FIG. 31. Same conditions as Fig. 29, but with equal horizontal deflection in each case to show change in linearity.

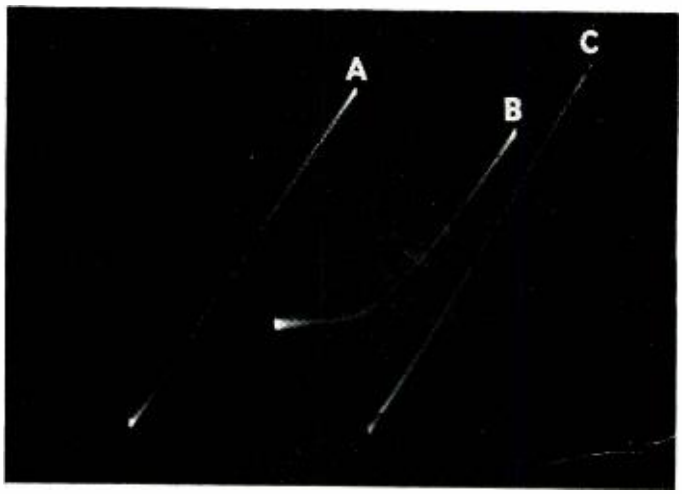

FIG. 32. Loading effect of internal cathode impedance:
(a) Cathode signal voltage with one triode, $R_k = 1700$ ohms.
(b) Second triode added in parallel, cathode and plate only.
(c) Grid of second triode also added in parallel.

minated transmission line acts as a purely resistive load and therefore accepts all frequencies equally well. To the amplifier the line appears simply as a resistance. Therefore, the problem becomes one of providing proper coupling to the low resistance presented by the line.

The cathode follower is often regarded as the most acceptable circuit arrangement for feeding a line. Where direct coupling to the line is possible, it has some advantages, namely, excellent low frequency response all the way down to zero (dc), general simplicity, and the property of providing (with slight modification) a termination at the sending end of the line which helps to minimize reflections. However, it has one disadvantage which is rather serious; with direct coupling, the d-c component of the cathode current of the amplifier tube flows in the transmission line. This is an objectionable feature because many of the transmission circuits now provided by the common carriers, such as the A. T. and T. Co., include wide band transformers which cannot accommodate any d-c. If direct coupling is to be avoided, very large coupling capacitors must be used. Because of this situation, it has become customary to avoid the use of cathode followers for line driving, and to resort to plate output circuits in their stead.

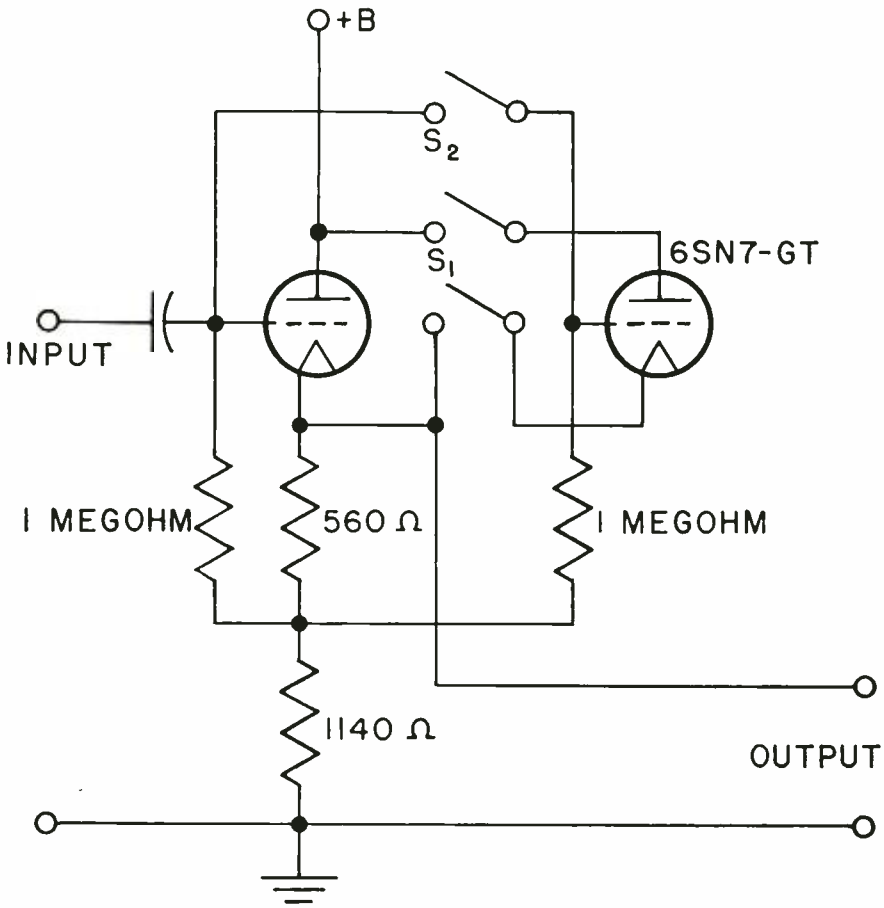

FIG. 33. Schematic of test circuit of a typical cathode follower used in obtaining the curves of Figs. 28-31.

Plate coupled output amplifiers require blocking capacitors too, but much better low frequency performance can be obtained as will be seen from the following discussion. Figure 13 includes a plate-coupled output stage which is redrawn in Figure 34 for convenience. The low frequency performance of a network like this may be measured in terms of the time constant of the loop which includes the coupling capacitor; i.e., the product, RC, where R is the total resistance around the loop. In Figure 34, $R = R_p + R_o$, assuming negligible resistance in the power supply. For good performance, RC should be as large as possible. By adding the frequency, f, at the low end of the band as a third factor, a figure of merit for low frequency performance may be determined, i.e., RfC. Circuits having values of RfC less than 20