Simple induction motor electric meter
(A brief explanation of the principles for those who know some calculus-based E&M).

Assume $V_1$ and $V_2$ are a.c. voltages at frequency $\omega$. The currents $I_1$ and $I_2$ need to be 90° out of phase. One way to do this is to use a capacitor and choose values so that $\omega L << R << 1/\omega C$, where $R$ is the (d.c.) resistance of the electromagnet(s). As will become obvious, the electromagnets should be physically near each other. Note that $B_i$ is proportional to $I_i$, and $B'_i$ to $I_i$. The details of those proportionality constants are hidden in the constants $B_a$ and $B_b$ respectively.

Then at any given time, $B_i$ and $B'_i$ are opposite, while $B_i$ and $B'_i$ are in the same direction.

When $B_i$ and $B'_i$ are in the same direction, a net attraction results. While $B_i$ and $B'_i$ being in the opposite direction are always repelled. Both cause the disk to rotate in the same direction. Hence, the disk will turn in the direction indicated above. (Other forces present provide no net torque).

Note that the net torque will depend on the product of $B_a$ and $B_b$. If $B_a$ is proportional to the voltage across the power lines, and $B_b$ is proportional to the current through the lines (or vice versa), then the torque produced is proportional to their product, which is the power being delivered by the power lines.

A permanent magnet is placed across the other side of the disk to provide magnetic damping ("friction") which is proportional to the spinning rate. The equilibrium spinning rate is when the torque provided by the electromagnets matches this damping (similar to a terminal velocity calculation for a falling object). Hence, the equilibrium spinning rate will be proportional to the power being used.

Using gears or other means, the number of rotations is counted and will be proportional to the rotation rate times time. That count is proportional to power times time, which is the total energy which was used.