

# A Tuned Radio-Frequency Amplifier

By Wm. F. Diehl \*

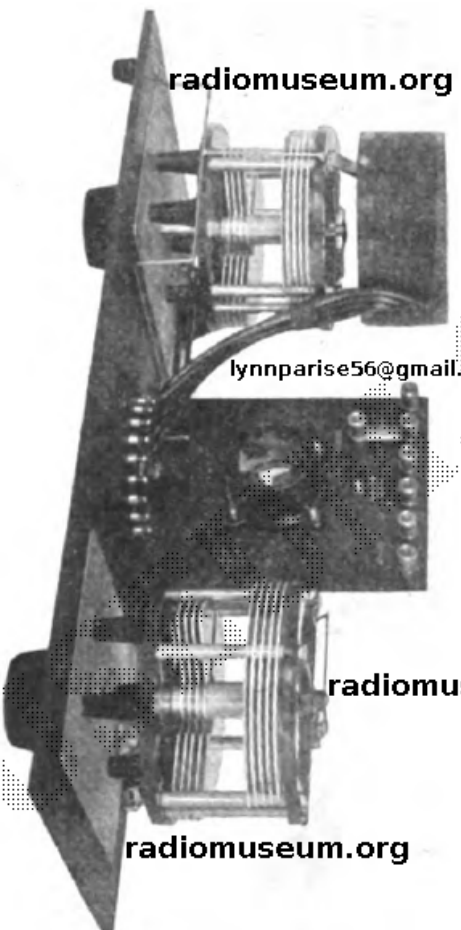
**T**HE amplifier described in this article is the result of a lengthy consideration of the problem of radio frequency amplification. R.F.A. is not new—many types of such amplifiers were used during the war. However, these were mainly designed for reception on a definite wave length or over very narrow frequency bands, the lowest wave length being 300 meters. Furthermore the vacuum

core for broadening the wave length band. This method, while very satisfactory as far as a fair degree of amplification was concerned, had the disadvantage of amplifying over but a very narrow wave length band. Transformer coupling was next considered, but here again while the amplification at the desired wave length was exceedingly high, yet even when using fine wire and iron-dust the wave length band was very narrow.

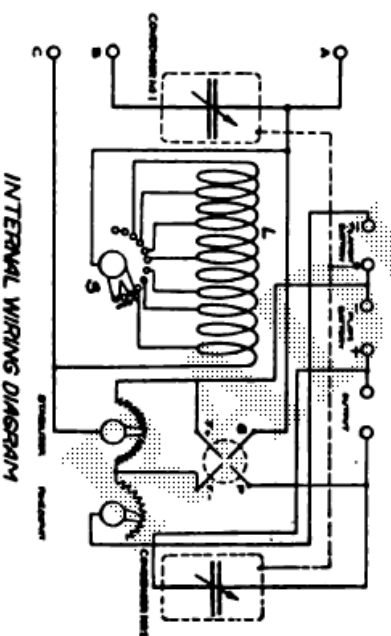
With these facts in mind attention was directed towards the development of an amplifier which would function over a range which would include the most useful wave lengths. The instrument shown herein is the result. It gives equal amplification over its entire wave-length range of 150 to 3000 meters. It is an amplifier of what might be termed the "tuned coupled-circuit" type. It has a tuned grid circuit using a variable condenser and inductance, with the inductance switch so arranged that either a loop or antenna may be used. The plate circuit is tuned by means of another variable condenser and an output inductance which may be either (a) the primary

tubes used on these wave lengths were especially designed so as to have low capacity between elements.

During the past year several manufacturers have attempted to solve the R.F.A. problem by designing transformers or choke coils of such characteristics that resonance is obtained at the desired wave length and using iron cores and resistance-wire windings to broaden the band of response. Tests were made in our laboratory using numerous types of circuits and employing various types of coupling elements. It was clearly demonstrated that the resistance type was out of the question for reception below 1600 meters, the reason being that at the higher frequencies the plate current, instead of flowing thru the coupling resistance elements, takes its path thru the capacity circuit afforded by the tube elements, so that practically no voltage is applied to the grid of the succeeding tube. The impedance type of coupling was next considered, using either an air-core choke with fine wire winding or with an iron-dust



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of the variocoupler of the usual loose-coupled tuner or (b) a special inductance coil supplied with the amplifier which may be placed in any location where it is in in-