

RADIO

VACUUM TUBE WHEN USED AS AMPLIFIER

It Will Function Thus for Either Radio Frequency or Audio Frequency.

Starting today we shall give a detailed description of the vacuum tube when used as an amplifier. This series, as in the past, is continuous and is clipped out and saved will be convenient for reference.

When the three-electrode vacuum tube was used as a detector, the circuits associated with it were such that where a symmetrical alternating difference was applied to the grid, a symmetrical change in plate current resulted. That is to say, the vacuum tube acted as a rectifier. In addition to rectifying, the tube also amplified. The variation in plate current was "K" where "K" is the amplification constant of the tube, times what it would have been in a two-electrode tube, for the same potential impressed on the grid.

By properly adjusting the electrical constants of the circuits associated with a three-electrode tube, symmetrical variations of grid potential can be made to produce symmetrical variations in plate current, which are "K" times the amplitude of the plate circuit variations of a similar two-electrode value with the same applied grid potential. This means that if a three-electrode value be used in the proper circuits in a radio receiver, the signals can be made to appear as though the received signal is "K" times as strong as it actually is. If two tubes are used with their proper circuits in conjunction with a radio receiver the received signals will appear to be "K" times as strong as they actually are and so the apparent strength of the incoming signal is multiplied by "K" for each additional tube added to the receiver circuit.

A vacuum tube used in conjunction with a circuit that will cause the plate current to vary in exact proportion to the applied grid voltage, but apparently caused by "K" times the actual grid voltage variation, is called an amplifier. If the tube functioning as an amplifier is used to amplify the incoming signal at radio frequency before it is rectified by the detector, it is termed a radio frequency amplifier. If the tube functioning as an amplifier is used after the incoming radio frequency has been rectified by the detector, it is termed an audio frequency amplifier.

Returning again to the characteristic curve of the three-electrode vacuum tube, shown in Figure 22, notice its shape. Suppose that a positive potential was applied to the grid by means of a "C" battery so that the tube would function at a point represented by "A" on the characteristic curve. If now the applied grid potential from the "C" battery is reduced by an amount represented by A-B in Figure 22, the corresponding reduction in plate current will be represented by B-C on the other hand if the grid potential be increased by an amount represented by A-C, where A-C equals B-C, the corresponding increase in plate current is C-D.

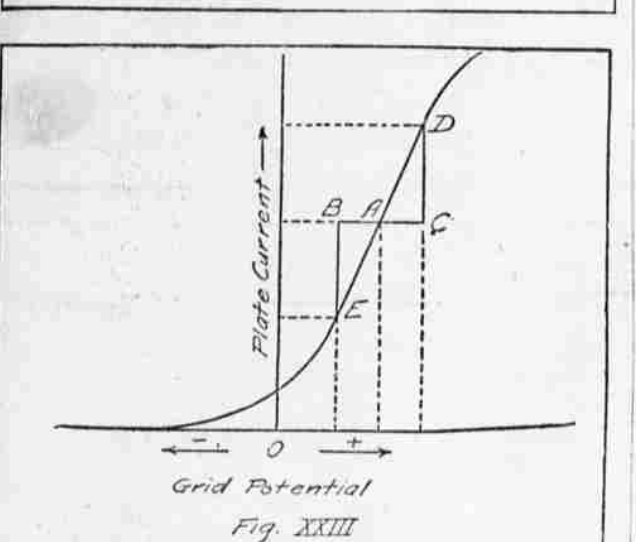
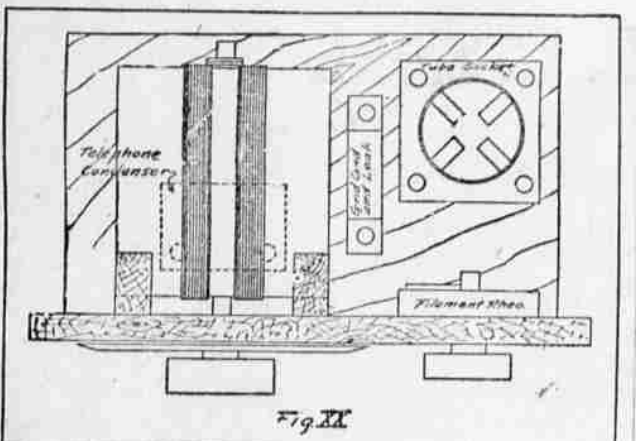
If the portion of the characteristic curve in the region of EAD is a

straight line, then O-D will equal B-C, or so long as the working range falls within straight line portion of the characteristic curve, symmetrical changes in grid potential will cause symmetrical changes in plate current. From this it can be seen that if the working point "A" be selected near the bend of the characteristic curve, symmetrical changes in grid potential will not cause symmetrical changes in plate current. Since the plate current variation in such case would bear only slight relation to the grid variation in potential, the output of the tube would be distorted.

In applying amplifiers to receiving sets used to pick radiophone stations, distortion is one of the greatest difficulties to overcome. Two strong signals will result in decreased amplification. In Figure 23, if the applied variation in grid potential were 10 times that shown in the example, the plate current would not change 10 times as much, because of the bend in the curve, due to saturation. Finally, a condition can be reached where the use of an amplifier tube will decrease the signal strength because of the saturation of the tube.

The rectified incoming signals would be louder without the use of the amplifier tube, because of the inability of the plate current of the tube caused by saturation to increase in proportion to the signal strength.

There are, in general, two factors that can be taken from the characteristic curve and the second is the length of the straight portion of the curve. The slope of the straight por-



tion of the curve determines the amplification of the tube. The more nearly vertical the straight portion of the curve is, the greater will be the change in plate current for a given change in grid potential, or in other words, the louder will be the response in the telephone receivers corresponding to a given received signal. The length of the straight portion of the curve determines the maximum variation in grid potential that will cause the tube to function properly without distortion.

TIPS TO RADIOISTS

At Muncie, Ind., Bacon was tried by means of a radio current. At last an explanation for that "frying" noise.

Gifford Pinchot, nominated for governor of Pennsylvania by the vote of the people, acknowledges his great indebtedness to the radio. A primary coil no doubt played an important part.

An inventor of Chicago claims to have invented radio apparatus that permits of successful communication with the spirits. We hope that the anti-prohibitionists will not misinterpret this claim.

The police department of Portland, Ore., has asked for an appropriation for radio receiving and broadcasting stations and to equip the police automobiles with radio apparatus. Copper wire, it is needless to say, will be used.

Lord Northcliffe, famous English editor, in speaking of the future of journalism, recently predicted that radio would have an effect upon the publication of newspapers that will equal the invention of the typewriter and high-speed press. He said that radio would undoubtedly come into general use of newspapers and news-gathering agencies.

SHIPBUILDING REDUCED.
(By Associated Press)
LONDON, July 19.—(By Mail)—Lloyd's Register reflects the depression in the shipbuilding world. For a quarter year ended in June there was a decrease of 310,000 tons in ships under construction in the United Kingdom as against a year ago. Also work

had been suspended on 481,000 more tons. Tonnage launched during the quarter is 185,000 less than in the March quarter.

Construction abroad also shows material decrease.

READ THE WANT ADS!

Churches

All church notices must be in the hands of the editor by 4 p. m. Friday afternoon.

LATTER DAY SAINTS—Regular services at the Tabernacle, Sunday school continuance at 10:30 a. m. Sacramental services at 12:15 o'clock p. m. Mutual Improvement Association, Sunday at 7:30 p. m. Priesthood and Relief Society meeting at 7:30 p. m. Primary association at the tabernacle Tuesday, for children, 4 p. m. Primary association on north side at the little chapel, for children, Thursday at 4 p. m. Religion class at tabernacle Thursday at 2:30 and 4 p. m. Religion class at the chapel on north side at 2:30 and 4 p. m. Tuesday. Regular choir practice at the Tabernacle Thursday at 7 p. m. The public is cordially invited to attend any or all of our services.—David I. Stoddard, Bishop.

First Church of Christ, Scientist.—Corner of First and Washington, Sunday morning service at 11 o'clock. Subject, "Love."

Sunday school at 9:45 a. m. Wednesday evening meeting at 8 o'clock. Reading room open to the public every Monday, Wednesday and Saturday from two to four. All are welcome to attend our services.

CHURCHES
First Methodist Episcopal Church.—"The Great Unseen Realities" will be discussed in the sermon Sunday morning at the 11:00 o'clock hour. This quiet hour service will meet a real need, and will be of its blessing. We will unite with the other churches in a joint meeting in the evening at the Christian church to listen to a sermon by its pastor, Rev. A. R. Sitten. Bible school at 10:00 o'clock sharp. Claude Cooper, superintendent.—G. H. Quigley, minister.

Presbyterian Church.—Summer time is when we are all anxious to read the best seller and you will have that opportunity tomorrow morning at 9:45 when the Bible will be read in our school. No book searches the heart of man, is so largely sold, nor has done so much to make the world a better place in which to live, as the Bible. Read the best seller every day and be guided by its precepts. Morning worship at 11 and the young people's gathering at 8:30. Union service will be held in the Disciple Church at 8:00, with the Rev. O. W. Jones bringing the message. Plan now to spend your Lord's Day with profit and pleasure.—W. C. Ross, minister.

Zion Lutheran Church, 905 M. Ave.—Sunday school at 10 a. m. Mr. B. Boegstad, superintendent. Preaching services, 11 a. m. Sermon subject, "Why Believers Should Rejoice." Rev. R. Boegstad, pastor.

First Baptist Church.—Sunday school at 10 a. m. G. B. Hogan, superintendent. We want one hundred in Sunday school Sunday morning. A knowledge of God's Word is power. Sermon at 11 a. m. Subject, "Religion in the Home." "The inheritance of truth and faith is greater than the inheritance of lands and gold." Let us make the Sunday morning service what it should be by everyone receiving present. God can use you to bless others. Every Christian should pray for and help in the revival meetings going on in the city. We will receive members Sunday morning. You are invited to make this your church home.—A. R. Sitten, pastor.

FIGHT ON BACK HAUL CHARGE ON

PENDLETON, Aug. 5.—Further plans will be made by the Interstate Rate Association at its meeting in Salt Lake City, August 14, to combat the proposed back haul charge by the railroads, according to C. A. Ford of Spokane, executive secretary of the organization. Ford stopped in Pendleton Wednesday to address the local Rotary club after 10 weeks spent in Washington in the interest of the association.

A decision from the interstate commerce commission on the back haul question is not expected until fall, he said. In the meantime the association should carry its fight into congress, Ford declared.

"We have no time to lose," he said. "The railroads are showing an inclination to overreach more and more upon the fourth section and by degrees are trying to return to the old discriminatory practice. Four years ago we led them into congress and we beat them. We can do it again. Anyway, the time has come for decisive action on our part."

Find Rich Vein of Copper Ore Near City

BAKER, Aug. 5.—A vein of high grade copper, silver and gold ore has been discovered in the Liberty mine in the Eagle mountains east of Baker. Gus Sherman, discoverer and one of the owners of the property, came in from the mine today bringing samples of the new discovery. He states the full width of the vein has not been disclosed yet, though they have proved the ore to full 10 feet in width.

Mr. Sherman discovered the Liberty property consisting of eight claims 20 years ago, and he and his partners have done considerable work in the past few years in development. They now feel that they are making a showing that will reward them well for their labor.

Associated with Mr. Sherman in the property are Bill Nash, O. W.

Epidemic Prevention Added To Child Feeding By A. R. A. To Save Millions of Lives



Scientific methods are used by the American Relief Administration in its child-feeding work in Russia. The children who are fed are first given a thorough physical examination to determine what their needs are. They are weighed and records are kept of their underweights. The medical system is used in caring for the undernourished boys and girls. In addition to the examination given for the purpose of determining the amount of nourishment necessary and to facilitate the treatment of disease, the children are also inoculated against cholera, typhoid, paratyphoid and smallpox.

The lower picture shows a group of children waiting in front of the medical rooms of the American Relief Administration at one station in Russia. The upper picture shows the conception of the work that confronts the doctors and nurses can be gained from this picture. All these children are to be carefully examined and prescribed for. The upper picture shows a group of medical workers, all of whom are Russian volunteers and work without salary in appreciation of the Ameri-

cramer and W. S. Rucker, Nash and Rucker are working at the mine and Mr. Sherman will return there in a few days.

Just Thirty Years Ago in the Grande Ronde Valley

August 5, 1892.
Mr. Delph, a teamster, was hauling a load of lumber near Black Flat at the Black grade Friday and when the team reached the steepest pitch, the load started back. Both wagon and team went off the grade, the wagon being smashed beyond recognition and both horses being killed. Delph was walking beside the wagon at the time and was uninjured.

The Baker City Morning Inquirer, a paper that was not very high in the public standing has ceased publication.

The Honorable G. W. Webb has been quite ill for the past few days and his illness at one time assumed a very serious aspect. His condition is now improved at present.

The Sign branch has a large amount of business on hand at present, principally in hauling fires. There is also a considerable passenger business.

Three of the passenger trains going through La Grande now stop for meals. The new arrangement went into effect Monday.

The excavation for the Palmer and Business building was finished this week.

A picnic gotten up by the members of the Presbyterian church was held at Probstels' grove Wednesday.

G. B. Swinchart has disposed of his interest in the Elgin Recorder to his former partner, A. R. Tuttle, who will continue to edit the paper.

A frost in the mountains a few nights since killed the huckleberry crop to a considerable extent, and several parties who have been hugging the mountains of a mountain trip are now disappointed.

The house of Andrew Blackland near Island City was destroyed by fire Saturday. The property was formerly the residence of C. A. Gilliam, an old Grande Ronde, who now lives in Iowa.

W. J. Snodgrass returned yesterday morning from a business trip to Portland.

A new flour mill is to be built at Nech Powder, the machinery having already been ordered and work commenced on the foundation of the building.

The resignation of F. S. Slater as city clerk was presented and accepted by the council. W. B. Sargent was elected to fill the vacancy.

News was received at Baker City Monday morning of a shooting affair at Cracker Creek, thirty-five miles from Baker City, in which Joseph Miska, a salaried soldier, shot and killed Andrew Olson, who started to re-occupy an account of the former kicking Olson's dog.

Deputy Sheriff Hailey, of Pendleton, was a passenger on the west bound train Tuesday evening having in charge Joseph Miska, who was arrested at Baker City on the charge of poisoning his wife.

The principal part of the force working on the waterworks is still not employed at the supply well and at the reservoir. At the former the depth now reaches 150 feet but it is a question whether this will hold a large enough supply of water. The water pipe are expected to arrive next week.

The railroad company is making preparations for the winter season in procuring a necessary supply of coal. About 3000 tons of black diamonds are now being stored in the bunkers.

INDIAN'S DEATH INVOLVES MANY

THE DALLES, Aug. 4.—Two Indian deaths, Aug. 3.—Two Indians, are now involved in the strange murder case that has been developed here in the last few days by police from the Warm Springs and Yakima reservations.

Ramifications of the affair apparently extend in all directions. Additional material witnesses have been arrested at White Salmon, to the west, Jim Starr, the Indian who was slain, came from the Warm Springs reservation, 90 miles to the south, while Nan Annie lives along the river near Galbridge, east of The Dalles, and belongs to the Yakima tribe, 90 miles north.

Starr was slain along the beach of the Columbia just below this city, the Indian policemen say. He apparently was clubbed to death, the affair occurring during a drunken brawl. Nan Annie, a squaw, an outcast from her people, and now held in the local jail, witnessed the murder, the police declare, but did not aid in the commission of the crime.

Cesar Williams, head of the Yakima reservation police, has arrested El Sam at White Salmon. This man also is in the local jail. Williams declares that Jim Starr tampered with the affections of several squaws and that the jealous bucks who were their husbands "framed up" to get the fellow drunk and then kill him. Williams declares he knows the actual murderers, and is now on their trail.

C. W. Rustall, superintendent at Warm Springs, is in the city assisting in the investigation.

Lucky.
Little Roger was being taken by his parents for a ride in their new motor car. As he looked out on the less fortunate people compelled to walk, he remarked, "Mother, ain't you glad we's us?"

FORD TO START GREAT PROGRAM

Flivver Maker Will Have Complete Chain to Plant from Mine it is Thought.

(By Associated Press.)

MICHIGAN, Mich., Aug. 5.—Marking what is believed here to be the start of a great development program by Henry Ford, the first shipment of iron ore from Mr. Ford's mine here has been sent to River Rouge, near Detroit, for conversion into iron and steel that next will be seen in automobiles and tractors.

About 500 tons of ore is being sent daily to Escalaba by rail and there dumped on an ore boat for the Detroit district. At River Rouge the ore will be put through the Ford blast furnaces. The only break in the procession from the Ford-owned mine to the Ford produced automobiles, is in the railroad and boat lines necessary to carry the ore. Mr. Ford has not yet attained control of these transportation facilities.

The mine, known as the Imperial will supply but a small percentage of the iron needed in the Ford industries but it is believed here other similar developments will follow, the manufacturer owning 400,000 acres of land in the lower Michigan peninsula and rich deposits of ore are believed by experts to underlie at least a part of this vast tract.

Operation of the Ford mine near here is similar to the other industries carried on by the manufacturer as is permissible. Working conditions for the men are revolutionary, mining men say. When the workers come out of the mine they remove their working clothes, stand under warm shower baths, don street clothing, and then go to their homes. The wage is \$6 a day for older employees and \$5 a day for those more recently added to the payroll. The eight hour day prevails.

The room in which the miners change their clothing are as carefully maintained as is the locker room of a club or University gymnasium.

Mr. Ford has also changed the style of buildings at the mouth of the mine. Most mine structures are corrugated iron over wooden frames. The Ford buildings are of metal lath and plaster. The manufacturer also is laying plans to build stucco homes for his workers. Twelve of these structures are to go up this year.

The Ford plan so far has had little effect on working conditions in mines throughout the peninsula, as his mine employs but 100 men of the total of 15,000 on the Michigan ranges.

The Imperial is an old mine acquired by Mr. Ford in a property deal. Several months were required to put it in shape for operation. Mining operations were started last December and a pile of ore amounting to \$20,000 tons had been accumulated up to the time that orders from Detroit sent a steam shovel biting into the mass.

The mining railroad is constructed of old rails taken from the railroad of Mr. Ford's railroad, the Detroit, Toledo and Ironton. The owner has announced he soon will begin construction of a steam electric plant at the west end of Lake Michigan and develop power for the mine and the village of Michigamme, as well as for other enterprises he may develop.

STANDARD LAUNDRY CO.

OUR PROCESS cleans these delicate fabrics absolutely without injury—Try us on the soiled blouse, waists, lingerie, shirt, etc.

Low charges.

Phone MAIN 56

TO-NITE

Right Off The Wire

Nuff Sed

MRS. TEMPLE'S TELEGRAM

THE GARDEN'S

SEND IT TO THE MODERN LAUNDRY

"Send your laundry to The Modern Laundry, Mary. They're efficient and dependable. I have been using The Modern for quite a while, and find them entirely satisfactory."

"I shouldn't know what to do without them."

MAIN 77

THE MODERN LAUNDRY