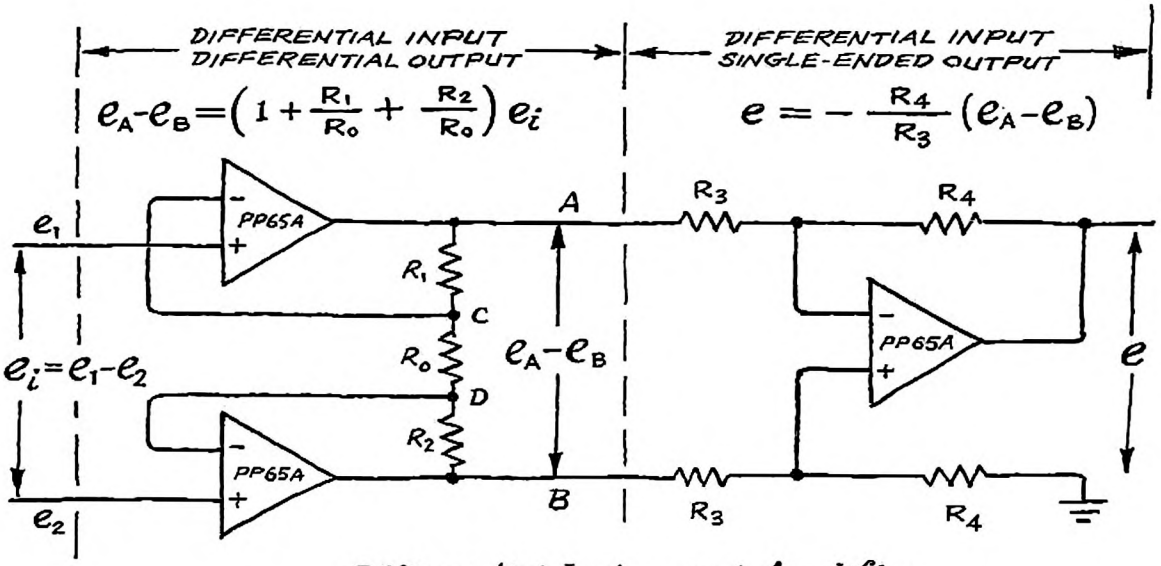
GAP/R Application Brief

D9 9/3/63

P65A'S USED TO FORM A LOW-NOISE DIFFERENTIAL INSTRUMENT AMPLIFIER

This is a circuit approach to measuring signals from common mode source impedance of up to 10,000 ohms with low noise (less than 10 μv p-p flicker), high input impedance (greater than 10 megohms), low drift (less than 50 microvolts per day under controlled laboratory conditions--and a factor of 5 better with PP65A at <u>really</u> constant temperature)--and high common mode rejection (at least 80 db at dc). It is especially useful for amplifying low-level, low-impedance transducer outputs; and it has been long used for measuring biopotentials (the so-called "medical amplifier"). Bandwidth exceeding 5 kc at gains of 20,000 is feasible.

One variation of the circuit is shown below.



Differential Instrument Amplifier
(DC effective circuit)

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We can actually use SP656, as is, as a high impedance stable follower, by grounding the output terminal and using a floating power supply with it. Naturally, good isolation and shielding are important--but PR-30 and PR-30C, in which common is isolated from the chassis can be used in such applications. Batteries can also be used. Note that in systems of several amplifiers and power supplies, each amplifier using an isolated power supply should have a separate chopper winding.

The same thinking naturally leads to the current pump, for grounded loads, as shown in Fig. 3. When the scheme is used with P75, it makes possible a faster unity-gain follower than is normally available.

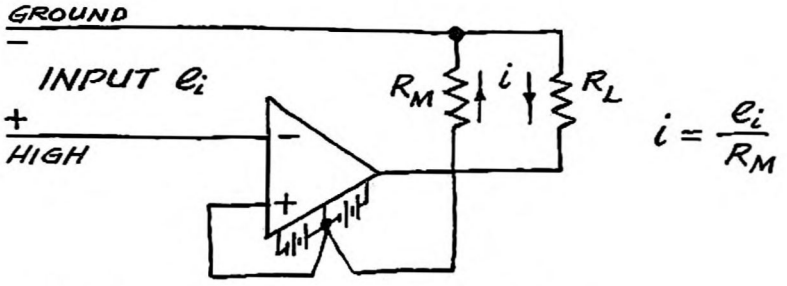

FIGURE 3. CURRENT PUMP

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