

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

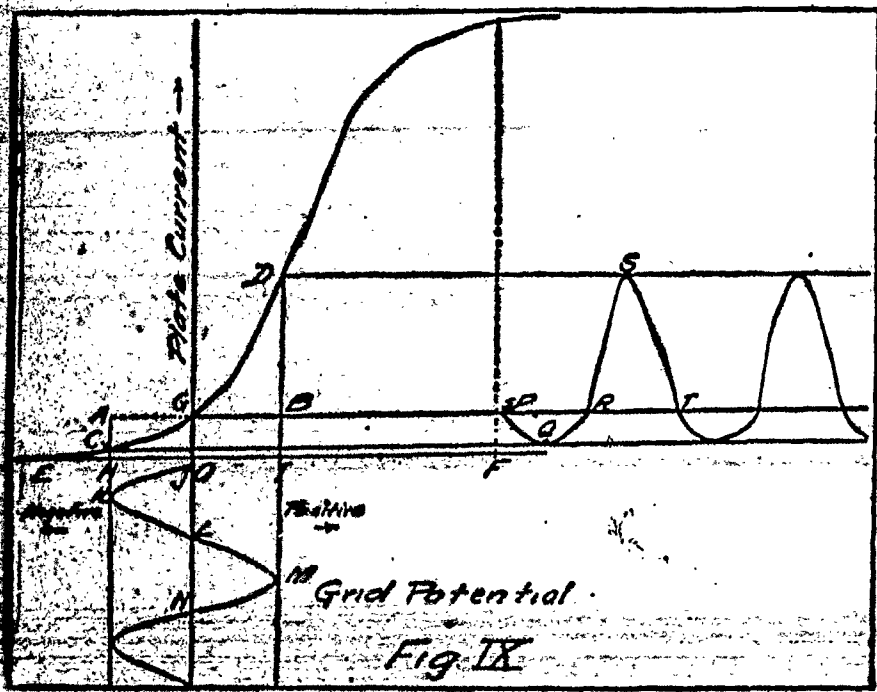


Fig. IX

determine the value of E_g is the negative potential which must be applied to the grid in order to reduce the plate current to zero. The value of E_g when 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 very close to the filament, the value of E_g will be small because the electrons in passing through the small mesh of the grid on their journey from the filament to the plate will be negatively charged and will be repelled. Similarly a small positive charge applied to a fine mesh will tend to accelerate the velocity of the electrons. In the case of a very coarse mesh grid, the electrons can pass through the apertures in the grid without coming in close to the charge on it and a relatively high potential will be required to stop the grid to control the electron stream, or in other words, the current flowing in the plate circuit.

Referring to Fig. VIII, O-Q, 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 the value at P down to a value at Q equal to zero.

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

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 circuit 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

FASHIONS IN HORSES' TAILS

Odd Designs That Have Been More or Less Popular at Various Periods of History.

Horses' tails have been subjected to curious changes of fashion. In the time of the Stuarts the English coach horse's tail was worn long and flowing, and was cut square. It was adorned with ribbons on gala days, and strapped up in a leather case in winter weather; thus a certain harmony was preserved between the wig of the master and the tail of his horse.

By the time of George II a short wig and a pigtail had taken the place of the flowing curls in which the cavaliers of Charles I and the rakes of Charles II's court delighted.

The brilliant idea occurred to Lord Cadogan, a cavalry officer of that period, to reduce the tails of his dragoon horses to a short dock. Possibly this was done with the view of saving his soldiers the trouble of cleaning those long tails and avoiding the nuisance of the splashes and accoutrements must have received from such hair streamers. Or it may be that the debased taste of the age made him think the appearance of his regiment was really improved by bobbed tails. That is a question which history does not decide.

The next step was to turn bobtails into pigtails by cutting all the hair from the last two or three inches of the dock. Having thus succeeded in disguising the hindquarters of dragoon horses, some individual devised the additional barbarity of cropping their ears.

RACE OF LANDSCAPE LOVERS

Japanese, Probably More Than Any Other People, Can See Beauty in Simple Countryside.

In spite of a fairly severe climate, it is with reluctance that the Japanese people close their houses against the landscape which is for them a perpetually renewed spectacle of beauty. The fundamental principle on which the Japanese taste is based would seem to be a constant application of refinement and a conservation of simplicity. A Japanese is accustomed to place a flower in his room, not as an ornament, but as a companion. Buddhism has exalted in the Japanese "that sympathy" for everything animate which is natural, it seems, to the various Asiatic peoples.

We are perpetually struck by the Japanese tastes for a countryside seen under snow or under moonlight. The French child who tries his hand at drawing first makes a house or a man, then the little Japanese draws a tree or the curve of a finger nail. The Japanese is one of the least migrant of nations. In spite of the density of its population, Japan is not overcrowded, and in all the northern portion of the country there is ample space.

Natural Smoke Screen. The muskrat, a deep-sea prawn, has a method of lighting that gives the appearance of a multitude of smoke rings. When excited by the nearness of an enemy the prawn ejects respiratory water in tiny squirts and into this stream the luciferin is forced from countless glands opening into the stream by fine ducts. As the chemicals combine, puffy clouds of luminous particles float in the sea. This is the "smoke screen" provided by nature.

The species of luminous fish, called "photobryon," has a dimmer system in an inside chamber that burns continuously. When the fish wishes to shut off the light, he causes a black pigmented curtain to slide down over the light cell opening into an eyelid. The light organ preserves its luminescence even when removed and is used by fishermen of the islands of Banda, about 800 miles southeast of the Philippines as bait for night fishing.

Spiders Mostly Deaf and Dumb. Whether insects can hear is a disputed question. Early writers say this sense would seem to be highly developed in spiders and certain other insects because some species not only make musical sounds but also are

great lovers of music. However, no truth can be accredited to those old romantic stories in which the hero, confined in a dungeon, charmed spiders with sweet music and prognosticated weather by observing their behavior.

Recent experiments show that spiders are not only deaf, but most of them are dumb, only a few being able to make sounds. Much has been written about the sense of hearing in insects, but critics still contend that it has never been demonstrated beyond a doubt that any insect can really hear.

DEATHS

Born—Mary Born, 48 years, died March 21st, this city. Funeral March 24, St. Michael's church.

Cason—Phoebe Cason, aged 60, of 235 River st., died March 21. Holy Cross Church, March 24.

Finein—Mrs. Eleanor A. Finein, died March 21, at St. Mary's Hospital, Immaculate Conception church March 24.

Galvin—Mrs. Susan M. Galvin, aged 65, died March 22d, at 4,015 Lake avenue. Holy Cross Church March 24.

Boyle—James A. Boyle, died March 19, at 363 South Goodman street, Funeral March 21, Blessed Sacrament Church.

Ritz—Mrs. Frances Ritz, 442 Maple street, March 17. Funeral from Holy Family Church March 21st.

Young—Enos Young, aged 61 years, died at 278 Averill Avenue March 19. Funeral March 21, from St. Boniface Church.

Fox—Patrick died at his home March 17, at 1115 St. Paul St. aged 63 years. Funeral March 20th, from St. Bridget's Church.

Badhorn—Mrs. Elizabeth Badhorn died March 17, at 712 Jay St., Funeral March 20th, from Holy Family Church.

Byrne—Mrs. Anna Byrne died March 17, at 32 Baldwin St. Funeral March 20, from Corpus Christi Church.

Baug—Joseph Baug, aged 53 years, died March 20, at 89 Manchester street. Funeral from St. Andrew's Church March 24th.

Forristal—Marie A. Forristal, died at 51 Cayuga street, March 19. St. Boniface church March 23rd.

King—Mrs. Anna M. King, died at 619 Dewey avenue, March 20. Funeral March 23 at Holy Rosary Church.

Marriott—Richard Marriott, died March 19, at General Hospital. Funeral from Holy Apostles' church March 23.

McCann—James McCann, aged 38 years, died March 21, at 32 Sawyer street. Funeral from St. Monica's church March 24.

Kerwin—Mary Hugh Kerwin, aged 52 years, died at 1212 Main street east, March 20. Funeral March 24, from Corpus Christi church.

Joy Turned to Sorrow. A letter which had been brought by the postman was thinner than the bulky ones which a struggling young author usually received, and he tore it open eagerly and read: "Your recent favor stating that you inclose manuscript of story, with stamps for return if not suitable, has been received. Your contribution is accepted."

"At last!" exclaimed the young author joyfully. But his heart seemed to sink as his eyes caught the following: "E. S.—You neglected to inclose the manuscript."—Montreal Gazette.

16,500,000 Books Printed. Basing conclusions on what is considered reliable data, an English librarian estimates that since the invention of printing in Europe in the fifteenth century the output of the world's book presses has amounted to about 16,500,000 works, of which some 4,400,000 have been printed since 1800. The librarian believes that perhaps 20,000 of all the books printed still possess value.

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Pretty Soft for Tigs. "If the people are so genuinely enthusiastic over motoring, as they are, of course," says a Detroit motorcar manufacturer, "what about the dogs? Dogs seem to have simply gone crazy about riding in an automobile. They will ride on the running board, cling to the fenders or take any easy seat, inside the car or outside. I have two dogs of my own, and know any number of drivers who also have dogs, but I have yet to see a dog that won't drop everything, even a fight with his favorite enemy, to take a ride in the family bus."

During the next 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 grid potential is zero, to I-D, an increase in plate current equal to O-I.

During the remaining fourth quarter of a cycle 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

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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.