delays, first when Temple Ehmsen, designer, was called into the Naval Reserve¹¹¹ and later when defense priorities slowed delivery of necessary equipment. However, the new dispatching studio was eventually completed by Charles Austin and RW Baumgartner."¹¹²

As of December, 1941, KGPP (2442 kc) was handling more than 1,000 messages per day for agencies in Multnomah, Washington and Clackamas County and Clark County Washington as well as serving police in Vancouver, Camas, Gresham, and Oswego.¹¹³ Additionally, "United States Customs patrol cars, Federal Bureau of Investigation cars, and members of the Washington State Highway Patrol operating in the vicinity of Vancouver, received their orders through KGPP."¹¹⁴

¹¹¹ Ehmsen was called to active duty in 1944 per Pioneer Mikes.

¹¹² "Police Radio Transferred to New, Up-to-Date Studio"

¹¹³ Ibid

¹¹⁴ Ibid

By 1950 the City of Portland had created the Bureau of Radio Communications apart from the Police Bureau. Austin transferred to the new bureau and continued working as a Radio Technician with Temple Ehmsen as Chief.

Charley Austin retired from the City of Portland in 1955 at the age of 65.



*Undated photo of Charley Austin at the 500-watt KGPP transmitter on Mount Tabor.
(Image courtesy of CHRS/SOWP)*

Sources

- Adams, Craig. "Charles Austin: Father of Oregon Radio." PDXradio.com 2006.
- Adams, Craig [published anonymously] History of Portland Radio by Stations (October, 1994: Broadcast Pro-File, Hollywood, CA).
of Portland." PDXradio.com 2008.
- Adams, Craig. "PE: Portland's First Wireless Station." PDXradio.com 2006.
- Adams, Craig [Craig W Pattillo] Portland Area Radio Slogans with Call Letter Meanings & Frequencies 1922 to Present 3rd ed. (1996: self published, Portland, OR).
- Adams, Craig. "Journal's KALE to KKPZ, The." PDXradio.com 2002.
- Anonymous. "2 Radio Stations Quit." *The Oregonian* 6/01/1924 pg. 19.
- Anonymous. "Aerials to Come Down." *The Oregonian* 8/29/1914 pg. 5.
- Anonymous. "Amateur Radio Set Factory is Local Innovation." *The Oregon Journal* 3/20/1921 pg. 16.
- Anonymous. "Ambitious Portland Boys Have Effective Wireless Association." *The Oregonian* 3/17/1912 pg. 22.
- Anonymous. "Among our Neighbors – Charley Austin." *The Oregon Journal* 6/25/1939 pg. 6.
- Anonymous. "Beaver's Wireless Perfect." *The Oregonian* 11/17/1912 pg.8.
- Anonymous. "Benson Radio Station 1947-48 Budget." Portland Public Schools.
- Anonymous. "Boys Show Wireless Telegraph." *The Oregonian* 1/10/1908 pg. 12.
- Anonymous. "Boys to Make Tests with Wireless." *The Oregonian* 6/1/1908 pg. 4.
- Anonymous. "Charles L. Austin: Portland's First Broadcaster." California Historical Radio Society / Society of Wireless Pioneers, 2021.
- Anonymous. "Construction of Radio Set is Completed." *Tech Pep* Vol III #27 April 20, 1923.
- Anonymous. "Efficient Portland, Oregon, Radio Station 7XG, The" *Radio Topics* 4/1922 pp. 11-13.
- Anonymous. "Former KYG Station in New Home." *Radio Waves* April, 1923 pg. 281
- Anonymous. "In Portland Schools." *The Oregon Journal* 4/29/1923 pg. 48.
- Anonymous. "Know Your Portland." *The Oregon Journal* 3/18/1921 pg. 10.
- Anonymous. "KBPS Receives New Transmitter." *Tech Pep* Vol XXXI #1 October 1, 1948.
- Anonymous. "KBPS Will Get New Transmitting Tower." *Tech Pep* Vol XXX #8 April 23, 1948.
- Anonymous. "Long and Short Wave Novelties." *The Oregonian* 2/15/1931 pg. 45.
- Anonymous. "Police Have Radio Set." *The Oregonian* 8/1/1922 pg. 4.
- Anonymous. "Police Radio Transferred to New, Up-to-Date Studio" *The Oregonian* 12/14/1941 pg. 21.
- Anonymous. "Portable Receivers for Summer Radio." *The Oregonian* 5/03/1925 pg. 75.
- Anonymous. "Portland Boy is Wireless Expert." *The Oregonian* 4/25/1909 pg. 12.
- Anonymous. "Radio an Asset to Police Department." *Radio Waves* June, 1922 pg. 43.
- Anonymous. "Radio Broadcasting News." *The Oregon Journal* 3/30/1924 pg. 27.
- Anonymous. "Radio Bugs." *The Oregon Journal* 6/25/1922 pg. 32.
- Anonymous. "Radio Club Organized." *The Oregonian* 6/10/1922 pg. 14.
- Anonymous. "Radio Concert Promised." *The Oregonian* 5/27/1921 pg. 6.
- Anonymous. "Radio Company Formed." *The Oregonian* 4/20/1922 pg. 15.

- Anonymous. "Radio Factory Makes Every Part of Set." *The Oregon Journal* 12/13/1925 pg. 58.
- Anonymous. "Radio Station to Rise." *The Oregonian* 4/14/1921 pg. 4.
- Anonymous. "Radio Tower Offered City." *The Oregonian* 9/21/1941 pg. 51.
- Anonymous. "Station's Call Changed." *The Oregonian* 3/18/1930 pg. 9.
- Anonymous. "Summit of Hood is Now Equipped with Wireless." *The Oregon Journal* 8/15/1920 pg. 2.
- Anonymous. "Tech to Have Radio Station." *The Oregon Journal* 3/15/1923 pg. 13.
- Anonymous. "Unexpected Death Ends W.P. Hawley Jr. Career." *The Oregonian* 2/3/1960 pg. 4.
- Anonymous. "William Allingham." *The Oregonian* 2/11/1973 pg. 10.
- Anonymous. "Wireless Equipment is Installed at Y.M.C.A." *The Oregon Journal* 12/8/1912 pg. 10.
- Anonymous. "WRW, KYG and WDZ All Famous." *Radio Digest Illustrated* 5/20/22 pg. 6.
- Austin, Charles L. "10-Watt Radio Telephone Transmitting Set." *Radio Waves* June, 1922.
- Austin, Charles L. "Autobiographical Sketch of a Wireless Pioneer." California Historical Radio Society / Society of Wireless Pioneers, 1932.
- Babcock, Larry. "Wurlitzer Radios." *The Antique Radio Gazette* Fall, 1987 pp. 8-23.
- Benson Polytechnical High School. The Poly Tech (January, 1924: Portland Public Schools, Portland, OR).
- Benson Polytechnical High School. The Poly Tech (June, 1925: Portland Public Schools, Portland, OR).
- Benson Polytechnical High School. The Poly Tech (January, 1930: Portland Public Schools, Portland, OR).
- Benson Polytechnical High School. The Poly Tech (1953: Portland Public Schools, Portland, OR).
- Blowers, John. "Benson Tech History Told." *The Oregonian* 9/26/1948 pg. 67.
- Broadcasting.Fandom.com/wiki/. "Chronology_of_call_letter_KBPS" (undated).
- Broadcasting.Fandom.com/wiki/. "Chronology_of_call_letter_KFIF" (undated).
- Cello Expressions Photography. celloexpressions.com/photography/2021/03/benson-polytechnic-high-school-1916-2021/
- Chamberlain, Eugene Tyler US Commissioner of Navigation. Annual Report of the Commissioner of U.S. Bureau of Navigation (Dept of Commerce) to the Secretary of Commerce and Labor for the Fiscal Year Ended June 30, 1911. (1911: U.S. Government Printing Office, Washington DC).
- Coco, Sebastian L & Fantz, Gary. "From Call Boxes to Kelly Butte: Coco, Fantz Look at Communications History." *The Rap Sheet*, January, 1975 pg. 5.
- Douglas, Alan. Radio Manufacturers of the 1920's Vol 1, (1988: Vestal Press, Vestal NY).
- Federal Communications Commission "KFIF/KBPS History Cards"
- Frost, S E Jr. Phd. Education's Own Stations: The History of Broadcast Licenses Issued to Educational Institutions (1937: University of Chicago Press, Chicago).
- Green-Swenson, Dr. Patricia L. Radio in the Public Schools of Portland, OR (1958: Privately Published).
- Howard, Dan. "Happy Birthday KBPS." *The Call Letter* April, 1998 pp. 5.

- Howard, Dan. "Mount Hood Calling – The Western Forest Wireless Tests." *The Antique Wireless Association Review Vol. 29*, (2016) pp. 1-32.
- Howard, Dan. Voices of Vanport, The – Radio and the Flood of '48. (2024: Northwest Vintage Radio Society, Portland OR).
- Howard, Dan and Howard, Richard. Hallock and Watson Radios (2025: Northwest Vintage Radio Society, Portland OR).
- Institute of Radio Engineers Inc, The. Year Book 1927 (1927: New York)
- Kramer, Ron. Pioneer Mikes, (2009: JPR Foundation, Ashland OR).
- Kent, A. Atwater. "My Faith in Radio's Future." *National Radio News* July, 1929 as quoted in *The Call Letter* March, 1978.
- McMahon, Morgan E. Radio Collector's Guide 1921-1932 – Revised Edition, (1981: Vintage Radio, Palos Verdes Peninsula CA).
- Morrison, Wilma. "KBPS: School of the Air." *The Oregonian* 3/21/1948 pg. 76.
- Moyes, William "Behind the Mike." *The Oregonian* 3/20/1942 pg. 9.
- Northwest Vintage Radio Society. "Before KBPS." *A Souvenir History* 3/18/2023.
- Northwestern Radio Manufacturing Company. Northwestern Radio Apparatus Catalog (ca 1922: Portland, OR) [Radiola Guy Reproductions reprint].
- Oates, Nick. "KBPS Broadcasts Live for First Time in 5 Months." *The Benson Orbit* 11/22/2024.
- Radio Corporation of America Radio Enters the Home (1922: New York) [Vestal Press Reprint].
- Radio Dealer, The. The Radio Dealer Year Book (1925: New York).
- Redman, Arthur H. "An Interview with Charley Austin." *The Call Letter* January, 2012 pp. 9-10.
- Redman, Arthur H. "Northwestern Radio Manufacturing Company." *Antique Radio Classified* September, 2005 pp. 6-11.
- Redman, Arthur H. "Portland Listens to Station 7XG." *The Call Letter* May, 1978 pp. 1-2, 11.
- Redman, Arthur H. "Station 7XG – An Oregon First." *Antique Radio Classified* February, 2008 pp. 20-21.
- Schindler, Paul. "KBPS at 43: 1966" (2023: Portland Public Schools, Portland, OR).
- Simson, Lloyd H. "Station '7YG' Oregon Institute of Technology Radio School." *Radio Waves* February, 1923 pp. 244-245.
- Sloat, Francis W "Tex". "The Northwestern Radio Manufacturing Co. Portland Oregon." *The Call Letter* November, 1990 pp. 8-9.
- Stuart, James. "KBPS Returns to the Air Amid High Praise for Programs." *The Oregonian* 11/20/1950 pg. 12.
- Tompkins, Jim Phd. City at Willamette Falls, The: A 3,000-Year History of Oregon City (undated & unpublished manuscript).
- Underwood, H W. "The End of the Bear." *Pacific Radio News* January, 1917 pp. 15-16.
- Waits, Jennifer. "Digging in to the Early History of High School Radio Station KBPS." Radio Survivor website 2015.
- White, Thomas H. "Comparison of 1911-1913 US Ship Radio Calls. earlyradiohistory 2001.
- White, Thomas H. "United States Early Radio History" earlyradiohistory.us
- Wikipedia. "KBPS (AM)" (undated)

Wikipedia. "KQAC" (undated)

Wilhelm, Donald. "New 1926-1927 Trends in Radio" (Na-Ald paid advertisement) *Radio Broadcasting* June, 1925 pp. 157-160.

Wilson, Norm. "Tube of the Month – UV-202"

Yount, Joanne "On the Air." *The Oregon Journal* 3/1/1943 pg. 44.

Recommended Reading

"Carl Braun & The Battleship Oregon." *The Call Letter* September, 2025 pp. 2-6.

"Mount Hood Calling – The Western Forest Wireless Tests." *The Antique Wireless Association Review* Vol. 29, Dan Howard, 2016.

Pioneer Mikes: A History of Radio and Television in Oregon, Ron Kramer, 2009.

Two Hundred Meters and Down – The Story of Amateur Radio, Clinton B DeSoto, 1936.

The Western States Museum of Broadcasting website (westmb.org) contains extensive information about Oregon broadcasters and is highly recommended.

About the Authors



Father and son team Richard and Dan Howard are charter members of the Northwest Vintage Radio Society. They have a life-long interest in Portland radio and enjoy preserving and sharing its history.

Both are native Oregonians and licensed amateur radio operators.

Oregon Journal March 17, 1922

Radio Programs

Daily

The Journal news service, via Northwest Radio Manufacturing Co., 7:30 to 8 p. m.: General and Northwest news, sports and markets.

Mejer & Frank—Music, fifth floor, 12:15 to 12:45 p. m. and 4 to 4:45 p. m.

Tri-Weekly

Willard P. Hawley, Jr.—Music, Tuesday and Wednesday, 8 to 8:45 p. m.; Thursday, 9 to 9:30 p. m.

Semi-Weekly

Northwestern Radio Manufacturing Co.—Tuesdays and Fridays, 8:45 to 9 p. m., U. S. health bureau health bulletins.

Weekly

Northwestern Radio Manufacturing Co.—Journal of Electricity and Western Industries, general commercial and industrial news bulletins, Mondays, 7:30 p. m.

Notes

The Journal bulletin news service is broadcasting in cooperation with President Charles L. Austin of the Northwestern Radio Manufacturing Co.; Willard P. Hawley Jr., and the Hallock & Watson Radio Service.

Northwestern's 7XF/KGN and Willard P. Hawley Jr.'s 7XG/KYG shared time on 360 meters (833 kc). KGW began broadcasting on March 22nd.