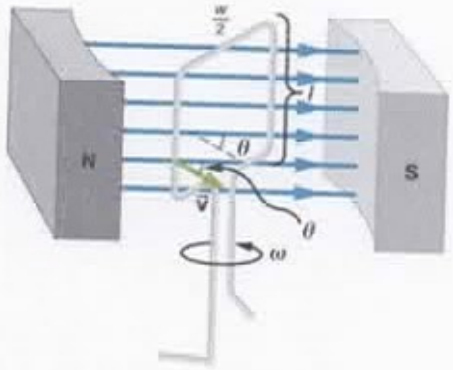

Figure 3: A schematic of the concept of an AC generator.

12. Suppose the AC generator in Fig. 2 has $V_0 = 12$ V so that $\epsilon(t) = V_0 \sin(\omega t)$. If the AC generator pushes current through a resistance $R = 50\Omega$, what is the average power generated?

$P = IV$

$P = I^2 R$

$\epsilon(t) = V_0 \sin(\omega t)$ ~~$12V \sin($~~ $12V$

$V_{RMS} = 0.707 (V_0 \sin(\omega t))$ $0.707 \cdot V_0 = 8.484V$

$I_{rms} = \frac{V_{rms}}{R} = \frac{8.484V}{50\Omega} = 0.17A$

$P_{average} = I_{rms}^2 R$

$P_{average} = (0.17A)^2 (50\Omega) = \boxed{1.45W}$