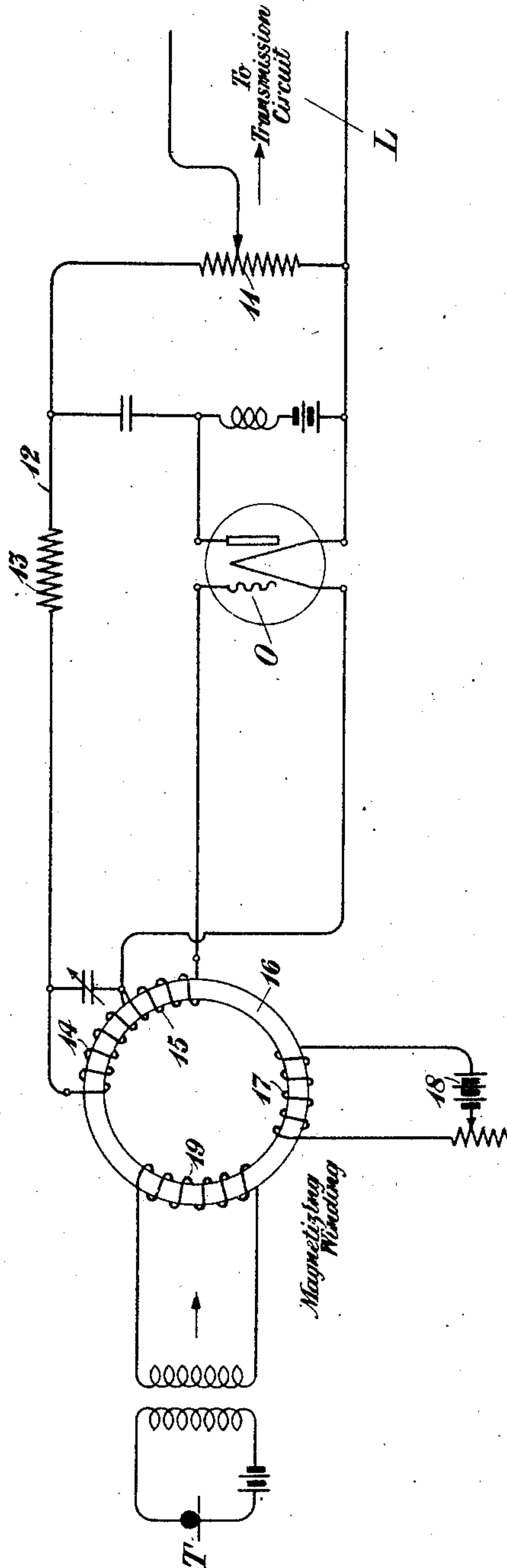


July 17, 1928.

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O. H. LOYNES
MODULATING ARRANGEMENT

Filed May 26, 1923



BY

INVENTOR

O. H. Loynes

g. v. for

ATTORNEY

UNITED STATES PATENT OFFICE.

OWEN H. LOYNES, OF WOODRIDGE, NEW JERSEY, ASSIGNOR TO AMERICAN TELEPHONE AND TELEGRAPH COMPANY, A CORPORATION OF NEW YORK.

MODULATING ARRANGEMENT.

Application filed May 26, 1923. Serial No. 641,708.

This invention relates to carrier transmission and more particularly to modulating arrangements for use in connection with carrier transmission circuits.

5 One of the principal objects of the invention is to provide a modulating arrangement in which a vacuum tube oscillator supplies the carrier current, modulation being effected by magnetically varying the coupling of the feed-back connection of the oscillator.

Other and further objects of the invention will be clear from the following description when read in connection with the accompanying drawing, the figure of which illustrates a preferred embodiment of the invention.

Referring to the drawing, O designates a vacuum tube oscillator of well known type 20 for generating the oscillations to be used as carrier current. The oscillations are supplied to a transmission circuit L through a potentiometer 11 in the output circuit of the oscillator. The grid and plate circuits of the oscillator are coupled together through 25 a feed-back connection 12, including a resistance 13 and a transformer comprising windings 14 and 15, the one winding being included in the plate circuit and the other 30 being included in the grid circuit. The coupling windings 14 and 15 are connected upon a core 16, upon which is also wound a magnetizing winding 17 energized by a direct current source 18. An operating or 35 modulating winding 19 is also wound upon the core 16, said winding being energized by modulating current from a telephone or other form of transmitter T.

40 The operation is as follows: Normally, the oscillator O generates oscillations through its feed-back coupling, the amplitude and frequency of the oscillations being determined by the constants of the circuit. These oscillations are transmitted through 45 the potentiometer 11 to the transmission circuit L. When the telephone transmitter T is actuated voice currents energize the operating winding 19 and produce variations in the magnetic circuit of the core 16, thereby

changing the frequency of the oscillator O 50 and causing frequency modulation in accordance with the voice of other signaling currents.

It will be obvious that the general principles herein disclosed may be embodied in many other organizations widely different 55 from those illustrated without departing from the spirit of the invention as defined in the appended claims.

What is claimed is:

1. A modulating arrangement comprising a vacuum tube oscillator for supplying the carrier currents, a magnetic feed-back coupling for said oscillator including an iron core and means to vary said magnetic coupling in accordance with modulating currents to correspondingly change the frequency of said oscillator. 60

2. A modulating arrangement comprising a vacuum tube oscillator for supplying the carrier currents, a magnetic feed-back coupling for said oscillator including an iron core and means to vary said magnetic coupling in accordance with modulating currents, said means comprising an operating winding upon the same core with said feed-back coupling and energized by modulating currents to change the frequency of said oscillator in accordance with said modulating currents. 70 75 80

3. A modulating arrangement comprising a vacuum tube oscillator for supplying the carrier currents, a magnetic feed-back coupling for said oscillator including an iron core, means to vary said magnetic coupling in accordance with modulating currents, said means comprising an operating winding upon the same core with said feed-back coupling and energized by modulating currents to change the frequency of said oscillator in accordance with said modulating currents, and a magnetizing winding associated with said operating winding and said coupling. 85 90

In testimony whereof, I have signed my name to this specification this 25th day of May, 1923. 95

OWEN H. LOYNES.