## AIM

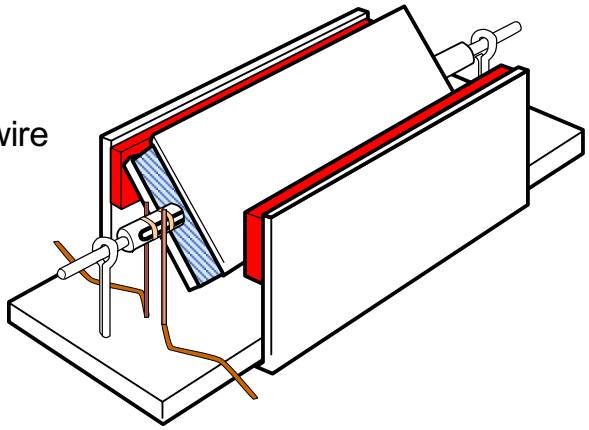
To construct a D.C. motor utilizing the fact that a current carrying conductor experiences a force when placed in a magnetic field.

## BACKGROUND INFORMATION

An electric motor converts electrical energy into mechanical energy. The reverse process, which of converting mechanical energy into electrical energy, is accomplished by a generator or dynamo. Traction motors used on locomotives often perform both tasks if the locomotive is equipped with dynamic brakes. Electric motors are found in household appliances such as fans, refrigerators, washing machines, pool pumps and fan-forced ovens.

## EQUIPMENT

- Wire cutters
- Soldering iron
- Solder
- 5 Amp ammeter
- Sellotape
- Thin insulated multi-strand copper wire
- Wood base with tin plate supports
- Two bar magnets
- Leads
- Cable ties
- Steel knitting needle
- Scissors
- Copper foil
- Large and small corks



## METHOD

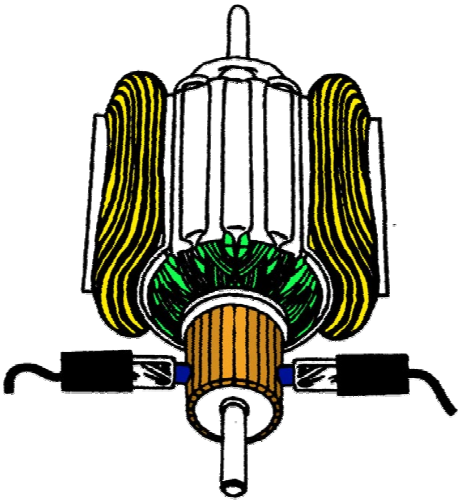
1. Push one of the skewers through the centres of the cork.
2. Glue two pieces of foil onto the small cork with two thin gaps between them to make a split ring commutator.
3. Wrap the thin copper wire around the thick cork 50 times. Hold in place with adhesive tape.
4. Strip the ends of the wire and connect to each of the foil strips of the commutator.
5. Make sure that the centres of the commutator strips line up with the centre of the coil endings.
6. Push the other skewers into the foil to support the coil and commutator.
7. Use the foil to make a set of brushes and use drawings pins to position them so that they touch opposite sides of the commutator.
8. Position the two magnets on opposite side of the coil so that North Pole faces South Pole.
9. Connect the DC supply of the brushes and observe the motion of the armature.to.
10. Vary the spacing of the magnets.
11. Find two ways to reverse the direction of rotation of the armature.

## RESULTS

My DC electric motors use 'drum' armatures that usually consist of a large number of windings set in longitudinal slits in the armature core, and connected to the appropriate segments of a multiple commutator. The DC motor was running successfully by the current produced will rise and fall depending on the part of the magnetic field through which the loop is moving. A commutator of many segments used with a drum armature always connects the external circuit to one loop of wire moving through the high-intensity area of the field, and as a result the current delivered by the armature windings is virtually constant.

## DISCUSSION

Most of the obstacles I ran across were detailed above, however, I will include a brief summary of them here, and details of other hurdles not previously mentioned. The main problem I had was fmding a pair of radial magnets. I knew others would have difficulty obtaining a set, and so I put a lot of effort into locating a store that sells them. I found many small pairs, but none that would fit my armature. Alas, it was not to be. Hence, I did the next best thing I created my own. My makeshift radial magnets worked better and were stronger than any I had seen. In an armature having only one loop of wire, the current produced will rise and fall depending on the part of the magnetic field through which the loop is moving. A commutator of many segments used with a drum armature always connects the external circuit to one loop of wire moving through the high-intensity area of the field, and as a result the current delivered by the armature windings is virtually constant. The fields of modern motors are usually equipped with four or more electromagnetic poles to increase the size and strength of the magnetic field. Some motors may also include smaller inter-poles, which are added to compensate for distortions in the magnetic flux of the field caused by the magnetic effect of the armature.



A simple DC electric motor. When the coil is powered, a magnetic field is generated around the armature. The left side of the armature is pushed away from the left magnet and drawn toward the right, causing rotation.

## CONCLUSION

In conclusion the experiment was conducted successfully. The DC motor rotated which experienced forces, when placing near a magnetic field. The motor was utilising the current from the DC power supply.