RADIO

POSITION AND SIZE OF GRID IMPORTANT

Determine Value of Negative Potential Necessary to Reduce the Plate Current to Zero.

In using a three-electrode vacuum tube in a radio set it is preferable to maintain the grid negative with respect to the filament in order to require the minimum amount of energy in the control of the plate circuit.

The relative position of the grid with respect to the filament and the plate and the size of the mesh of the grid, determine the value of E. E is the negative potential which must be applied to the grid in order to reduce the plate current to zero. The value of F, which is the positive grid potential that will cause the maximum or saturation current to flow in the plate circuit, is also determined by the relative position of the grid with respect to the filament and plate. If the grid is of very fine mesh, the value of E is small because the electrons in passing through the small mesh of the grid on their journey from the filament to the plate will negatively charge the grid and will be repelled. Similarly a small positive charge applied to a fine mesh will tend to accelerate the velocity of the electrons.

In case of a very coarse mesh grid, the electrons can pass through the apertures in the grid without coming in so close to the charge on it and a relatively high potential will be required on the grid to control the electron stream, or in other words, the current flowing in the plate circuit.

Referring to Fig. VIII, O-G, is the current that will flow in the plate circuit when there is no potential applied to the grid. Suppose a positive potential as O-I is applied to the grid. The corresponding plate circuit current will be I-D or B-D, more than it was when the grid had no potential applied to it.

A negative potential of O-H is now applied to the grid where O-H is equal in value to O-I, but opposite in sign. The application of the negative potential when applied to the grid will cause the plate current to be reduced to a value H-C or A-C, less than it was when there was no potential applied to the grid. So it is seen that a negative potential when applied to the grid does not reduce the plate circuit current as much as the same positive potential increased the plate circuit current. This irregular conductivity of the tube is made use of when the tube is used as a detector or rectifier of radio signals.

The incoming radio signal is a high frequency alternating current. Let us apply an alternating difference of potential whose maximum positive value is equal to O-I and whose maximum negative value is equal to O-H, to the grid of the three-electrode tube whose characteristic curve is the same as that shown in Fig. VIII. In Fig. IX is shown the alternating difference of potential applied to the grid. Through the first quarter of a cycle, from zero at J to a maximum negative value at K, equal to O-H, the plate circuit current will vary from O-G, its value at P when no grid potential is applied to a value at Q equal to H-C.

During the next quarter of a cycle the grid potential changes from a maximum negative value at K to zero at L. The corresponding values of plate circuit current are shown by the portion of the plate current curve Q-R.

During the next or third quarter of a cycle the applied grid potential increases from zero at L to a maximum positive value at M, equal to O-I, and causes the plate circuit to increase from I-B, its value when the plate potential is zero, to I-D, an increase in plate current equal to B-D.

During the remaining fourth quarter of a cycle as the applied grid potential varies from a maximum positive value at M to zero at N, the plate circuit current varies from a value S to T.

Assuming that the characteristic curve as shown in Fig. VIII and Fig. IX was with a potential of 40 volts on the plate, then, if the plate current is to be reduced to zero by a variation of plate voltage—with no potential applied to the grid—the plate voltage must be reduced to zero or a

If the 40 volts is maintained on the plate and a negative potential of E-O is applied to the grid, it will reduce the current to zero.

Suppose O-E represents five volts. It can be seen then that a change of five volts in grid potential will accomplish the same result that 40 volts will in the plate circuit. The ratio of the voltage change in the plate current is called the factor of the tube and is denoted by the letter "K."

In the tube just discussed the amplification factor would be 40 divided by five or eight. The amplification factor of the tubes available for amateur use at present is usually between 4 and 10. The amplification factor is a function of the dimensions and relative positions of the elements in the tube.

An incoming radio frequency alternating current applied to the grid of a three-electrode vacuum tube is not only rectified but the variation in the plate is multiplied by "K," the amplification factor of the tube. This

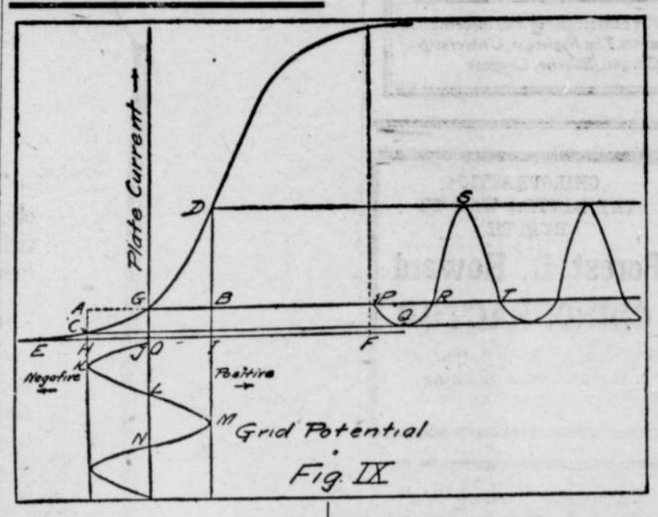

Fig. IX

makes the three-electrode vacuum the most sensitive detector available.

In actual tubes the point "G" on the characteristic curves as shown in Fig. VIII and Fig. IX may not fall on such a point of the curve that symmetrical changes in grid potential will cause a symmetrical change in plate current, starting with zero potential on the grid.

It then becomes necessary to apply a constant potential to the grid by means of a battery in the grid circuit, called the "C" battery, to maintain the grid at such a point on the characteristic curve that symmetrical changes in grid potential will cause the maximum symmetrical current to flow in the plate circuit.

Big Ships' Radio.

The radio equipment of the ships Paris and Lafayette is described in a recent issue of Radioelectricity. On both steamers a five-kilowatt tube transmitter has been installed with a wave range of between 2,000 and 9,000 meters. A five-kilowatt motor-generator set is used to produce the plate-high tension for four rectifying and four oscillatory tubes, and the low voltage current for the heating of the filament of these tubes. Both vessels are equipped with a radio range-finder, or "radio goniometer," which, reduced to plain English, means a radio compass. A distance of 3,400 kilometers has been covered safely by messages sent from the transmitter of the Paris.

Radio for Animal Training.

Experiments with the radiophone as an aid in animal training are to be made at the Hippodrome, New York city, by George Powar, trainer of the elephants, to determine whether it will be possible for his big pets at some future date to execute his orders on the stage while the trainer himself is absent.

Professor Bell a Radio Fan.

Finding the telephone, his own invention, a source of annoyance to him, Alexander Graham Bell had it removed ffrom his home. With the radiophone there is a difference, it seems, for Mr. Bell, now seventy-five years old, is said never to tire of "listening in" and experimenting with the new device. There are few more ardent enthusiasts, declare his friends.

RADIO DON'TS

Don't expect the circuit to oscillate with equal strength over a great range if you tune the grid circuit with capacity alone. Keep the ratio of L to C as near constant as possible while tuning.

Don't expect a circuit to oscillate if the natural period of the tickler circuit is equal to the natural period of the grid circuit.

Don't place the tickler or plate variometer tight against the grid coil or a change in the plate circuit will detune the grid circuit.

Don't expect high impedance tubes to oscillate freely in a circuit designed for low impedance tubes.

Don't discard a regenerative receiver until you have tried more than one detector tube.

Don't forget that a soft gaseous tube is the best detector, and that a hard tube is the best oscillator.

Don't treat inductance coils with shellac or any other varnish or compound that will absorb moisture.

State News

Astoria—$5400 to be spent for general work and $1802 for heating and plumbing at high school.

Eugene pear crop is placed at 500,000 pounds.

Portland—Bids being received for brick store building.

Lumber shipments from port of Astoria to both foreign and domestic ports realhing large figures.

Harrisburg—Paving work progressing rapidly.

Contract let for construction of Cresent Lake storage reservoir for Tumalo irrigation project. operation.

St. Helens to get big new garage.

Waldport—Contract let for new grammar school building.

St. Helens—Long Bell ferry completed and in operation.

Toledo—Tourist park being improved.

Work of grading St. Helens-Pittsburg road now complete.

Waldport cannery to run this season.

Myrtle Point—Fifth and Sixth strets being improved.

Waldport—New steel bridge to be erected over Scott Creek.

Toledo—Preperations being made for fair.

Wallowa—Work started on new Powwatka road.

Oregon City—County awards nine mile paving contract.

Redmond—3.7 miles cement walks to be laid here at cost of $19,800.

Marshfield shingle mill puts on night shift.

Eugene—Irving warehouses to be opened.

Astoria to improve several streets.

Hillsboro—Survey being made for railroad up Gales Crek.

Eugene—Phi Delta Theta fraternity building new home.

Freewater Federated church will construct modern $33,000 edifice.

Ashland—Hyatt prairie dam work progressing.

Banks paving strets.

La Pine—Survey started for new railroad.

Eugene—New method prune drier being built.

Estacada—Packing Co. has commenced canning operations.

OBITUARY

Ida Mercy Martiny, daughter of Mr. and Mrs. W. N. Vaughn, was born July 15, 1860, in the old log cabin on the Donation Land Claim of her parents, on which claim the present town of Idaville, in Tillamook County, is now situated. She died July 27, 1922, being then 62 years and 12 days old. Her mother was the first white child born on the Clatsop Plains, South of Astoria, and she herself was the first white child born and still living in Tillamook County.

She came of the old, sturdy pioneer stock, and of parents whose openhearted hospitality and liberality were widely known throughout the country.

She was married to Edward Walker in the year 1891 at Tillamook, Oregon, and to this union was born one daughter, Harriett, on December 19, 1893. They later moved to a farm at Oretown in this county, where they resided for several years, after which they returned to Tillamook and Mr. Walker ingaged in business as a harness maker. Mr. Walker died in the winter of 1903. Shortly after his death she purchased the property in Tillamook City which has ever since been her home.

In the year 1908 she married Mr. David Martiny, who is now the owner and operator of a garage in Tillamook City, and who, together with her daughter Harriett, survive her.

Beside her husband and daughter she leaves four brothers and seven sisters: Amos Vaughn, Lydia Hoskins, Alice Woodward, Nora Bodyfelt, Annie Jacoby, Clara Carey, Warren Vaughn, Guy Vaughn, Geo. Vaughn, Lena Goodspeed and Myrtle Holden, all of whom reside in Tillamook county except Clara Carey who resides at Carlton, Oregon, and Nora Bodyfelt who resides at Portland, Oregon.

She died with a firm faith and trust in Christ as her Savior.

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