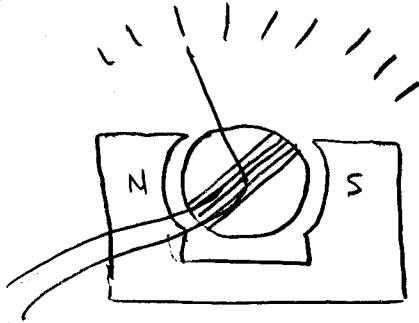


8.2 Measuring AC Quantities

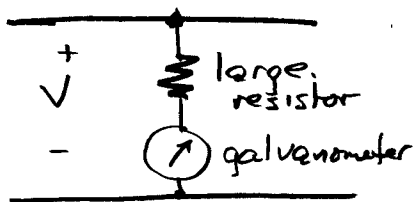
8.2.1

- You are familiar with measurement of DC voltage and current through use of a galvanometer movement

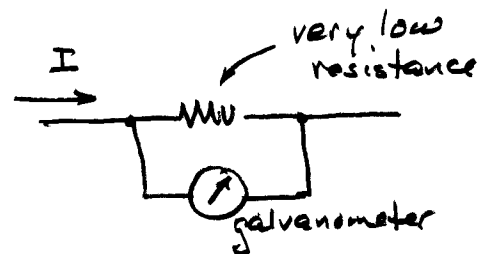


Coil mounted with a spring, deflection proportional to current through the coil.

As a voltmeter:

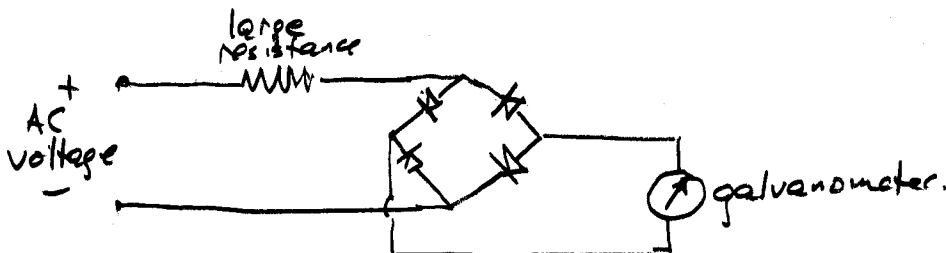


As an ammeter:



They won't work for AC, since the average torque on the coil is zero.

- One solution: rectify first, as in this voltmeter



But diodes are not perfect, esp for small voltages.

- Another solution – don't use a permanent magnet.

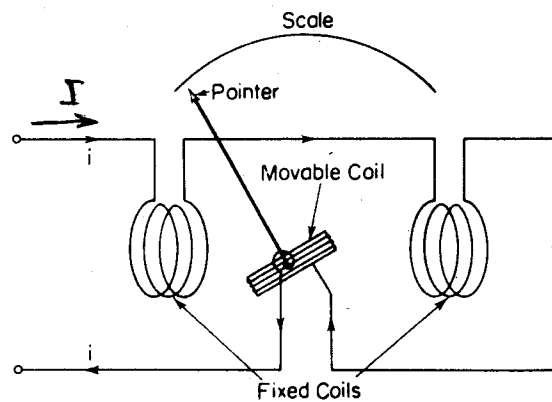


Figure 4-30 Schematic diagram of an electrodynamicometer movement.

The B field and the coil current are both proportional to $|I|$, so torque and deflection are ppl to $|I|^2$.

The deflection is not linear in current – smaller values are crowded.

Not very sensitive – air, not iron.

- If we separate the fixed and movable coils electrically, we have the basic mechanism of the wattmeter.

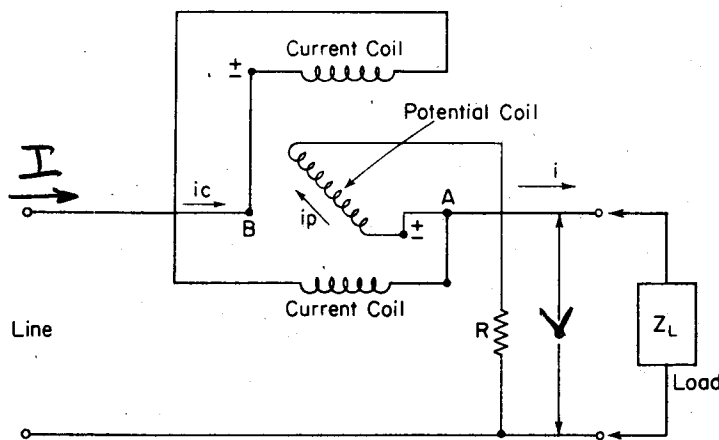


Figure 4-40 Diagram of an electrodynamicometer wattmeter connected to measure the power of a single-phase load.

- B field is proportional to $|I|$
- Movable coil current ppl to $|I|$
- Avg torque is ppl to $|I| |V| \cos(\theta)$
pf