

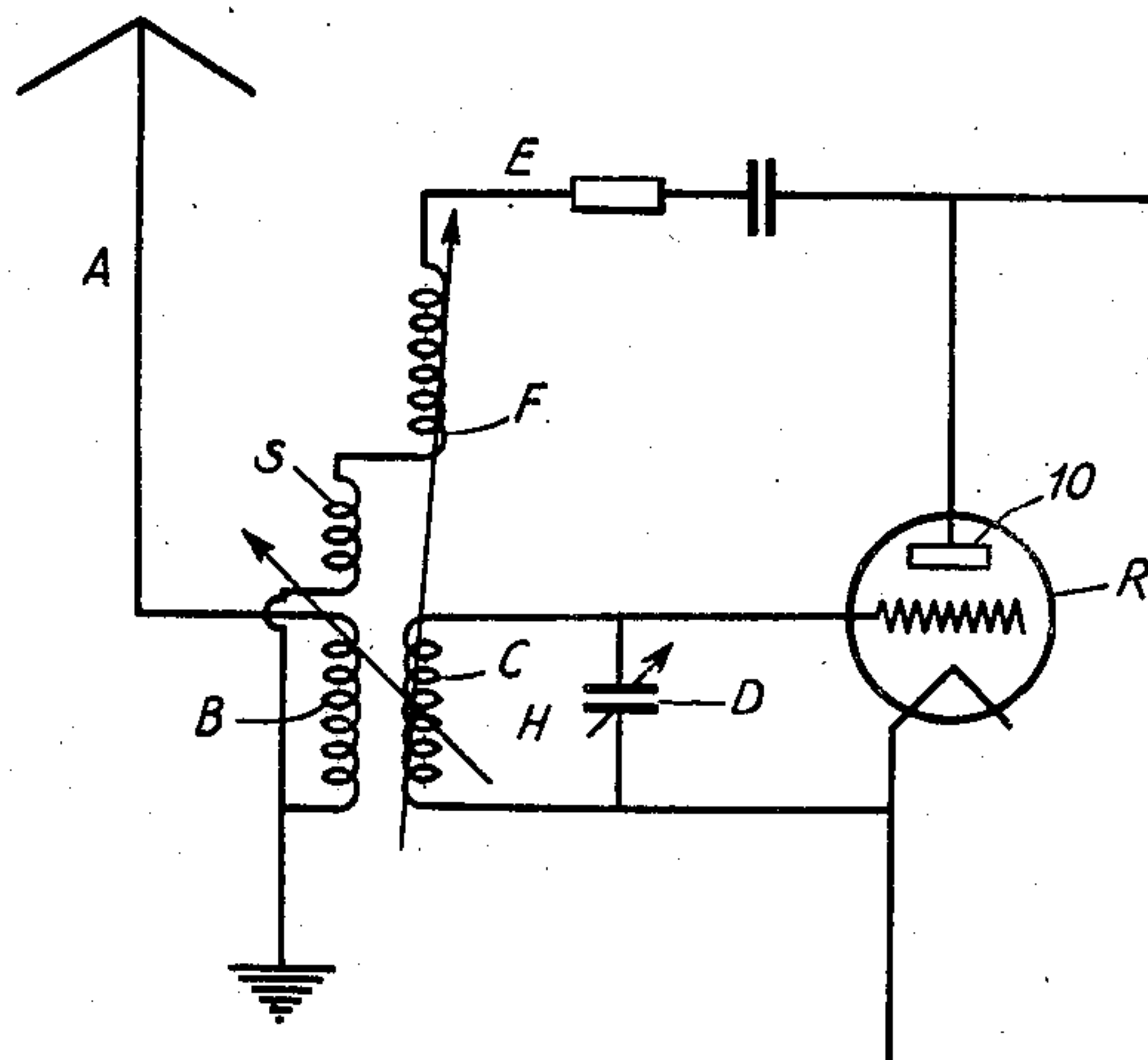
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AMPLIFIER DEVICE

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## UNITED STATES PATENT OFFICE

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## AMPLIFIER DEVICE

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The present invention aims at preventing oscillations of a return-coupled tube stage when its coupling to a second circuit is varied.

If the coupling of the input circuit of an amplifier tube with the source of signal currents is varied for the purpose of controlling the volume, I have found that when the usual type of feed back circuit is used, a reduction of the coupling below a certain value causes the amplifying stage to become unstable and commence oscillating.

This difficulty can be overcome by so limiting the intensity of the feed back that oscillations do not occur even when adjustment is made for the loosest coupling. For a fixed coupling it should however be understood from the beginning that no possibility exists of utilizing the entire feed back available.

These drawbacks can be overcome through manual control of the feedback, however, this complicates the adjustment considerably, since besides adjusting the tuning and the coupling it will also be necessary to adjust the feed back. Furthermore, the servicing is rendered still more difficult in view of the fact that the adjustments are in part independent of each other.

According to my invention, the said difficulties are overcome in that a part of the feed back turns are arranged on the turnable coupling coil in the preceding circuit. In this way, upon reduction of the coupling between the two circuits, the amount of feed back will be automatically reduced.

For a better understanding of the invention reference is made to the accompanying drawing showing a circuit arrangement embodying the same. The radio frequency amplifier R is shown as having a resonant input circuit H tunable to the signal frequency and comprising a fixed secondary coil C tuned by the variable condenser D. The antenna circuit A contains the adjustable or rotatable primary coil B coupled to C, the degree of coupling varying with the adjustment of coil B. The feed back circuit between the plate 10

and grid circuit H contains the feed back coil F which is rotatable or adjustable with reference to coil C, and also the coil S which is fixedly mounted on antenna coil B. Thus, if the coupling between the coil B and coil C of the input circuit is decreased by adjustment of B, by means of the arrangement described the value or amount of feed back will be decreased at the same time and the tube prevented from going into an oscillating condition.

Having described my invention, what I claim as novel and desire to secure by Letters Patent is:

1. In an amplifying device, the combination of a vacuum tube having an anode circuit and a resonant grid circuit, said resonant grid circuit including a transformer secondary winding, an antenna circuit including a primary winding adjustably coupled to said secondary winding, and a feedback circuit connected between said anode circuit and said resonant grid circuit, said feedback circuit including two series connected windings, one of said windings being adjustably coupled to said transformer secondary winding, the other of said series connected windings being mounted in fixed relationship with respect to said primary winding and coupled to said secondary winding whereby adjustments in the coupling between the secondary winding and the primary winding also affect the coupling between said secondary winding and said last named series connected winding.

2. In an amplifying device, the combination of a vacuum tube having a resonant grid circuit including a transformer secondary winding and an anode circuit, a rotatably mounted primary winding adjustably coupled to said secondary winding, and a feed back circuit coupled to said anode circuit and including a first coil having a fixed degree of coupling with said primary winding and a second coil adjustably coupled to said secondary winding.

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