The simplest method of controlling the oscillations of the dynatron is to vary the negative resistance, by means of a grid around the filament, as in the pliodynatron. It has been shown that the negative resistance of the pliodynatron is *inversely proportional* to grid potential. Hence, if the ratio of inductance to capacity and resistance be initially just large enough to produce oscillation (which is also the condition for producing pure sine waves), a slight decrease in grid potential will stop the oscillations.

This is exactly what is required for the radiophone, and it is easy to make pliodynatrons which have this characteristic.

The connections are shown in Fig. 4. The oscillating circuit has the pliodynatron connected up as shown, and is coupled inductively to the antenna. A microphone M, coupled thru the transformer T to the grid circuit of the pliodynatron, serves to control the amplitude of the oscillations. A battery of a few volts, between grid and filament, keeps the grid always *negative* with respect to the filament.

It is found that, with a proper ratio of inductance to capacity, the amplitude of the radio waves is very nearly proportional to the grid potential, and hence to the instantaneous displacement in the vocal (speech) wave. This was proved for constant grid potential by means of a hot wire ammeter in the antenna circuit, and for alternating grid potentials by impressing a sine wave on the transformer T, and observing the form of the rectified radio waves in a coupled circuit containing a kenotron rectifier and oscillograph.

Under these circumstances, it was found that speech transmitted to the microphone M, and received at a station a few miles distant suffered very little more distortion than in the ordinary wire telephone. With a small tube giving about 10 watts, it was possible to talk wirelessly 16 miles (26 km.) with good intensity and articulation. No attempt has been made to telephone greater distances, or to develop high power pliodynatrons. The maximum output of a single tube which it has been possible to control thus far is about 60 watts.

It has been found that a pliodynatron in series with a suitable resistance is capable of producing an aperiodic voltage *amplification of* 1,000-*fold. To maintain this* amplification requires constant batteries and continuous attention. A value of 100-fold is, however, very easy to maintain. By connecting two pliodynatrons in series a total *amplification of* 10,000-*fold has been* obtained. With this amplification it should be possible to receive radiograms on an aperiodic antenna.

[Ed note: Those interested in this article in detail would do best to refer to the Proceedings of The Institute of Radio Engineers, Vol. 6, No. 1, copy of which can be procured thru our Book Department.]

Television and the Telephot

(Continued from page 96)

makes use of a cathode tube, the wires 9 and 10 from the revolving mirror sender 1 being connected to wires 9 and 10 which in turn go to an electro-magnet *G*. Wires 11 and 12 from revolving-mirror sender 2 go to 11 and 12 which are also connected to another electro-magnet *H placed at right angles* to electro-magnet *G*. A pencil of cathode rays is thrown upon the screen in back of the tube, and this ray is influenced by the electro-magnets *H* and *G* synchronously to the revolving mirrors 1 and 2 of the sender. Consequently a picture should be traced out on the screen of the cathode tube point by point, and it is conceivable that a perfect picture could be readily obtained by this means. A condenser *K* is also arranged in the cathode tube to steady the cathode rays, and for certain other purposes which it is not necessary to delve into in this article. This is a particularly clever invention, but we do not have any information on hand showing if it has ever been tried in practise. It certainly looks more promising than any of the others, particularly as it requires only four wires.

We must also mention a certain other type of telephot which strictly speaking is not a telephot at all in the ordinary sense of the word because it does not transmit pictures by electricity, but optically. It shows how a picture can be transmitted practically *by means of a single light ray*. This idea was patented by Mr. Alf Sinding-Larsen of Christiania, Norway. The idea is to have two mirrors vibrating at a different frequency of vibrations, which mirrors cut up the light ray into its components. For transmitting the pictures directly, the inventor makes use of a narrow tube with strongly reflecting inner surfaces which tube is arranged with its rear opening behind the light orifice in the transmitter. The optical system forming the image is arranged in such a manner that the rays form the individual image points across one another at a very acute angle. By this the inventor is enabled to cause the light taken up in the mouth of the tube to be transmitted thru the tube without being materially weakened in its passage to the other end of the tube and the image surface of the receiver.

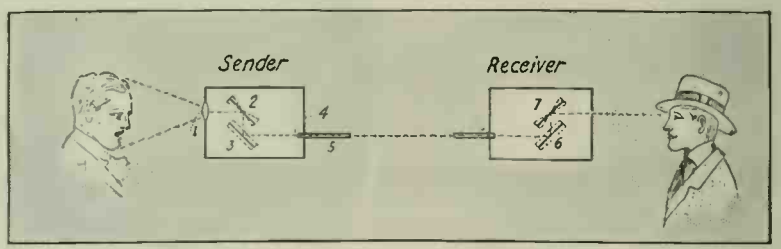

Fig. 5 Depicts the Sinding-Larsen Telephot. Two Mirrors Vibrating at Different Frequencies Cut Up the Light Rays. These Light Rays Are Past Thru a Metallic Tube Having Strong Reflecting Inner Surfaces. At the Receiver, the Light Rays Arer Past Thru a Similar System as the Sender and the Picture Is Thus Reconstructed.

The synchronous movement of the mirrors is effected by coupling them in series the electro-magnets serving to keep the mirrors moving. Reference is made to Fig. 5, where the sender and the receiver are connected with the aforementioned reflection tube 5; 1 is an object lens of the receiving station camera in which are placed two mirrors 2 and 3. The mirror 2 oscillating very fast on an axis perpendicular to the plane of the drawing, while the mirror 3 oscillates more slowly on an axis