

to the equation

$$\text{Change in capacity} = \frac{0.613}{\log_{10} \frac{b}{a}} \mu\mu\text{f per inch} \quad (21)$$

End effects and capacities to ground do not affect this result, since they are constant at all times.

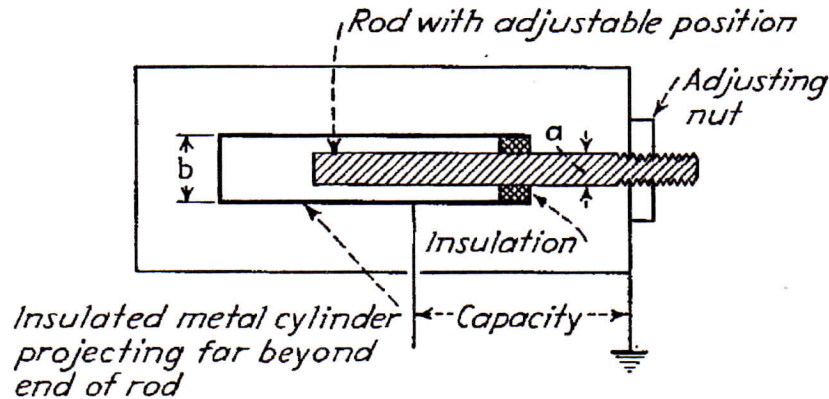


FIG. 27.—Schematic diagram of method of obtaining accurately known small increments of capacity.

The usual resistance standard employed in radio-frequency measurements is a resistance wire of such small diameter that skin effect is negligible at the frequency employed. In this way, the radio-frequency resistance will equal the low-frequency or direct-current resistance. It is not necessary for many purposes that the resistance standard be noninductive, since its reactance can be resonated out without affecting the resistance. It is, however, important that any shunting capacity present have a reactance considerably greater than the resistance. Resistance standards of this

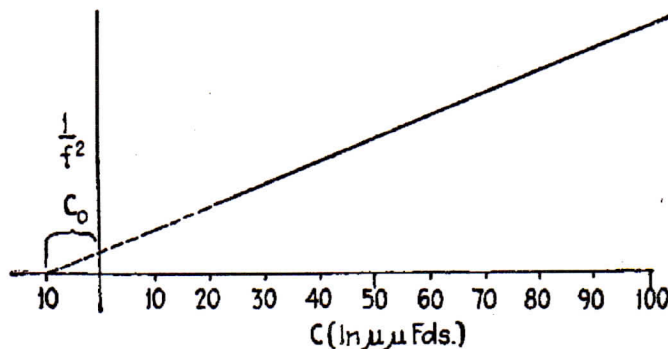


FIG. 28.—Plot of $1/f^2$, where f is the resonant frequency, as a function of external tuning capacity. The value of negative capacity C_0 at which the extrapolated line intercepts the capacity axis is the distributed capacity of the coil, and the slope of the line is a measure of the coil inductance.

type are satisfactory for low and moderate values, *i.e.*, up to the order of one hundred ohms. When standards of higher resistance are desired, it is customary to employ metallized or other similar types of resistors that maintain a substantially constant resistance from direct current up to very high frequencies. When precision is important, it is desirable to check such resistances against low resistance standards composed of fine wire. Resistances of different orders of magnitude can readily be compared by such expedients as (1) measuring a resistance shunted across a resonant

circuit in terms of the series of resistance of the circuit;¹ (2) the use of a transmission line; (3) by means of a bridged-T network, as in Fig. 24.

Resistance standards are preferably fixed because of the complications introduced if an attempt is made to provide continuous adjustment.

10. Miscellaneous. *Measurement of True Coil Inductance and Distributed Capacity.*—The true inductance and distributed capacity of a coil can be obtained by observing the capacity that must be added to tune the coil to resonance at several

¹ Paul B. Taylor, Method for Measurement of High Resistance at High Frequency, *Proc. I.R.E.*, Vol. 20, p. 1802, November, 1932.