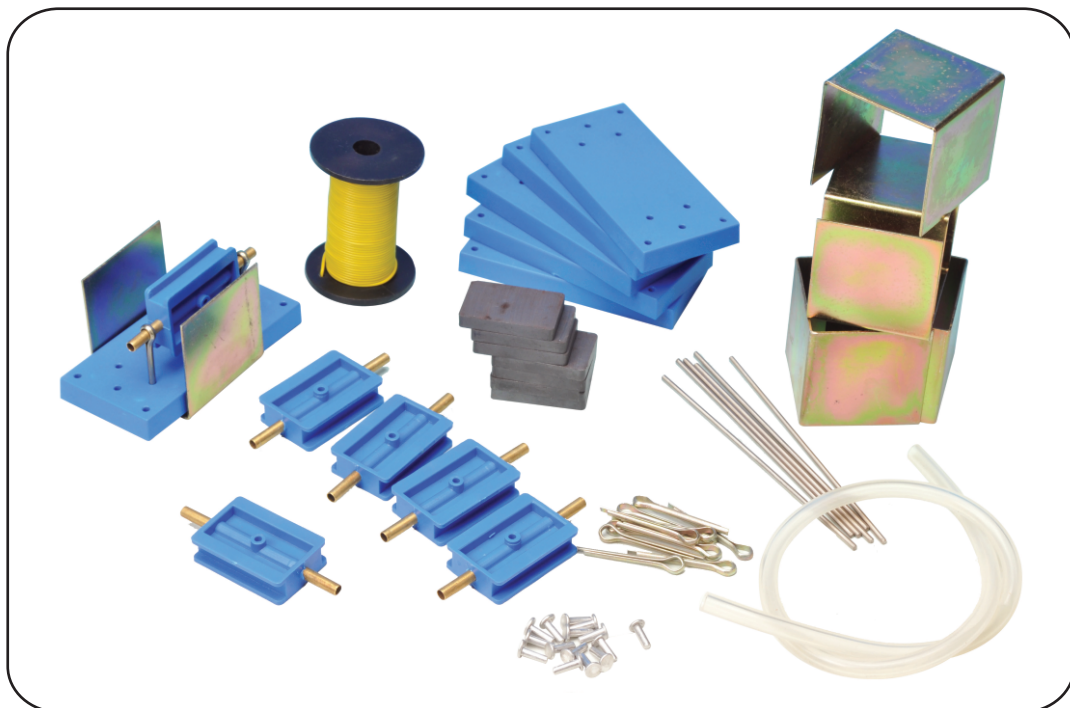




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ELECTRIC MOTOR KIT

CAT NO. PH1239

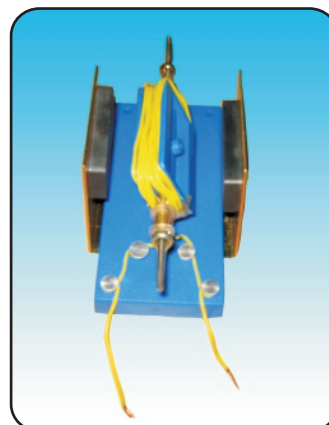


Instruction Manual

INTRODUCTION

This kit assists pupils to investigate the principle, design and operation of the electric motor. This kit enables students to handle apparatus assembled and built by him and for this reason it is most important that each pupil should have his own kit. At the most students should work in pairs.

All coils are wound by students himself from a reel of PVC wire which is regarded as expendable. With the special low voltage high current supply only a few turns are necessary. Students can therefore wind these in minutes or so.



CONTENTS

This kit has sufficient quantities to make up 6 motors.

Plastic support	6pc
Plastic armature	6pc
Shaft	6pc
Magnet	12pc
Mild steel yoke	6pc
Rivet	24pc
Split pins	12pc
Plastic covered copper wire	1 reel
Rubber tubing	300mm
Cello Tape	2pc

CONSTRUCTION

The armature is made from a block with a brass tube pushed through. The field is provided by the magnets held in place on the mild steel yoke by attraction. A shaft is put through the brass tube in the armature block, and this provides a convenient bearing.

This in turn is supported from the base by split pins.

It should be noted that the split pin may be rotated so that the needle shaft jams in the eye of the split pin and thereby encourages rigidity. There are holes in the base to take the rivets used in fixing leads, spirals, etc.

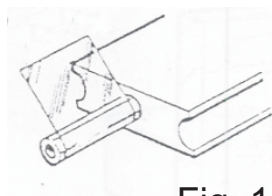


Fig. 1

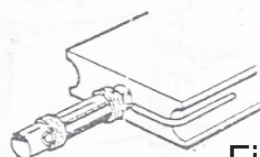
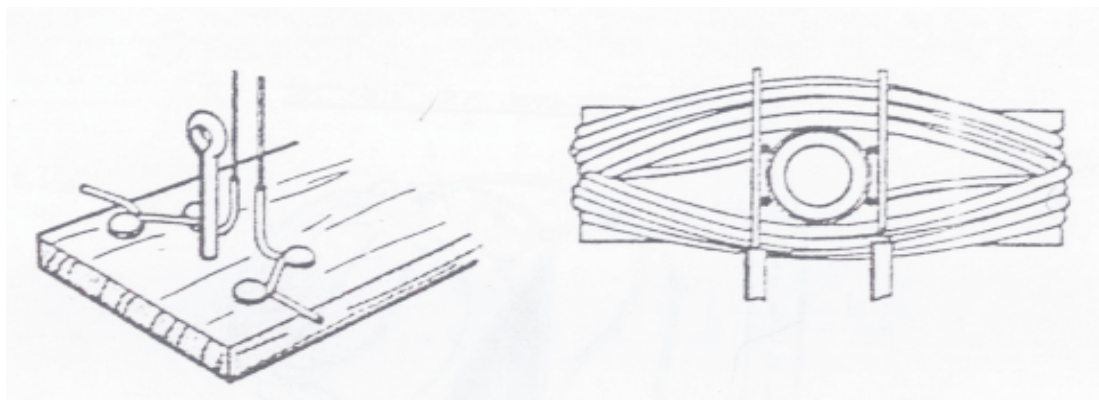


Fig. 2

To construct a motor first insulate one end of the brass tube with cello tape fig 1. Then cut two slices of the rubber tubing to make two rubber bands which are slid over the end of the tube. Bare an end of the PVC wire and loop as shown in the figure 2 and fix in place with the rubber bands. Wind about ten turns on the armature and cut off leaving enough to finish the other side of the this end against the cello tape on the opposite side of the brass tube from the original loop. Finally, return the rubber bands to retain both ends of the armature in position.

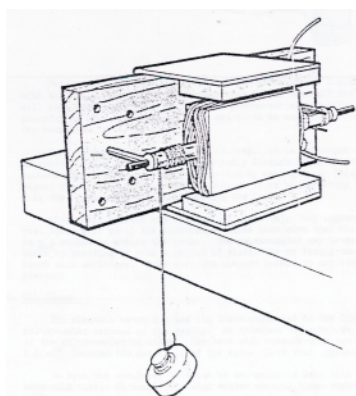
The looped ends are not strictly necessary a straight end would suffice, but the loop enables contact with the brushes to be maintained over a greater part of a revolution.



The brushes consist of two lengths of wire, which also serve as leads to the supply. They are attached to the fixing rivets pushed into holes in the base, being firmly held in place by the rivet heads. The ends are bared and bend to bear against the commutator. The wires should be bend vertical and almost touching. The commutator part of the armature can be eased gently between them pushing them slightly apart. Finally holding the armature in this position insert the shaft through the brass tube. Apart from the slight friction of the brushes the armature should spin freely when twisted with the fingers. Note that contact with the coil is in the horizontal plane is particularly important.

Field is provided by two magnets and the mild steel yoke. When the supply is connected a slight twist of the armature will start the motor which revolves at high speed.

TRANSFERRING ENERGY WITH THE MOTOR



The Motor will raise a 5gm weight, or a lump of plasticine tied to the brass tube by a cotton thread. The cotton was threaded between the armature and the coil and made fast to the coil.