1 ELECTRICAL TOOLS

1.1 AIMS AND OBJECTS OF THE ELECTRICAL SHOP

Following are the aims and objects of the electrical shop.

1. To acquaint the trainee with the names and uses of various tools, instruments, machines and materials required for working in this shop.

2. To develop sufficient practical skill and knowledge to handle job independently.

3. To enable the trainees to become a true technicians.

1.2. ESSENTIAL TOOLS AND EQUIPMENTS

Following are the essential tools and equipments of the electrical shop.

1. Screw Driver
2. Pliers
3. Knife
4. Wooden Saw
5. Hacksaw
6. Chisels
7. Hammers
8. Centre punch
9. Scratch Awl
10. Rawl plug
11. Hand drill
12. Twist drill
13. Ratchet Brace
14. Auger Bits
15. Files
16. Reamer
17. Die and die stock
18. Plumb Bob
19. Blow Lamp
20. Pipe Vice
21. Conduit pipe cutter
22. Conduit Bending tools
23. Tap set and Tap wrench
24. Wrenches.

1.3 DESCRIPTION AND USE OF TOOLS AND EQUIPMENTS

1. SCREW DRIVER :

In the electrical shop the most common and important tool is screw driver. It is used more often than any other tool. The screw drivers are available in different blade sizes and lengths. Mostly three types of screw dirvers are used in electrical shop such as (a) Standard screw dirver (b) Thin blade screw dirver and (c) Square blade screw driver.

Standard screw dirvers are used to meet different types of job. Thin blade screw drivers are used to screwing or unscrewing the small screws such as screws of switches and lamp horders.

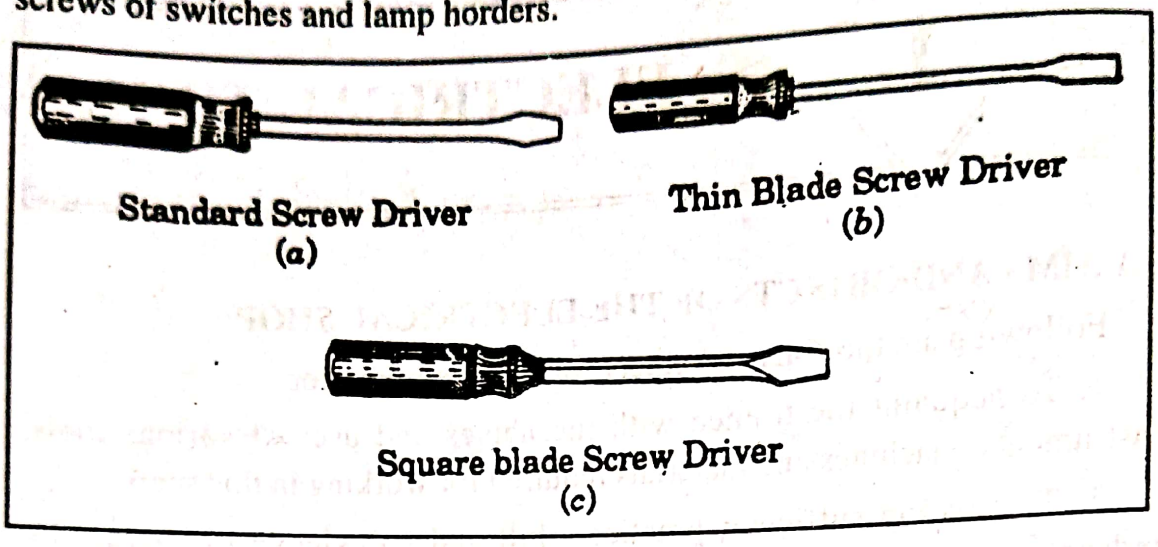


Fig.1.1 Screw Drivers.

2. PLIERS :

Another most common tool of the electrical shop is pliers. The following four types of pliers are used in elctrical shop.

(i) Side Cutting Plier. (ii) Diagonal Cutting Plier. (iii) Long Nose Plier. (iv) Slip Joint Plier.

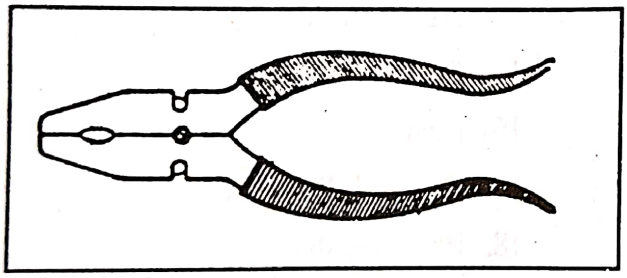


Fig.1.2 Side Cutting Plier.

(i) Side Cutting Plier : This plier usually provided with snub-nose jaws. It has a cutting edge only on one side. For general use 15 cm plier or 22.5 cm plier is used.

(ii) Diagonal Cutting Plier : Diagonal cutting pliers are used to cut the conductor of the wires terminating into the holders, switches etc. This work is not possible by the other pliers. This plier is specially used under such odd circumstances.

(iii) Long Nose Plier : Forming eyes of the wires are made by using long nose plier. Eyes of the wires are to be used where they are held fast under the screw.

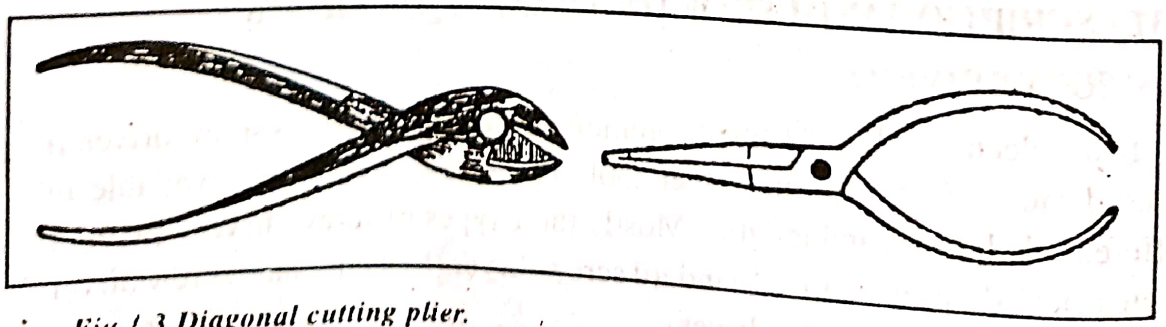


Fig.1.3 Diagonal cutting plier.

Fig.1.4 Long Nose Plier.

(iv) Slip Joint Plier : This plier has a slip joint so that the jaws of this plier can be opened to a greater width. Slip joint plier is generally used in conduit wiring. The application of this plier is in the making up locknuts and bushings and holding conduits.

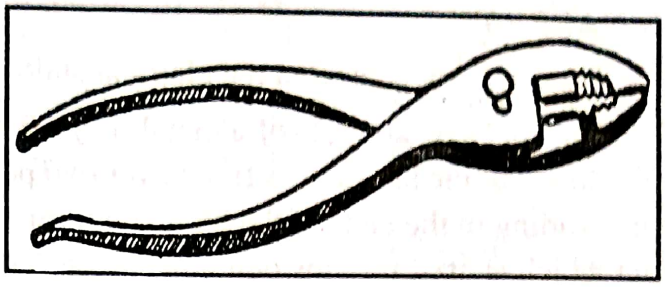


Fig.1.5 Slip Joint Plier.

3. KNIFE

Two types of knives are used in the electrical shop such as (1) Pocket knife and (2) Putty knife.

Pocket Knife : It is the most important and common tool of electrical shop. Generally pocket knife is used to remove insulation from the wires. Usually this knife is made from high grade cutlery steel. Pocket knife is always a closing type knife. In absence of this knife, a knife made from a broken hacksaw blade can be served the purpose of the pocket knife.

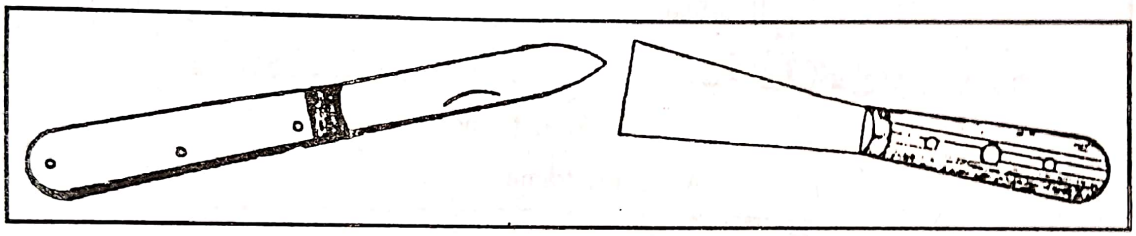


Fig.1.6 Pocket Knife.

Fig.1.7 Putty Knife.

Putty Knife : The Putty knife is used to cut out the excess part of the wooden gutties after inserting them into the holes on the wall and ceiling.

4. WOODEN SAW

For making wood casing house wiring wooden saw is used. Wood saw is used to cut casing or caping and required lengths of wooden batten for the stock. Key hole saws are used for cutting holes. Keyhole saw has a thin and

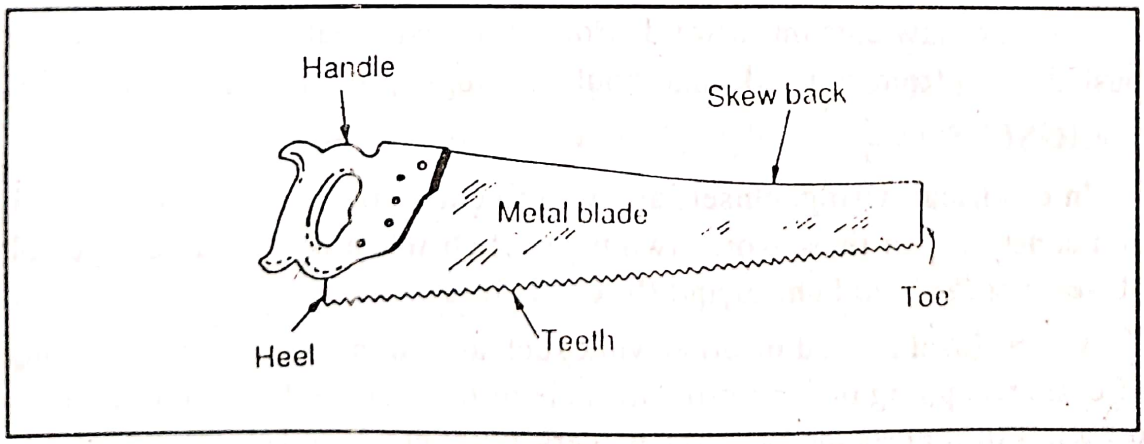


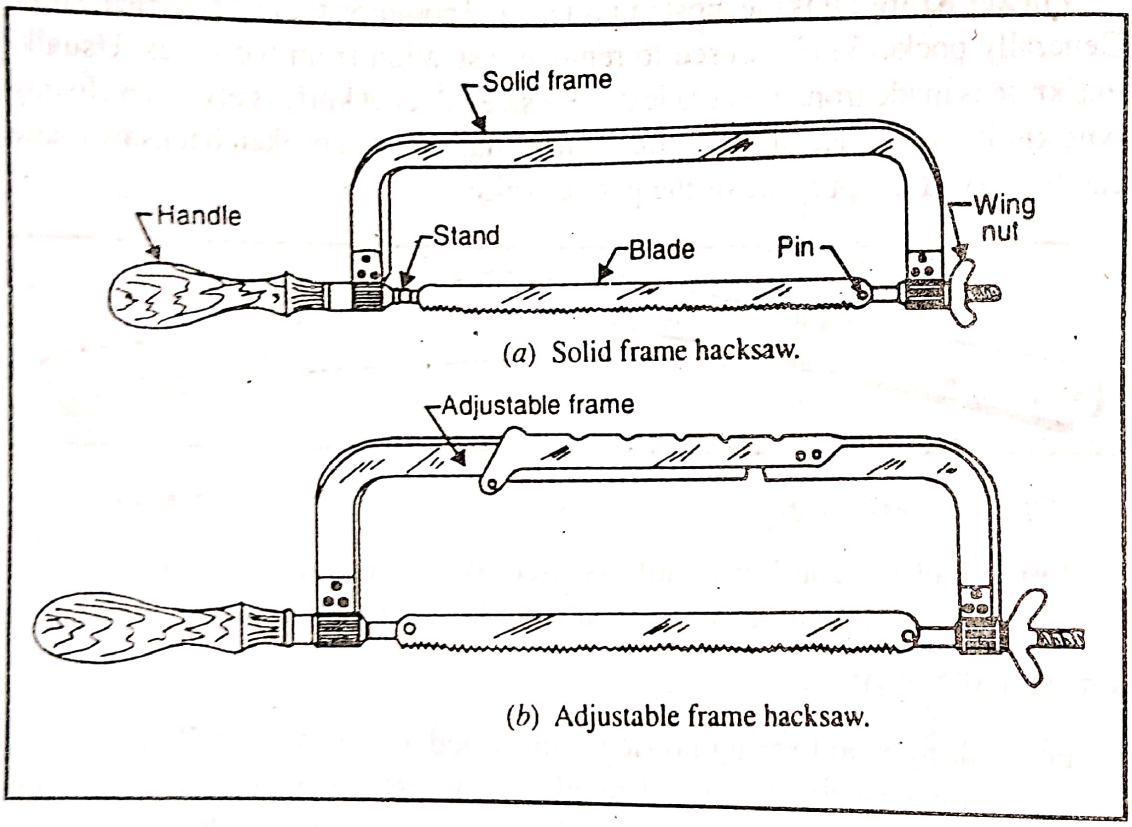
Fig.1.8 Wooden Saws.

narrow blade which is generally attached with a fly nut to the handle. The cause of this is the replace the blade when it breaks.

5. HACKSAW

The hacksaw is used in the elctrical shop to cut conduits, cables etc.

The hacksaw consists of a metal frame which may be solid or adjustable. The blade of the hacksaw is fitted over two pegs which are projected from the pins sliding in the ends of the hacksaw frame. In the front side there is a wing nut which is used for tensioning the blade. The hacksaw blade is specified by its length and the pitch of the teeth. For coarse job, the less numbered of teeth per cm of blade is used while for fine cuts, the more numbered of teeth per cm is used.



(*a*) Solid frame hacksaw.

(*b*) Adjustable frame hacksaw.

Fig.1.9 Hacksaw.

The hacksaw cuts on forward stroke. So it will make full stroke while push the saw from your side and should not apply pressure on return stroke.

6. CHISELS

In electrical wiring, chisels are used to cut wood and also to cut brick and concrete. For these works two types of chisels are used. Two types of chisels are (a) Wood chisel and (b) Cold chisel.

Wood chisel is used in wood work such as making various connections of casing, capping or for cutting the side of the wooded board for entering the wires to connect the switches, holders, plugs etc. Wood chisel is generaly bevel edge flat chisel. Cold chisels are used for the cutting of plaster or

bricks of the wall. Both the chisels are specified by the width of the cutting edge.

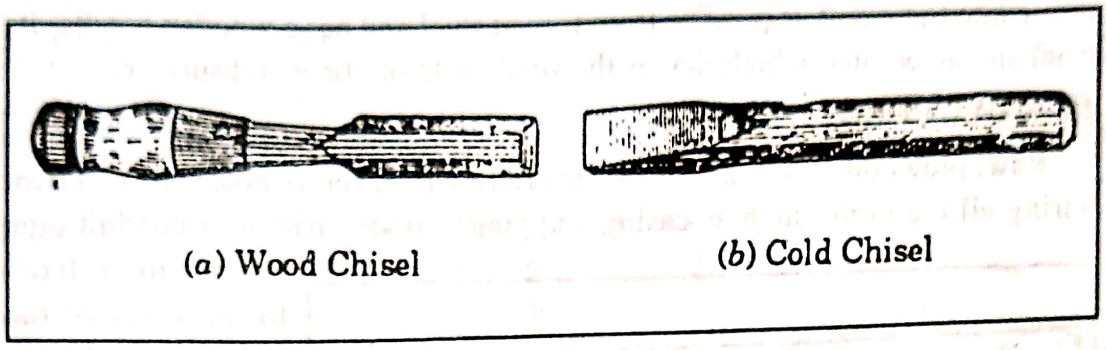


Fig.1.10 Chisels.

7. HAMMERS

For electrical wiring two types of hammers are used. Name of those hammers are (a) Straight claw hammer and (b) Ball peen hammer. Claw hammers are two types i.e. (a) Straight claw hammer and (b) Curved claw hammer. In the electrical shop straight claw hammers are used because its straight claw can be inserted behind, beneath or between the wooden boards which are to be removed.

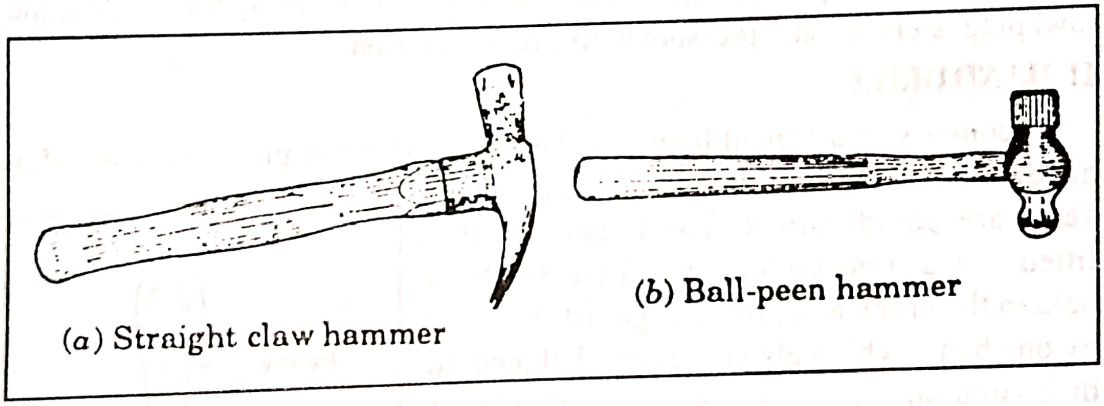


Fig.1.11 Hammers.

Ball peen hammers are used for driving nails into the wooden board or battens and also for cutting bricks, plaster and concrete during chiselling work. Hammers are specified by its weight without handle.

8. CENTRE PUNCH

Centre punch is usually used for marking the centre of the hole to be drilled in metals. It is made of high grade steel. Its both the ends are made hardened.

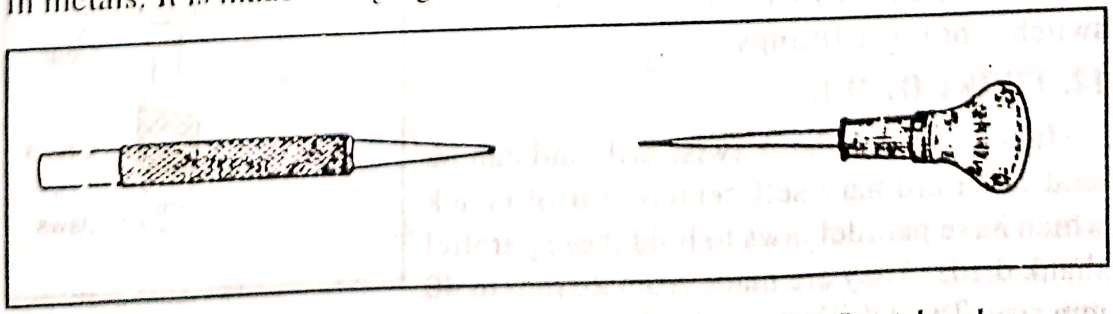


Fig.1.12 Centre Punch.

Fig.1.13 Scratch awl.

9. SCRATCH AWL

Scratch awl is used to make a small hole on the wood to insert a wooden screw into the wood. It is made from forged steel and has a wooden handle. Its front side is pointed which makes the small hole on the wood surface.

10. RAWL PLUG

Rawl plug consists of a tube of hard fibre with a centre hole. In electerical wiring all the items such as casing, capping, wooden batten or conduit pipe etc. are to be fixed to the walls of the building. All the above items are fixed to the wall by means of screw. For inserting the screw into the wall, a drill hole is to be made and that hole is made with the help of rawl plug. Two types of bits are used with the rawl plug. These two types of bits are known as bullet bit and drill bit. Bullet bit is used in soft plaster by directly pressing it into the plaster without turning the bit. While using the drill bit, the rawl plug is given hand pressure with a rotary motion.

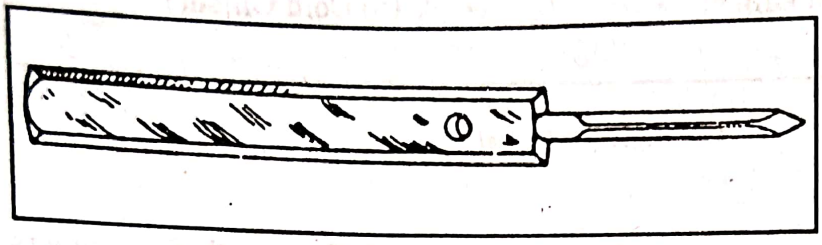


Fig.1.14 Rawl Plug.

11. HAND DRILL

It consists of a forged body, on the top of which is provided a wooden handle and at the bottom a chuck. Two bevel gears are povided in it. The larger wheel is fitted with a crank on the same shaft. The bit is held in the crank and pressed against the wood by one hand, which also holds and balance the drill simultaneously. By means of other hand, the crank is rotated, which rotates the larger wheel along with it. Thus the spindle rotates through the smaller wheel. As the spindle rotates the chuck also rotates and at the same time the drill bit also rotates. Hand drill is used to make a drill hole in wooden blocks and wooden boards to facilitate the passage of insulated V.I.R. wires which terminate into switches or other fittings.

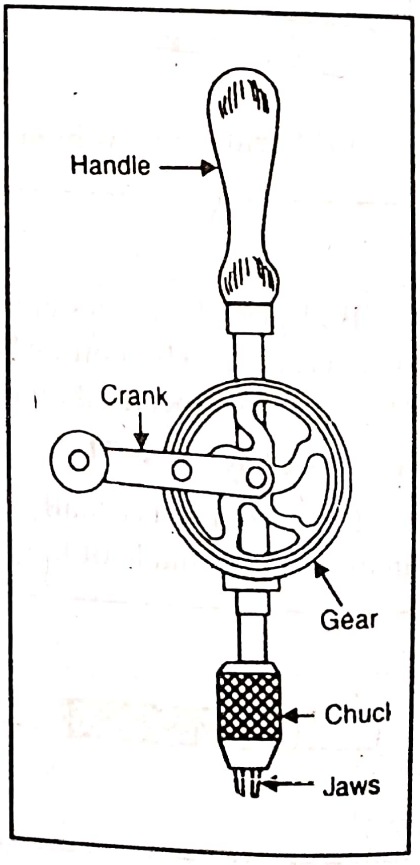


Fig.1.15 Hand Drill.

12. TWIST DRILL

It is a parallel shank twist drill and can be held in an ordinary self centering drill chuck which have parallel jaws to hold these parallel shank drills. They are made from 20 mm to 40 mm size. Twist drill is used in electric drill and

hand drill machine to drill holes into the metals. Such drill is also used for drilling holes into wooden boards etc.

13. RATCHET BRACE

Ratchet brace is used for holding different types and sizes of bits for producing holes in wood. It consists of a crank made of steel, provided with a wooden hemispherical head at the top, a wooden handle in the middle and a chuck at the bottom end. The facility of this brace is that its bit rotate in only one direction and when the crank is rotated in reverse direction the bit does not rotate.

For drilling hole near the corners, corner brace is used. The arrangement of this brace is that the hole will be slanting depending upon the place where a hole is to be made. Drilling a horizontal hole in a joist can be done by the joist boring machine from the floor level.

14. AUGER BIT

It is a fluted body having two cutting lips and a screw point at its bottom. The cutting work is done by one of the cutting lip and the other cleans the hole and thus prevents the fluted body from clogging to the wood. As the whole body beings fluted, it is easier to remove of cut pieces of wood or its shavings. This bit is used for drilling deep holes.

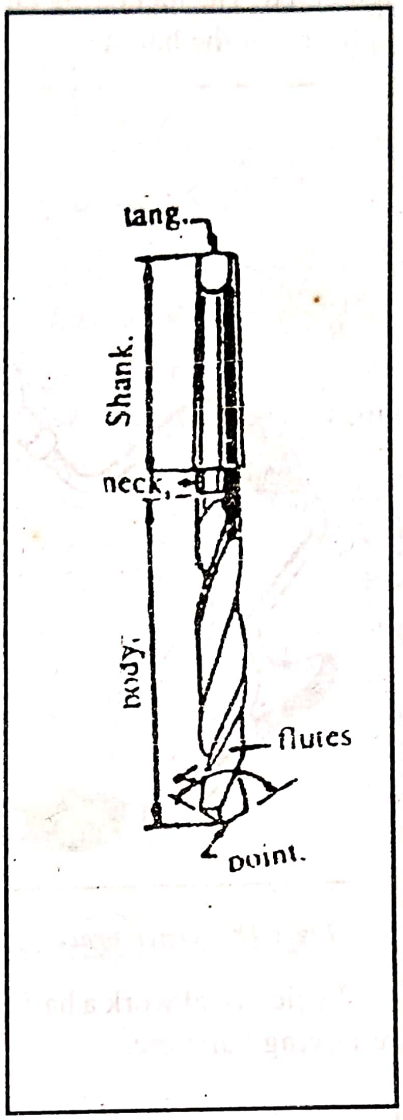


Fig.1.16 Twist Drill.

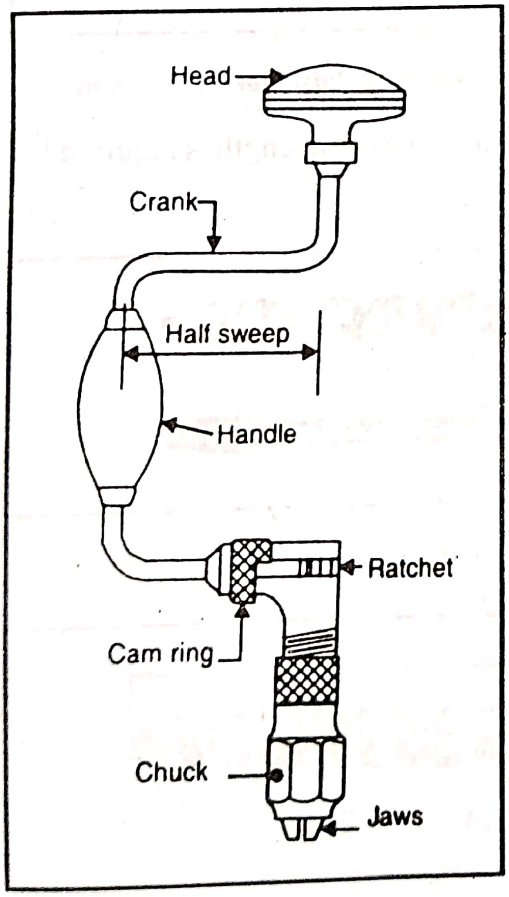


Fig.1.17 Ratchet Brace.

15. FILES

A file is a hardened piece of high grade steel with slanting rows of teeth. It is used to cut, smooth or fit metal parts. It cuts all metals except hardened steel and it cuts only on the forward stroke. It cosists of a blade or body with a tang for fixing into

16. REAMER

The burrs or sharp edges formed on the conduit after cutting it with a pipe cutter or with a hacksaw, are removed by means of a reamer.

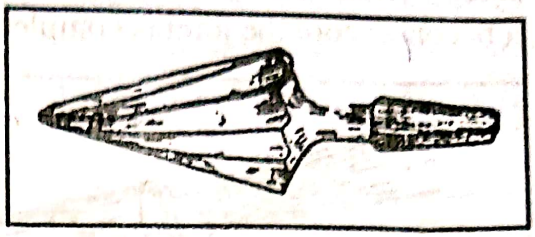


Fig.1.22 Reamer.

17. DIE AND DIE STOCK

Dies are used to cut external threads on cylindrical parts like conduits. Two types of dies are used namely solid die and adjustable die. A solid die stock consists of a single block of steel having two handles which can carry dies. In an adjustable die with stock, the adjustable die is capable of cutting external threads on varying diameter on the conduit.

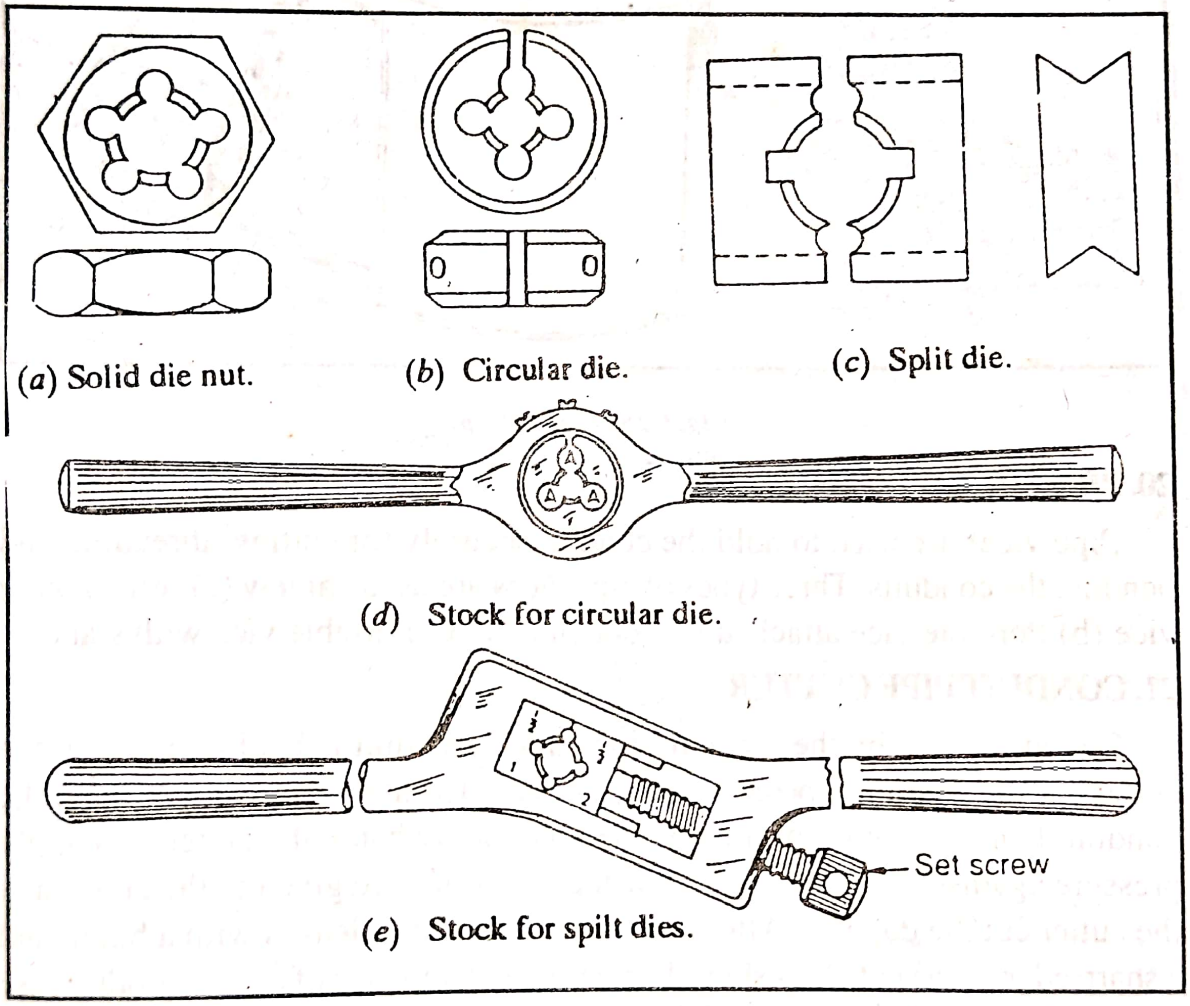


Fig.1.23 Die and die stock.

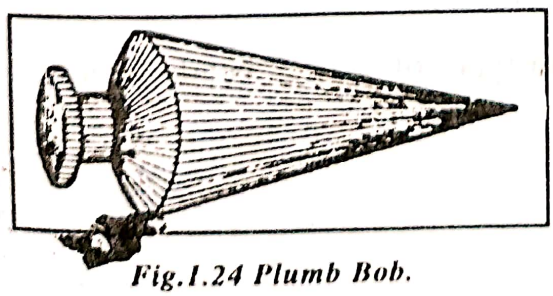


Fig.1.24 Plumb Bob.

18. PLUMB BOB

Plumb bob has pointed end with a hole at the top for attaching a string and is used to establish a true vertical line.

19. BLOW LAMP

The blow lamp is used for cable joining

With the help of rotating screw the jaws of the adjustable wrench can be adjusted.

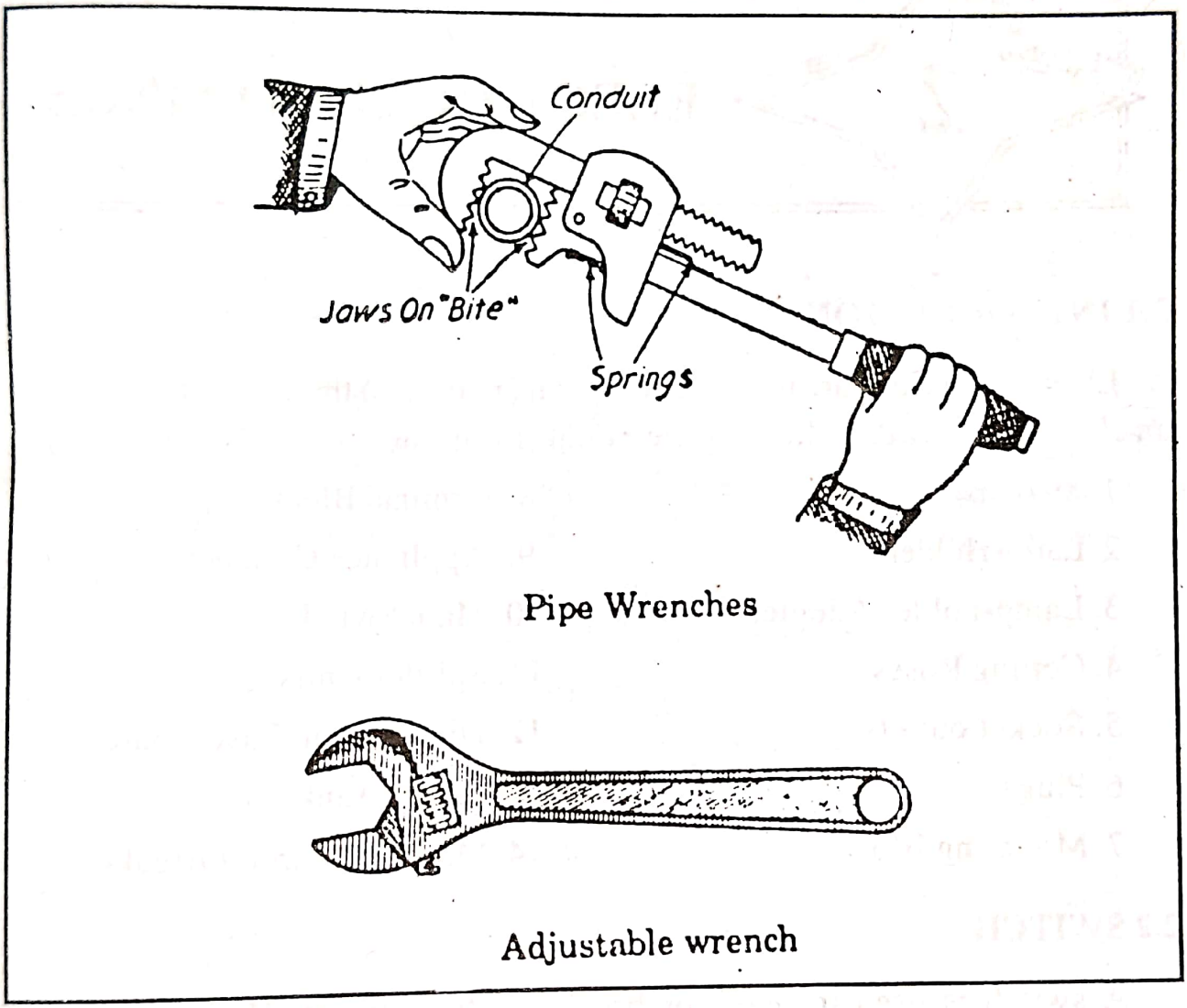


Fig.1.33 Wrenches.

EXERCISE—I

1. Name the tools usually require in the electrical works.
2. Describe different types of brace and bit ?
3. Describe the vices used in the electrical shop.
4. Describe each type of conduit bending tool.
5. Describe the wrenches used in the electrical shop.

controll the movement of the blade and thus it opens or closes. This switch is used for starting motors in automobiles and for controlling the light system in refrigerator.

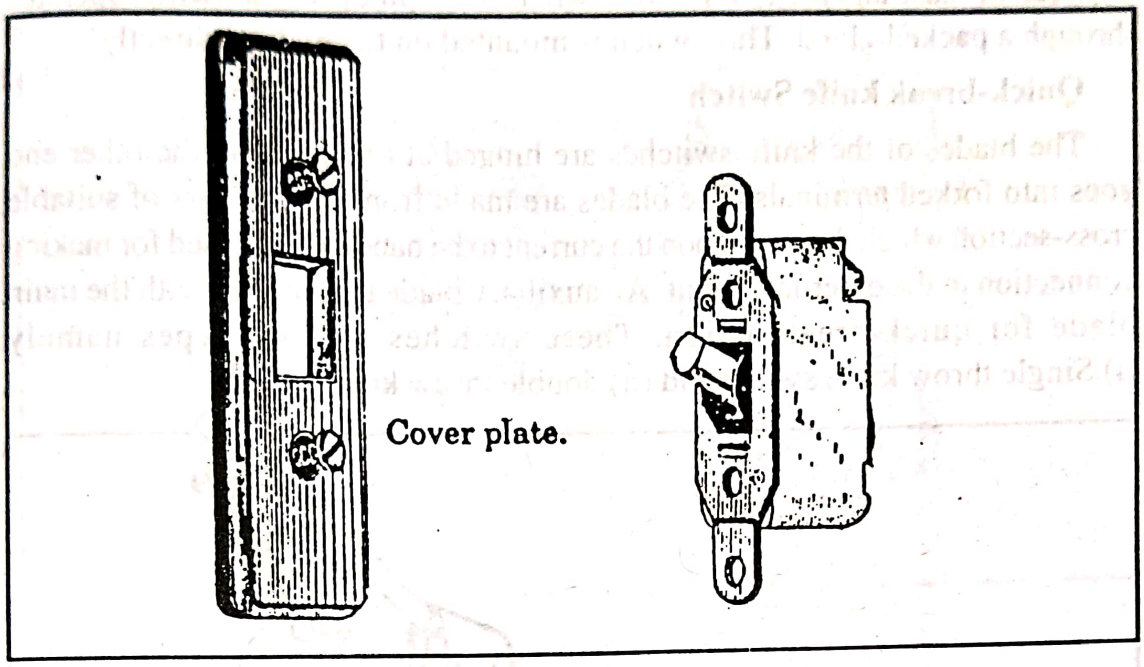


Fig.2.5 Architrave Switch.

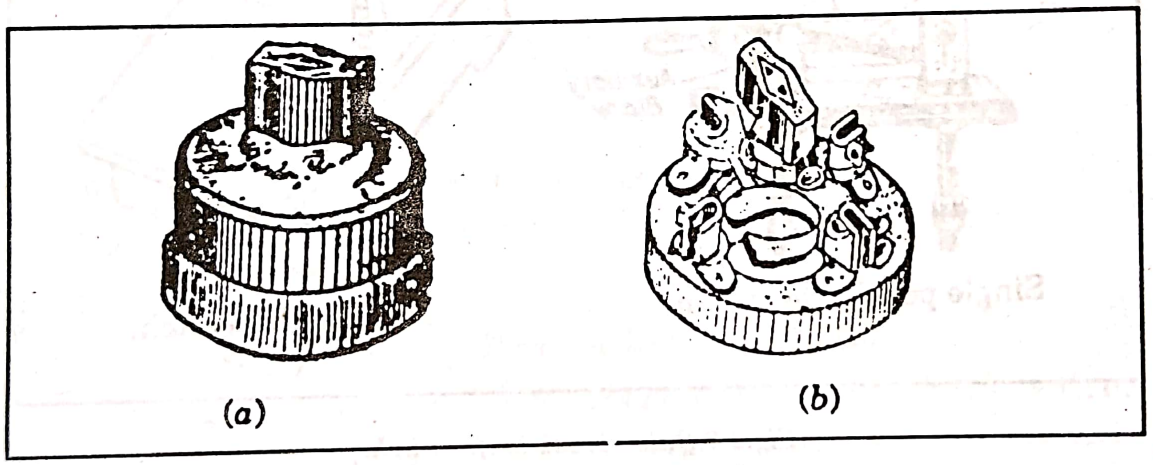


Fig.2.6 Rotary Snap Switch.

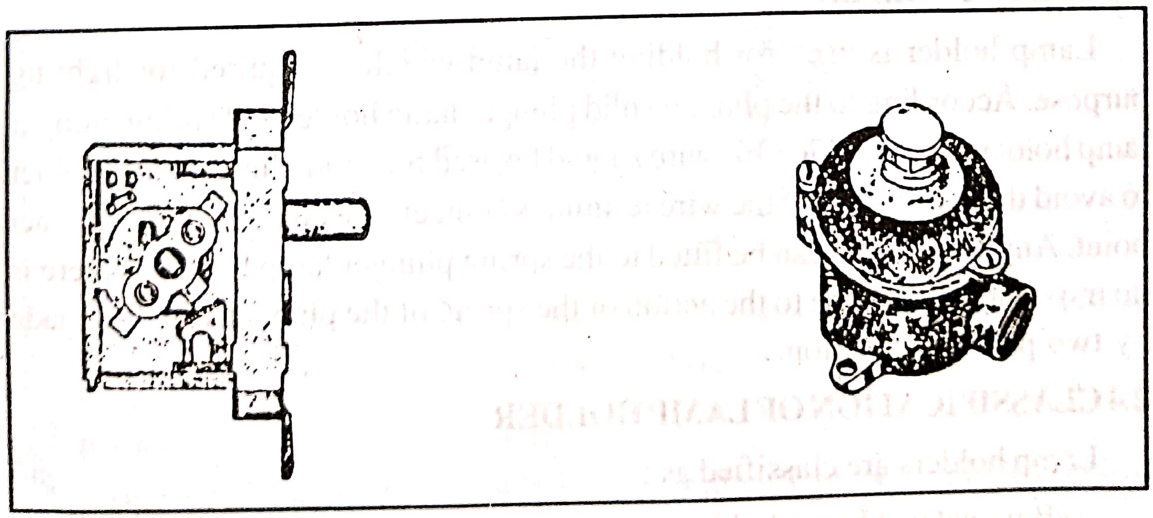


Fig.2.7 Push button switch.

Fig. 2.8 Iron-clad water-tight switch.