

Motor-Build Lab

Materials used:

- Wooden board
- Magnets
- Flexible, insulated, copper wire
- Stiff copper wire
- Wires with alligator clips
- Electrical tape
- Adjustable power supply

Procedure:

1. Board was laid out, and small holes were drilled into the board, several inches apart
2. Loops were bent into one end of the stiff copper wires, and the other ends were stuck into the drilled holes
3. The insulated copper wire was bent into a many-looped coil, with the ends of the wire sticking out on each end
4. The insulation on each end of the wire was sanded off on one side, creating exposed conducting surfaces
5. The ends of the wire coil were placed in the loops in the stiff wire, suspending the coil in the air
6. A pole of magnets was placed below
7. The alligator wires were connected between the stiff wires and the power supply
8. The power supply was turned on, and the wire coils were given a slight nudge
9. Spiiiiinnnn!!!!

Results:

When the power supply was turned on, the wire coils began to spin around their axis. Varying the voltage of the power supply changed the speed at which the motors rotated; the more voltage, the faster they spun. Reversing the polarity of the power supply wires caused the coil to spin in the other direction. Additionally, the motor would spin faster if the magnet stack was closer to the motor, or had more magnets connected together.

Conclusion:

The observations are in line with the right-hand rule, which is a way to remember the directions of magnetic forces in relation to a current. It states that if you hold your right hand out with your thumb pointed upwards, your pointer directly ahead, and the middle finger to the left, then the middle finger will represent the direction of current, the pointer finger represents the Magnetic field, and the thumb will represent the direction of force. From this, if you align your middle finger with the direction of current in the motor, and the pointer finger with the magnet stack, the direction of force will be pushing on the sides of the coil, causing it to spin.

