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## Experiment : 3

Object :

To understand the construction principle of working , electrical circuit , dismounting , assembling , possible faults , testing method of following electrical appliance i.e. electrical iron

- 1 Non-automatic
- 2 Automatic with wats

### Constraction :

## Sole Plate

The sole plate is the thick, triangular-shaped slab of iron that forms the base over which the electric iron is built up. The bottom surface and edges are heavily chromium plated, to prevent it from rusting. The base plate should hold the iron pressure plate and cover plate in position. For this purpose we can see two or sometimes three studs in the base plate. These studs aid in holding the position of cover plate and pressure plate.

#### Pressure Plate

This plate is generally called the top plate as it follows the shape of sole plate. The pressure plate has some holes through which the studs form the base plate passes through. We should tighten the nuts on the studs in such a way that the pressure plate and sole plate are pressed tight against each other. In some iron the pressure plate is heavy and made of cast iron while in some other cases, it is a thin sheet of steel, about ¼ cm thick.

In automatic type of electric iron, the pressure plate has a rectangular or circular hole for locating the thermostat.

### The Heating Element

The heating element is present between the sole plate and pressure plate. It is pressed hard between the two plates. The heating element consists of nichrome wire wound around a sheet of mica. The two ends of the nichrome wire are connected to the contact strips. The contact strips are connected to the terminals of the iron. There are two reasons for which mica is chosen in the heating material. Mica is a very good insulating material. Besides that mica can also withstand very high temperatures. The entire assembly of mica sheet, nichrome wire and contact strips are riveted together resulting in a mechanically sound and robust construction. There is an asbestos sheet, which separates and thermally insulates the top plate from the heating element.

### The Cover Plate

The cover plate is made of thin sheet of iron. It is placed on top of the base plate and it covers all the internal parts of the iron. The handle and connector are only attached to the cover plate.

### Handle

The handle can be made either with wood or with plastic. The handle is attached to the cover plate with the aid of screws. Studs can also be used for this purpose.

## Pilot Lamp

The pilot lamp is housed in the cover plate of the electric iron. One end of the pilot lamp is connected to supply, while the other end is connected to the heating element. A shunt resistance is provided across the pilot lamp which assists in providing a voltage drop. The shunt is designed to provide a voltage drop of 2-5 volts.

### Thermostat

When it comes to an automatic electric iron, the thermostat is the most important item. It uses a bimetallic strip to operate the switch which is connected in series with the resistance (or) heating element.

The bimetallic strip is a simple element which converts a temperature change into mechanical displacement. A bimetallic strip consists of two different metals bonded together. The two metals should have a different coefficient of expansion. If such a strip is heated, it starts to curve towards the metal having the lower co-efficient of expansion. On cooling, it straightens and comes back to the normal position.

Now we might wonder why such an element is used in iron. What is the purpose of this element in an electric iron?

The bimetallic strip is attached to a contact spring through small pins. The contact point between the strip and contact points remains closed. When the temperature rises significantly, the unusual expansion causes the strip to curve and the contact between strip and contact spring opens. Thus the supply to heating element is temporarily stopped (until the temperature goes down to normal). A special device called the cam is placed is placed near the contact spring, with which we specify the amount of curving of bimetallic strip required to separate the contact. Thus using bimetallic strip the temperature is kept constant within certain limits.

## Capacitor

The thermostat helps in maintaining the temperature within limits. But frequent making and breaking of circuit damages the contact points and it may also result in interference with radio reception. To avoid this, a capacitor of certain range is connected across the two contact points.

## REPAIRING

there are many problems that can come up with iron. The following are some of the common dry iron problems along with their possible solutions.

- Dry Iron not heating enough
  - PROBLEM: One of the most common troubles with dry irons is iron not heating enough.Â The possible causes for this could be wrong thermostat setting, problem with electric connections, problem with the power switch etc.

SOLUTION: Thus to resolve this problem, you first need to check if you have made all the connections properly and in accordance with the user manual. Check the power switch, the plug and the thermostat as well. The thermostat is that element of an iron which helps control the temperature and the mode. If it is set at the wrong temperature, in particular a lower one, then the iron may not heat enough. So make sure you turn it to a reasonably higher setting. Â Moreover, try changing the heating mode to see whether the heat increases.

- Dry iron not working
  - PROBLEM: Not heating enough and not working altogether are different issues. One common problem that people face is dry iron not working.

SOLUTION: If your dry iron is not working at all then in that case you need to check the power cord first. If the cord is broken or damaged in any way, then this could be a cause of the appliance not working at all. Also try changing the plug into another power outlet to check whether the issue is with the outlet or the iron. Some other reasons why your dry iron may not be working could be wrong iron setting for example auto-off setting, limescale deposits on the soleplate and others.

- PROBLEM: Any kind of iron can experience issues with the sole plate. Over a period of time and usage, a sole plate can get dirty and its holes can get clogged. This may affect its heating and overall performance.
- SOLUTION: It is thus important to clean and maintain the sole plate on a regular basis. For this, you must first remove any particles you see on the sole plate with your hand. After that, take a cloth, dampen it and put some salt on it. Now rub this cloth on the bottom of the iron to remove stains and marks. Â You can remove burn marks by directly sprinkling some oven cleaner and leave there for some time before washing with cold water.

## Iron sticking to clothes

- PROBLEM: Another common dry iron problem that you may experience is iron sticking to the clothes or fabric. This could be due to a burnt soleplate. What happens is that due to constant usage, some fabric tends to stick an burn and this can lead to a burnt soleplate. This may result in the fabric getting stuck to the deposits.
- SOLUTION: In this case, make sure you clean your soleplate properly. You can do so first making a paste of 1 tablespoon water and 2 tablespoon baking soda. Apply this to the soleplate and use it for wiping the iron clean, cleaning steam holes

# Precations at time of fixing

- 1 The surface of base plate and weight plats should be well smoothed with file and sand paper.
- 2 When asbestos sheet is used , be careful to place it between the weight plate and the upper
- side of the element to avoid the dissipation of heat to upper side of element.
- 3 There should be no gap between pressure plate and sole plate otherwise the element will be damaged very losses .
  4 Fitting should be tight enough.

## Precations at time of testing

- 1 Do the in series of the supply and check also the supply before testing.
- 2 At the time of DC supply unless you are sure that there is no defect in the iron.

# Result

Iron is successfully studied.

Dirty sole plate