

FIFTEEN MINUTES OF RADIO EACH DAY

By Edward N. Davis
Formerly Technical Electrical Expert For U. S.
Government

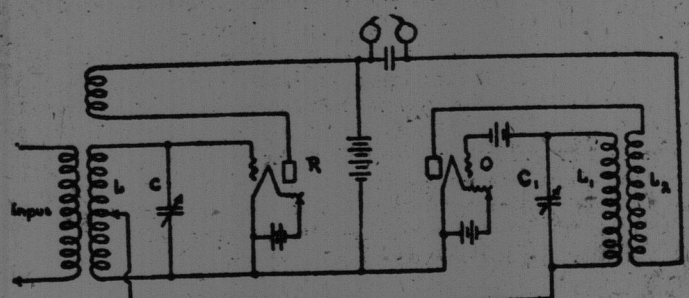
Lesson No. 191.

THE ARMSTRONG SUPER-REGENERATIVE CIRCUIT.

It is estimated by E. H. Armstrong that the Super-Regenerative system, of which he is the originator, has a power of amplification approximately 100,000 times as great as the maximum magnification of signal produced by the regular regenerative circuit, and in theory a ratio having the magnitude of 1,000,000 to one may be obtained.

Owing to the fact that the continuous or modulated continuous waves are amplified by super-regeneration to a much higher degree than damped waves, this system is comparatively free from the interference due to spark stations which frequently cause interruptions in the ordinary types of radio receivers and at times entirely prevents broadcast reception.

In the accompanying diagram, super-regeneration is obtained by the use of two tubes, the first tube acting as a regenerator and the second tube, in addition to operating as a local oscillator, performing the functions of a detector by rectifying the signals which have been amplified by super-regeneration in the first tube.



In this circuit, like the other methods of producing super-regeneration, the incoming signals are amplified in the first tube and by means of the tickler coil coupling a portion of the energy of the plate circuit is fed back to the grid circuit. The magnetic coupling between the tickler coil and grid circuit is so adjusted as to produce regeneration beyond the normal oscillating point of the tube. The second tube acts as an oscillator and produces oscillations having a frequency of 10,000 oscillations per second. During the half-cycle when the 10,000 cycle oscillations gives a negative value to the grid of the first tube the circuit is given a negative resistance and amplification to an extremely high degree is obtained. In this half-cycle, regeneration is carried beyond the normal oscillating point of the tube, but before the tube can burst into oscillation the succeeding half-cycle of the local oscillations renders the grid of the first tube positive which attracts electrons from the filament to the grid with a resultant flow of grid current. This is equivalent to introducing a positive resistance in the circuit with the result that oscillation of the tube is effectively prevented. Exceptional amplification of signal is obtained, therefore, during the half-cycle when the local oscillations give the circuit a negative resistance.

In this circuit it will be noted that the second tube besides acting as an oscillator also rectifies the signals which have been amplified to a high degree by the super-regenerative action of the first tube. If amplifier tubes are used for both the regenerator and the oscillator, the voltage of the plate battery should be approximately 100 volts with a grid bias battery having a potential of 5 to 10 volts, so connected as to give a negative value to the grid of the detector tube. If it is desired to utilize a larger amount of power for the operation of a loud speaker, a 6-watt power tube may be used or the second tube in which case the plate voltage should have a value of 180 to 200 volts with a negative bias potential of 15 to 20 volts on the grid of the detector.

With reference to the operation of this circuit, E. H. Armstrong states in his article "Some Recent Developments of Regenerative Circuits," contained in the "Proceedings of the Institute of Radio Engineers," as follows: "When a super-audible frequency of variation is employed, it is sometimes

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of advantage to perform the detecting function in the oscillating tube. The operation of this system is as follows: Incoming signals are amplified by means of the regenerative action of the amplifier tube (R) and the variations of potential across the tuned wave frequency circuit (L) (C) impressed upon the grid of the oscillating tube (O). These oscillations are then rectified and two frequencies are produced in the circuits of the amplifier tube. One of these frequencies corresponds to the frequency of modulation of the signalling wave. The other corresponds to the frequency of the variation and contains a modulation in amplitude corresponding to the modulation of the transmitted wave. The second frequency is then impressed upon the circuits of the oscillating tube with which it is in tune, amplified by the regenerative action of the system (L-C), (O) and then rectified. The amplification obtainable with this form of system is considerably greater than that of the single amplification circuits, but is naturally more complicated to operate.

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EQUAL SUFFRAGE BACKED BY WOOD IN PHILIPPINES

Manila, P. I., Nov. 30. (By Mail)—Governor General Wood's recent message to the Philippine Legislature contained a strong recommendation for the granting of suffrage to the women of the Philippines. He said: "There is one final recommendation to which I earnestly invite your favorable consideration, and that is the extension of the suffrage to the women of the Philippine Islands under the same



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condition and to the same extent that you have extended it to the men. Such action will tend to build up and greatly extend an enlightened public opinion, to raise the standards of public and private morality, to increase interest in public affairs and to greatly improve the efficiency of the government; in a word, it will tend to the advancement and betterment of the people of the Philippine Islands.

PLANS FOR NEW YEAR'S DAY.

At the meeting of the Ladies' Auxiliary of the Y. M. C. A. held in the Association building yesterday afternoon, plans were made for the New Year's reception which is an annual event, and for the new year's entertainment, which is also a much enjoyed annual occasion. Mrs. G. Wilford Campbell, the president, was in the chair and the meeting was a busy and successful one. Arrangements were made for providing refreshments for the reception and for the extending of invitations. It was expected that there

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- 98 lb bag Western Grey Buckwheat \$4.20
- 6 Tins Corn 69c
- 6 Tins Peas 90c
- 6 Tins Tomatoes 75c
- 6 Tins Blueberries 75c
- 3 Tins Peaches 72c
- 3 Tins Pears 72c
- 4 Tins Brunswick Sardines 23c
- New Figs, lb. 30c
- Best Shelled Walnuts, lb. 45c
- Best Shelled Almonds, lb. 45c
- 2 1/2 oz bottle Pure Lemon 23c
- 2 1/2 oz bottle Pure Vanilla 23c
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- 1 oz bottle Wintergreen 12c
- 1 oz bottle Peppermint 12c
- 1 lb tin Finest Coffee 52c

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Fresh Eggs, per doz. 40c

Choice Corn, per tin. 11c

Choice Tomatoes, large tins, 13c

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Choice Peas, per tin. 14c

2 tins 27c

Good Large Peas, 2 lbs 25c

Reg. 15c box Matched, 2 boxes for 20c

24 lb bag Royal Household Flour 98c

Fresh Killed Geese, per lb 45c

Fresh Killed Ducks, per lb 40c

98 lb bag Cornmeal \$2.20

98 lb bag Cracked Corn \$2.20

98 lb bag Shorts \$1.55

2 bushel bag Oats \$1.00

Finest Orange Pekoe Tea 45c lb, 3 lbs \$1.25

Dry Kindling Wood, 5 bundles 25c, per doz 55c

Lipton's Jelly Powders, all flavors, 3 pkgs for 20c

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2 lb Tin Clark's Beans, plain or Chili Sauce, 15c

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2 1/2 oz. pkgs. Seedless Raisins 25c

2 1/2 oz. pkgs. Seedless Raisins 25c

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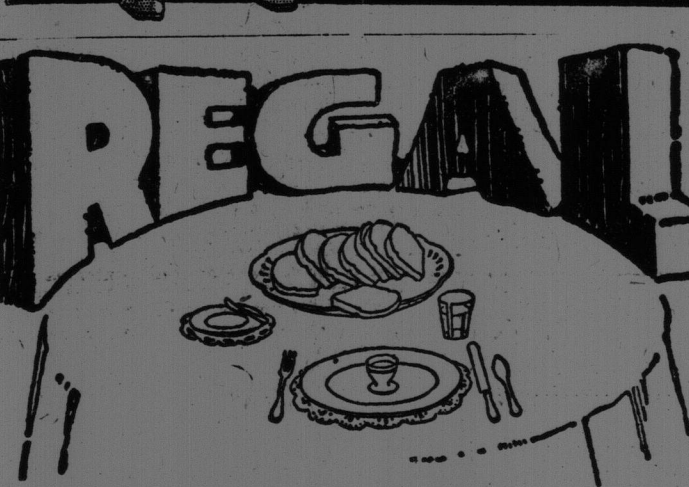
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Baldwin Winter Apples, \$1.50 per bbl

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