

D.C. Motor/Generator

You need both a magnetic field and an electric current to make a motor turn.

Try this:

- Close the switch to make electricity flow.
- Bring the magnet in from the side to make the motor turn.
- Turn the magnet over and notice that the motor spins in the opposite direction.

What's going on?

All electric motors work for the same basic reason: when electricity flows through a wire when a magnet is nearby, the magnet pushes on the wire. Without either the electricity or the magnet, there is no "push" to make the motor turn. Turning over the magnet reverses the direction of the magnetic field, reversing the direction of the "push."

Every direct-current motor is also a generator.

Try this:

- Open the Bulb Switch and turn Crank A. Notice that Crank B also starts to turn.
- Turn Crank B and notice that Crank A starts turning.
- Close the Bulb Switch and turn either crank. Notice that your cranking turns on the bulb, and that it's harder to turn the crank.

What's going on?

These two motor/generators are exactly the same. The one you turn acts as a generator of electricity, while the one that turns in response acts as a motor.

When you close the switch, you add a light bulb to the circuit. The extra work required to light the bulb makes the crank harder to turn.