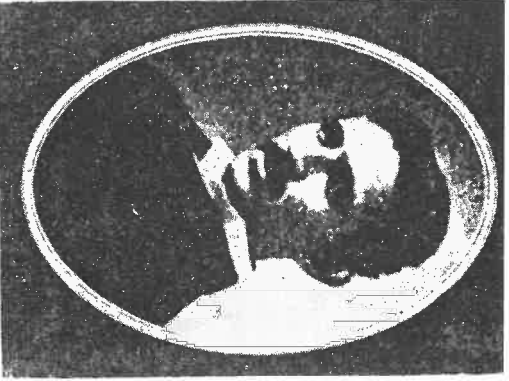


5 NIKOLA TESLA'S A. C. INDUCTION

motor



Nikola Tesla was born in 1857 at Smiljan and was educated first at Graz and then at the University of Prague.

While still a student he began working on electric motors. Till then all electric motors had operated on direct current (d. c.), but this form of motor had a number of disadvantages.

All electric motors operate on these simple principles:

1. when an electric current is passed through a conductor, it makes it into a magnet — an electro-magnet;

2. like poles on magnets repel each other and unlike poles attract.

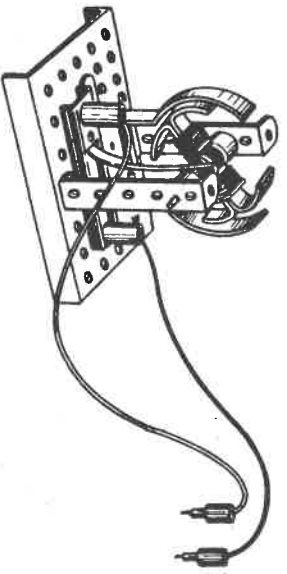
The disadvantages of the d. c. motor were that it required a commutator to switch the polarity and brushes to induce the current in the armature.

Tesla solved these problems by making an induction motor operating on alternating current (a. c.). Since the direction of flow in alternating current is continually reversed, there is no need to have a switching device on the motor itself.

In Tesla's induction motor the current is fed only to the stator magnet. The alternating current repeatedly changes the polarity of the magnet and so sets up a rotating magnetic field. The freely rotating armature, placed inside the stator, does not need to be separately magnetized. The current in the stator induces the current in the armature, which then creates poles on it. These poles are attracted by the rotating field of the stator and so the armature rotates.

By varying the strength of the current passing into the stator, it can be made to rotate at different speeds.

Tesla patented this motor in 1888 and since then it has been used in many different appliances. The induction motor is easy to build and is widely used both in industry and the home.



CHECK YOUR UNDERSTANDING OF THE TEXT

1 Say which of these statements are true and which are false. Give reasons for your choice.

1. Nikola Tesla was first educated in Prague and then at the University of Graz.
2. He started to work on electric motors in Smiljan.
3. He invented an electric motor which operated on d.c.
4. He was not satisfied with his invention, so he tried to find something better.

5. An electric motor needs two magnets.
6. Both magnets have to rotate so as to produce another driving force.
7. Like poles repel. This is one of the principles used in the electric motor.
8. All electric motors need a commutator to switch the direction of flow of the electric current and brushes to induce the current in the armature.
9. The direction of flow is continually changed in both d.c. and a.c.

10. In Tesla's induction motor only the stator has to be connected to the a.c. supply.
11. The alternating current changes the polarity of the magnetic field, by changing the direction of the flow.
12. The freely rotating armature is separately magnetized in the a.c. motor.
13. The rotating speed of the armature can easily be varied by changing the strength of the a.c.
14. Tesla's electric motor has been in use since 1888.
15. Tesla invented his motor in 1888.

2 Answer these questions:

1. Who was Nikola Tesla?
2. Where was he born and where was he educated?
3. When did he die and where?
4. What did he invent?
5. When did he start to work on an electric motor?
6. Why was he not satisfied with the existing d.c. motor?
7. What are the basic principles of all electric motors?
8. What is the advantage of the a.c. motor compared with the d.c. motor?
9. Where is the a.c. induction motor used in everyday life?