Free hand drawing of - Geometrical figures and blocks with dimension

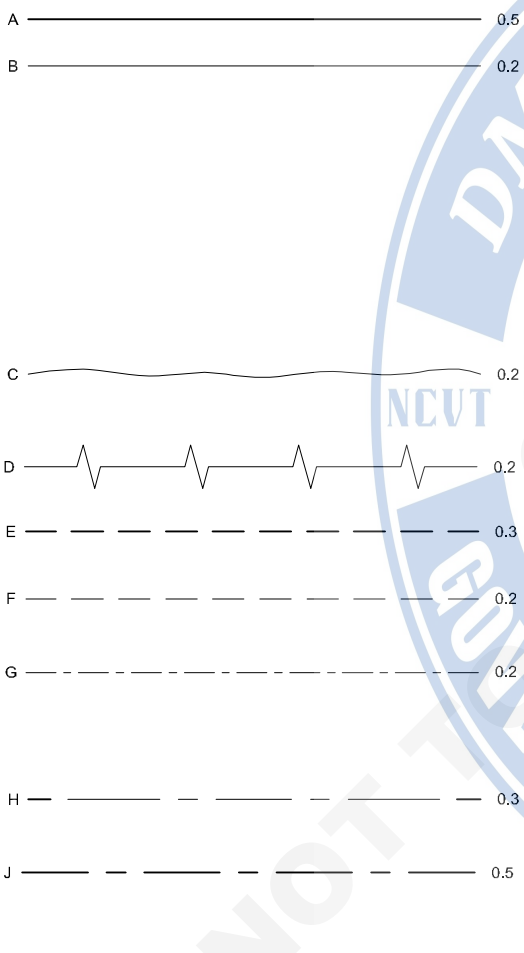
Drawings are made up of different types of lines. Just a language with alphabet and grammar.

Lines of different thicknesses and features are used for specific use.

Technical drawings are drawn with different types of lines. By proper choice and application of lines, product features can be correctly defined in a drawing. Different types of lines recommended for specific applications are given in Table 1.

Table 1

Types of lines and their application

Lines	Description	General applications See figure and other relevant figure
	Continuous thick	A1 Visible outlines A2 Visible edges
	Continuous thin (straight)	B1 Imaginary lines of intersection B2 Dimension lines B3 projection lines or extension line B4 Leader lines B5 Hatching B6 Outlines of revolved sections in place B7 Short centre lines B8 Thread line B9 Diagonal line
	Continuous thin free hand	C1 Limits of partial or interrupted views & sections, if the limit is not a chain thin
	Continuous thin (Straight) with zig-zags	D1 Line (See figures)
	Dashed thick	E1 Hidden outlines E2 Hidden edges
	Dashed thin	F1 Hidden outlines F2 Hidden edges
	Chain thin	G1 Centre lines G2 Lines of symmetry G3 Trajectories
	Chain thin, thick at ends & changes of direction	H1 Cutting planes
	Chain thick	J1 Indication of lines or surfaces to which a special requirement applies
	Chain thin double-dashed	K1 Outlines of adjacent parts K2 Alternative and extreme positions of movable parts K3 Centroidal lines K4 Initial outlines prior to forming K5 Parts situated in front of the cutting plane

1 This type of line is suited for production of drawings by machines.
2 Although two alternatives are available, it is recommended that on any one drawing, only one type of line be used.

In the above range, for craftsmen, 0.5 is preferred. This table shows the 0.5 line range and other lines under this range.

The numbers on the right side of the lines refer to the line thickness in mm.

Geometrical figures and blocks with dimension

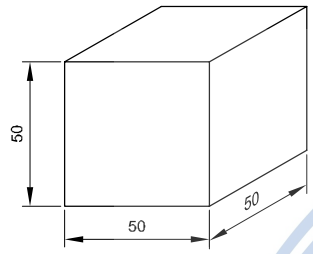
Freehand sketching: Apart from making drawing using instruments, often craftsmen will be required to make drawings with their free hand.

Freehand sketching is the easiest method to express the shape of a piece part or a component by an engineer or craftsman.

Freehand sketches are not usually made to scale. However, they should be as nearly to the proportions as possible.

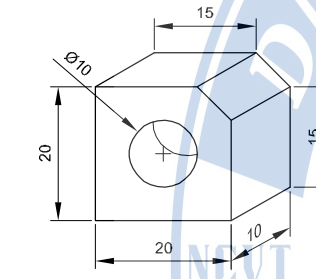
Cube (Fig 1)

Fig 1



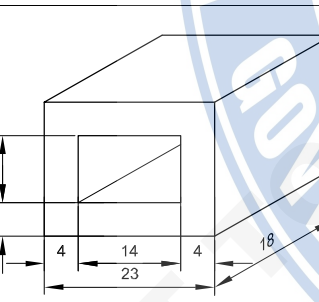
Square block (Fig 2)

Fig 2



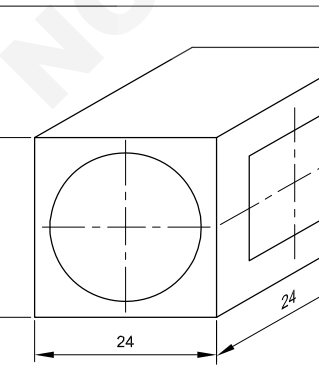
Rectangular block (Fig 3)

Fig 3



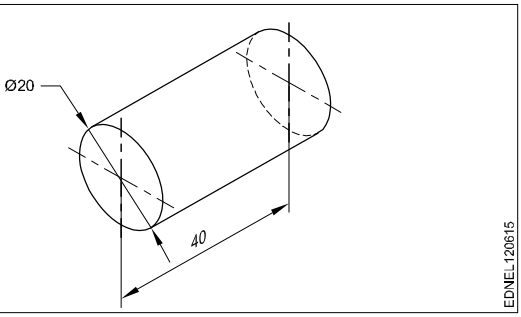
Cube block (Fig 4)

Fig 4



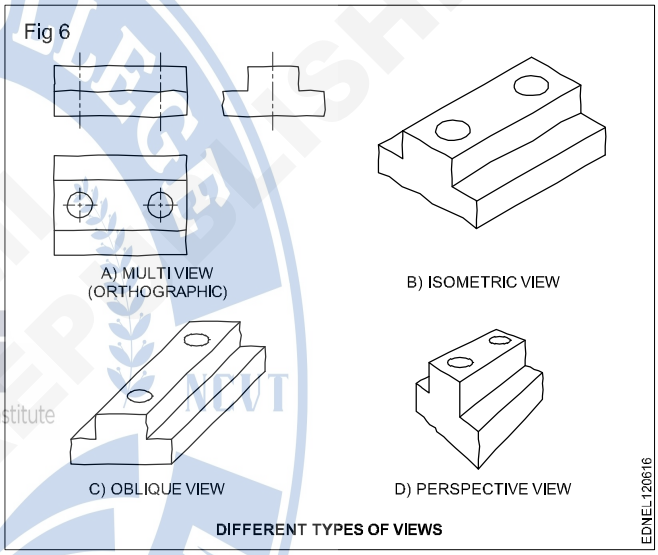
Cylinder (Fig 5)

Fig 5



Materials for free hand sketching: A4 size sheet (preferably a pad instead of loose papers) pencils of soft grade. Example H, HB, and a good quality eraser are the only materials required. For drawing different darkness, the pencil points should be sharpened to a conical shape. Fig 6 shows some free hand sketches of different types of views.

Fig 6

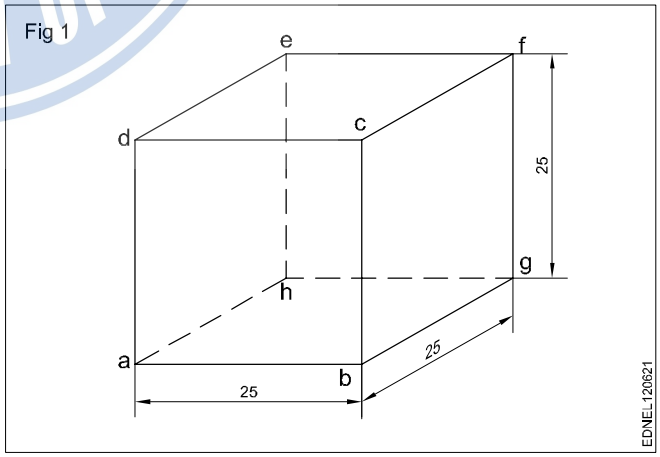


Procedure

Freehand drawing of solid figures, cubes, cuboids, cone, prism, pyramid, frustum of a cone with dimensions

Cube (Fig 1)

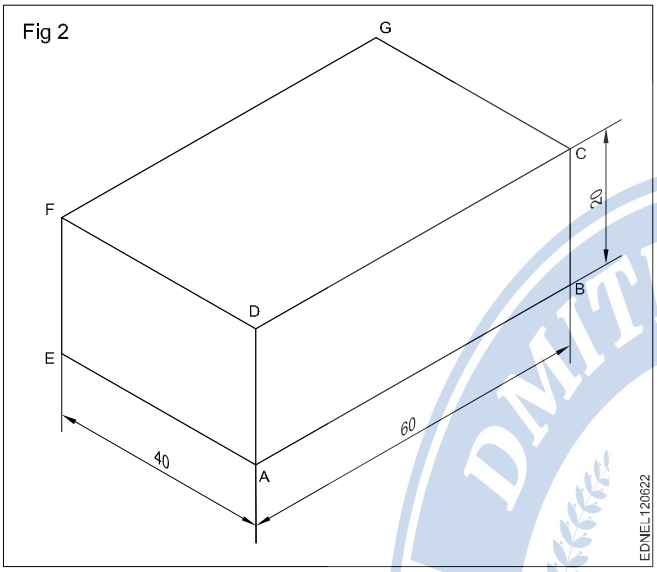
Fig 1



- Draw squares of a, b, c and d.
- Draw 30° from points b, c and d for the length of 25mm.
- Mark point g from b, f from c and e from d as shown in the figure.
- Joint all points.

Cuboid (Fig 2)

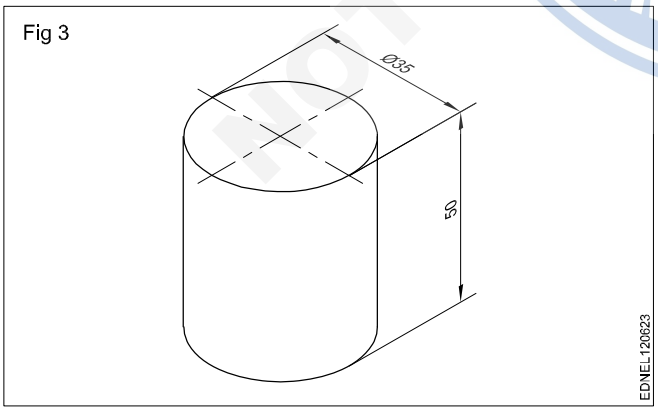
Draw the isometric drawing of a cuboid of base 60 mm x 40 mm and the height of 20 mm. (Fig 2)



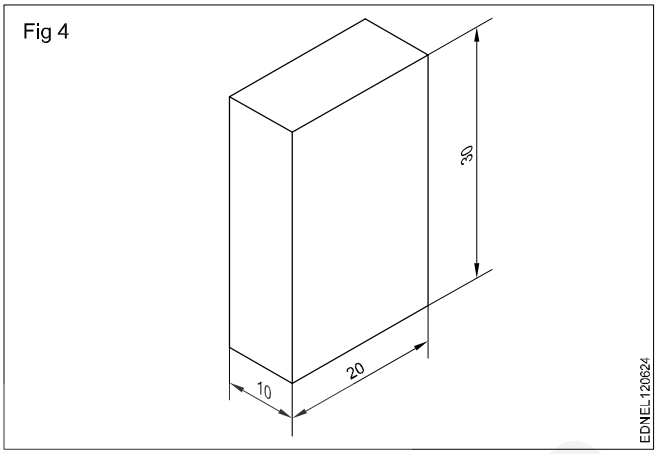
Draw the three isometric axes through the point 'A'.

- Mark AB = 60mm, AE = 40mm and AD= 20mm representing the three sides of cuboid.
- Draw two vertical lines EF and BC parallel to AD from points E and B respectively.
- Similarly, draw two more lines parallel to AB and AE to mark G's interesting point from F and C.
- Draw lines parallel to DC and FG Draw lines parallel to DF and GC.
- Join all the points.

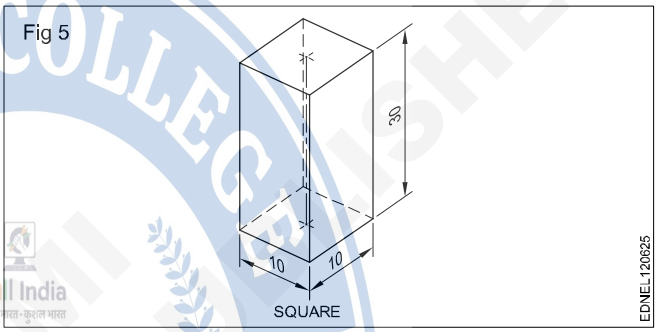
Cylinder (Fig 3)



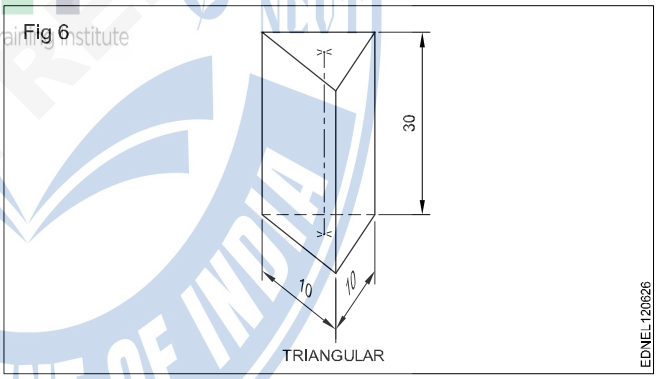
Rectangular prism (Fig 4)



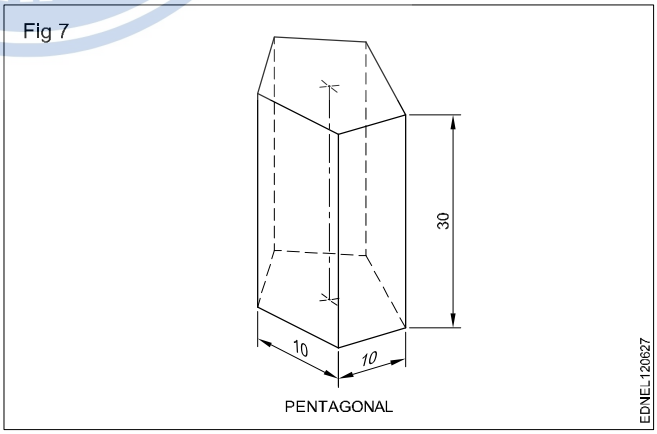
Square Prism (Fig 5)



Triangular Prism (Fig 6)

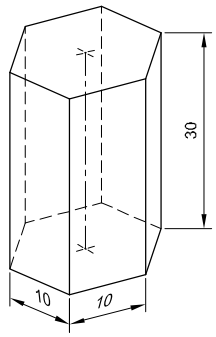


Pentagonal prism (Fig 7)



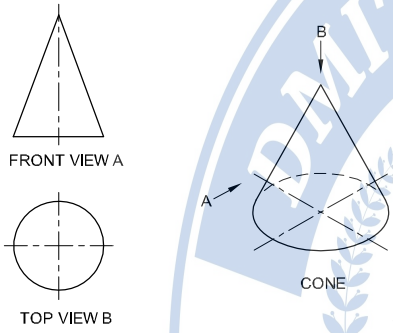
Hexagonal prism (Fig 8)

Fig 8



Cone: When a right-angled triangle revolves about one of its sides forming the right angle, a cone is generated. Cone forming has a circular face and a slant curved surface. (Fig 9)

Fig 9



Pyramids: Pyramids are polyhedron solids having a base surface whose shape may be triangular, square or polygon and as many slant triangular faces as there are sides in the base. All the slant triangular faces join at a common point called APEX.

Similar to prisms, pyramids also are known by the shape of their base viz triangular, square, rectangular, pentagonal, hexagonal etc. The imaginary line joining the centre of the base to the apex is called the AXIS.

Fig 10 shows some pyramids and their views.

When a semi-circle revolves about its diameter a sphere is generated. A sphere has no flat surface. (Fig 11D)

Frustums: Pyramid/cone is cut parallel to the base and the top portion is removed. The remaining bottom portion is called the frustum of a pyramid/cone.

If the cutting plane is at an angle to the axis/base, the pyramids or cones are called "Truncated pyramids or cones".

Fig 10

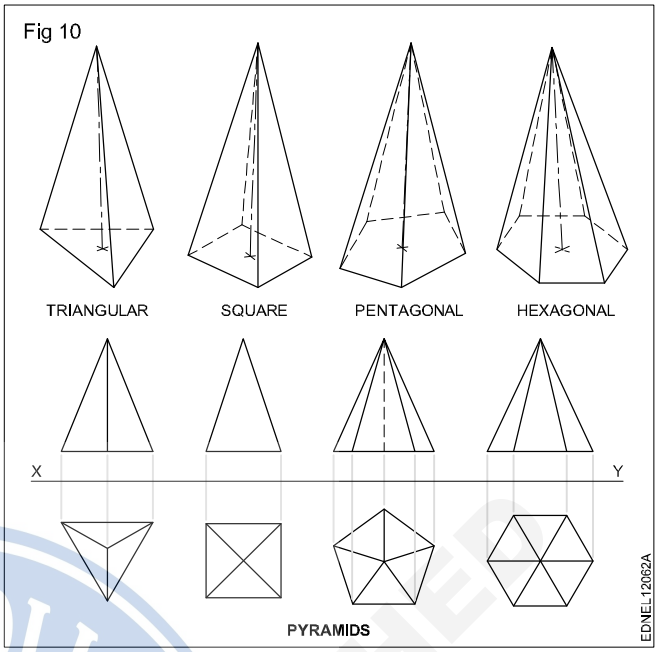


Fig 11

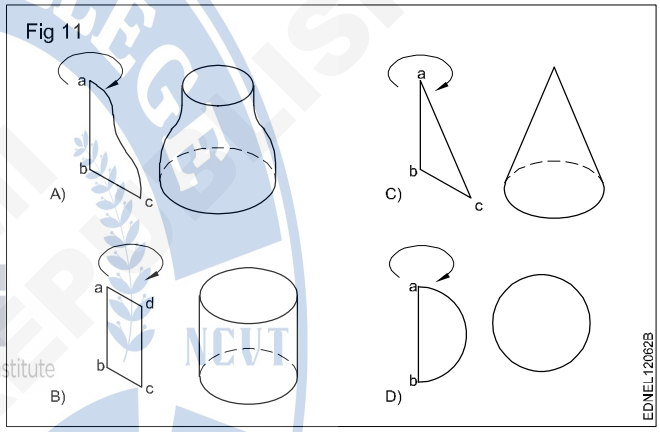
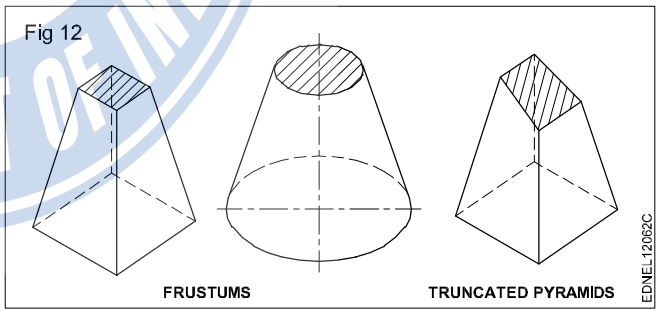


Fig 12 shows frustums and truncated pyramids.

All items we use are solids. Their shapes may confirm individual geometrical solids like prisms, cones or other combinations.

Fig 12



Free hand drawing of - Transferring measurement from the given object to the free hand sketches

Fig 1

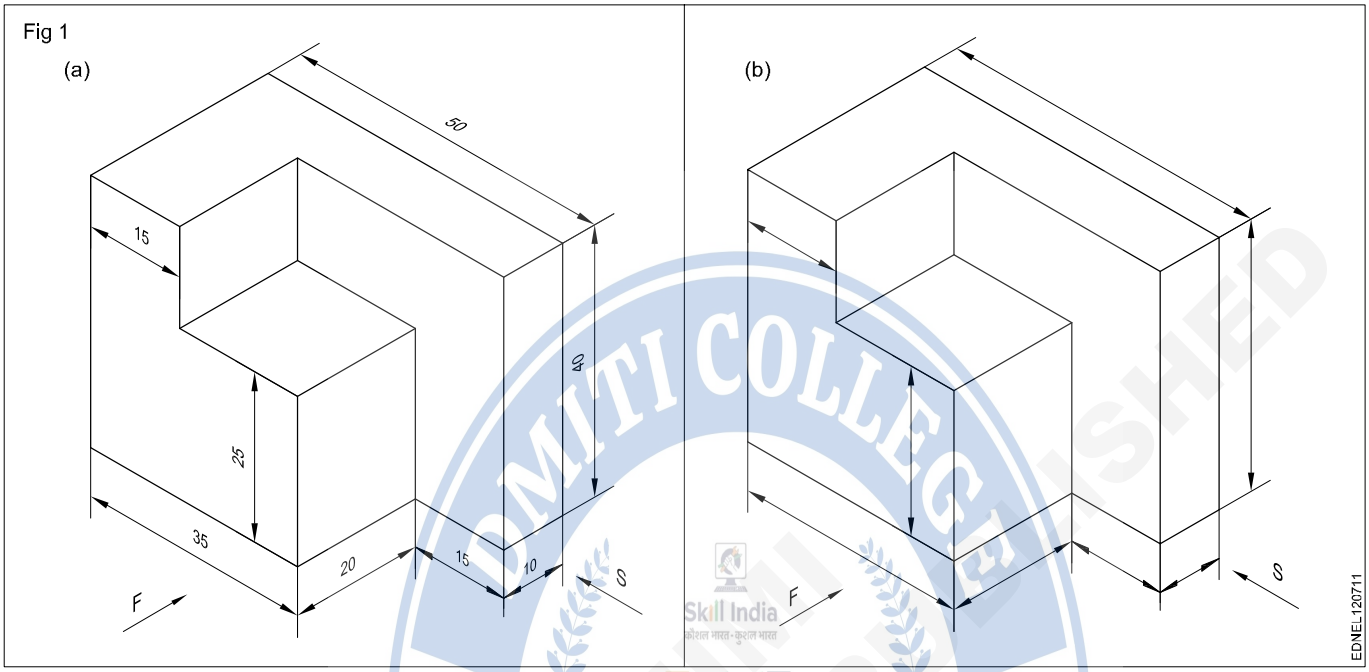


Fig 2

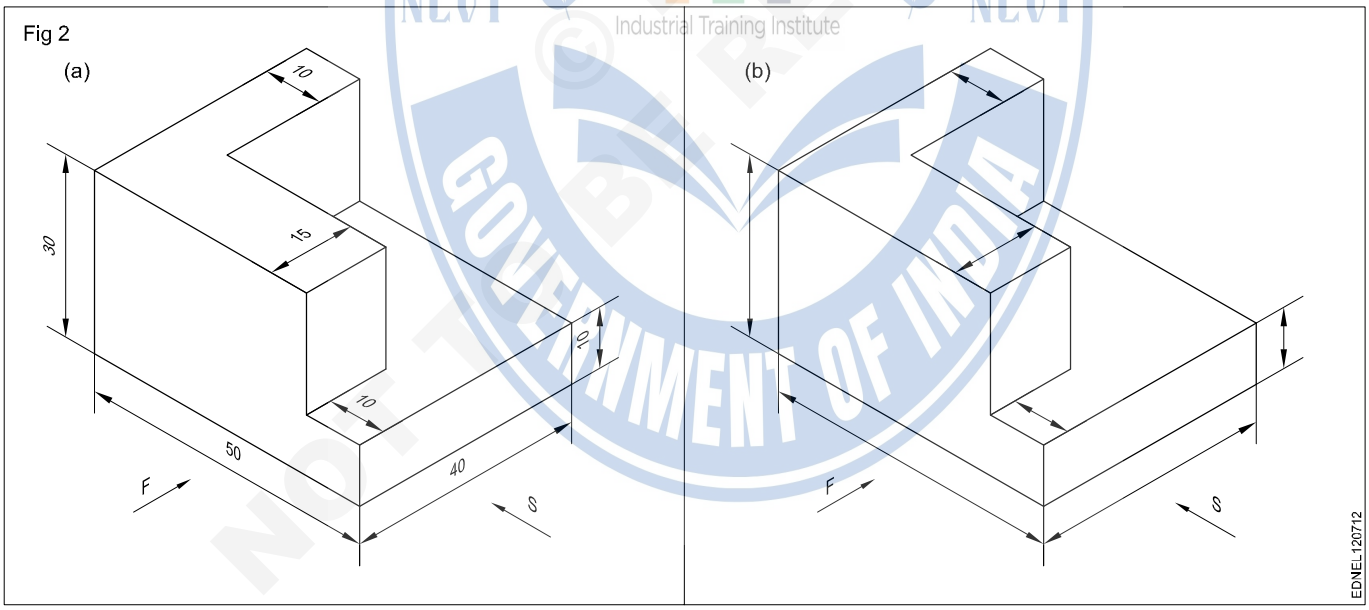
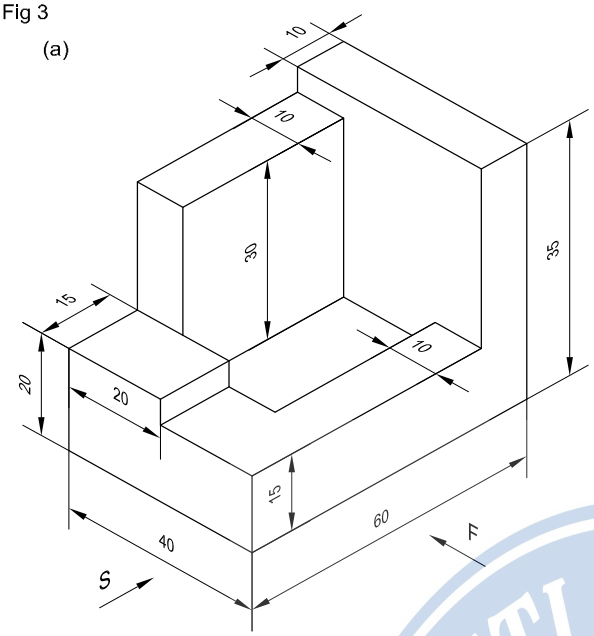


Fig 3

(a)



(b)

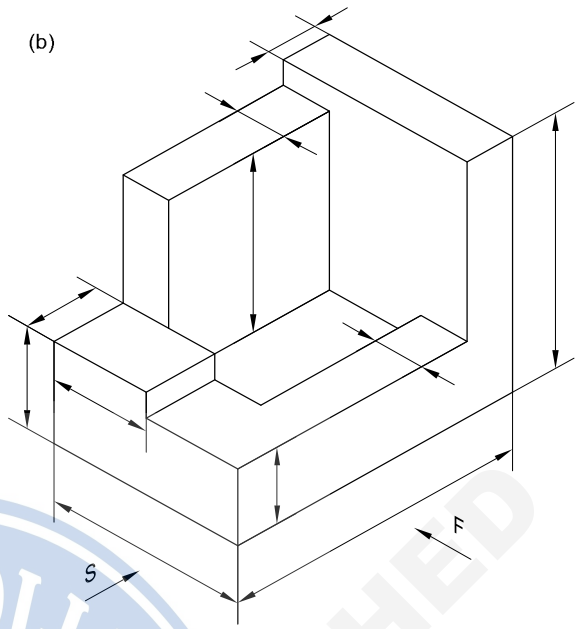


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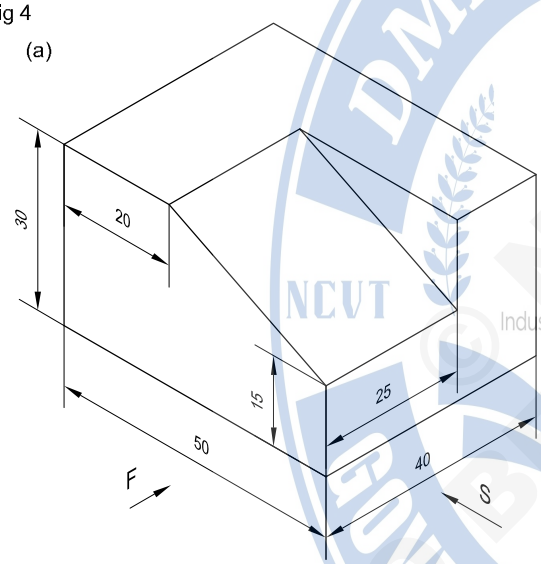
Fig 4

(a)



(b)

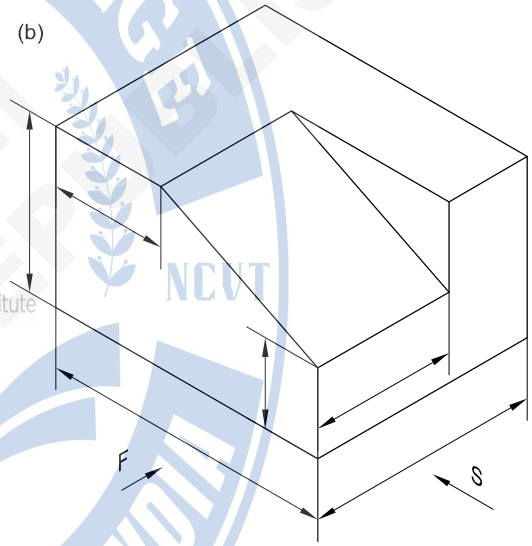


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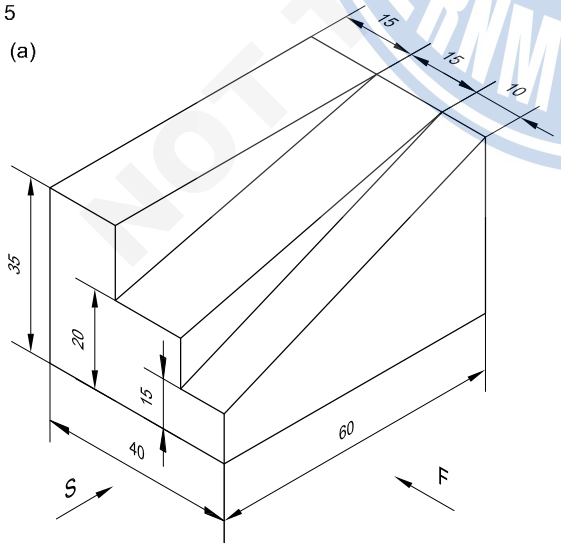
Fig 5

(a)



(b)

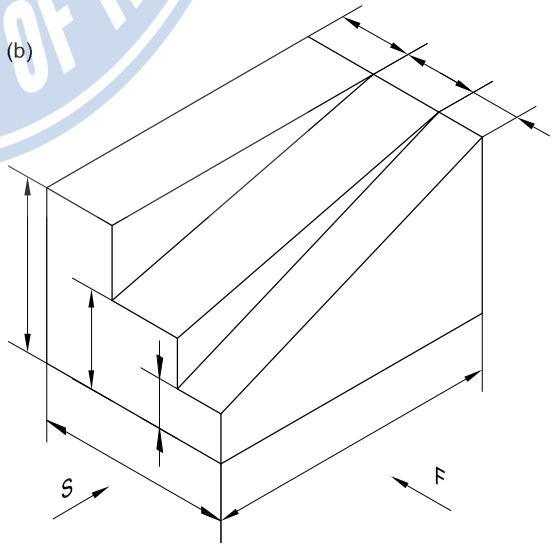


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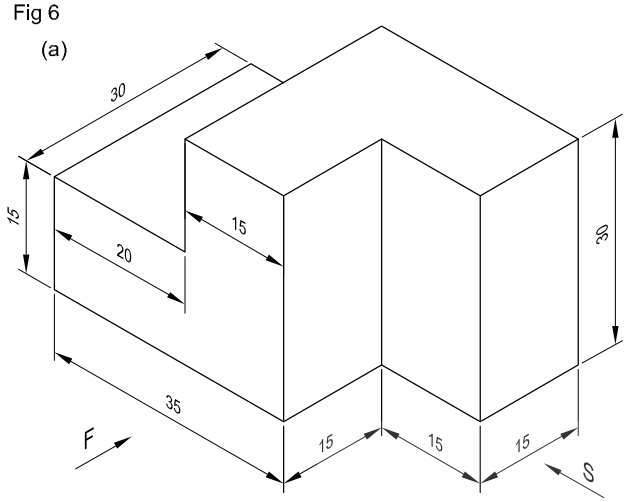
Fig 6

(a)



(b)

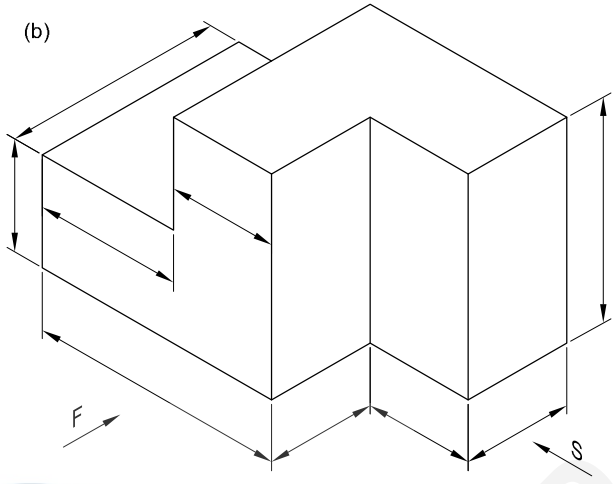


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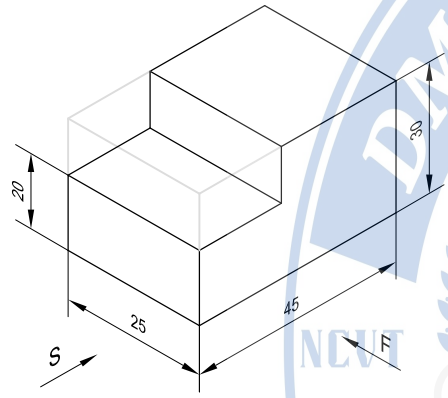
Fig 7

(a)



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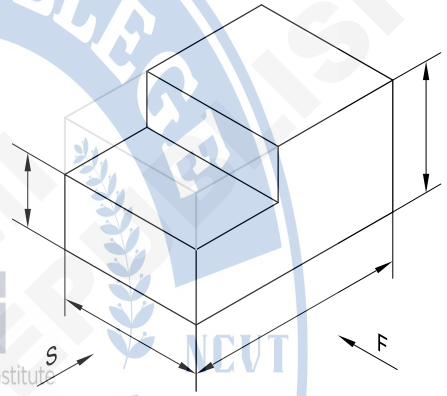

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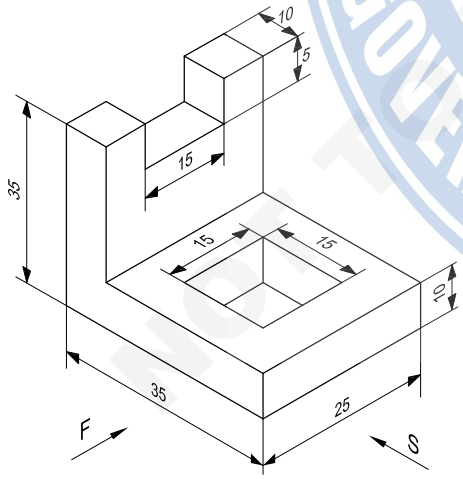
Fig 8

(a)



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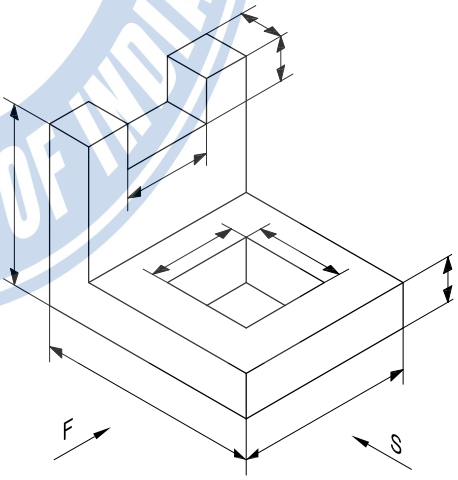

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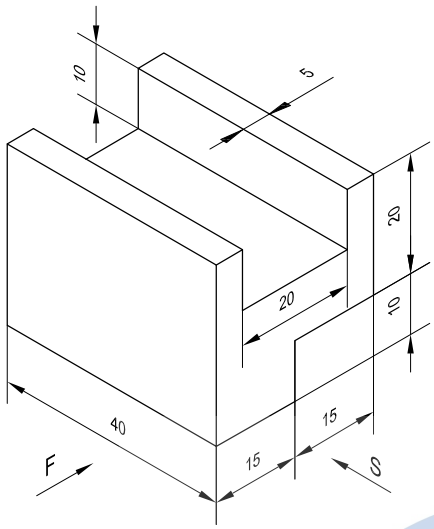
Fig 9

(a)



(b)

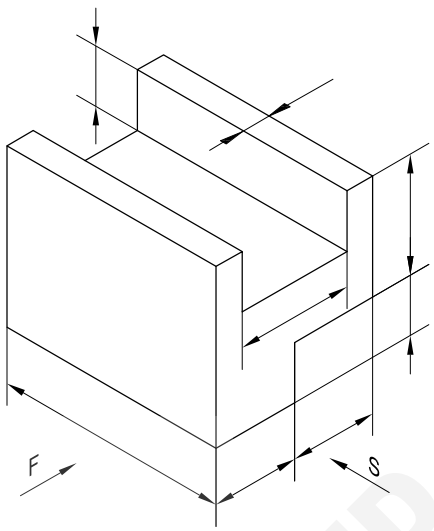


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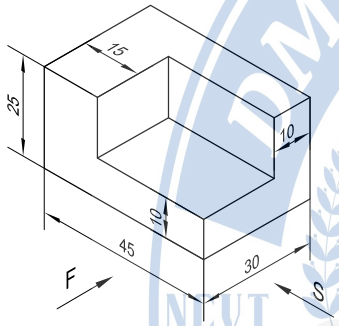
Fig 10

(a)



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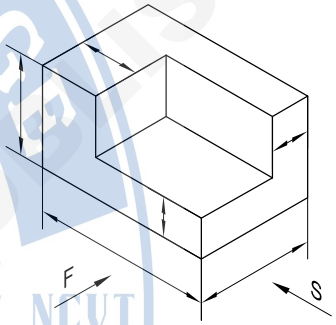

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Free hand drawing of hand tools

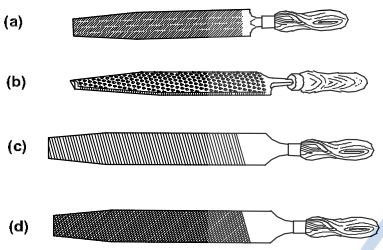
Hand Tools

Files (Fig 1)

a Curved cut file b Rasp cut file

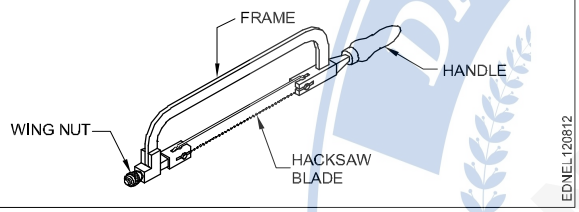
c Single cut file d Double cut file

Fig 1



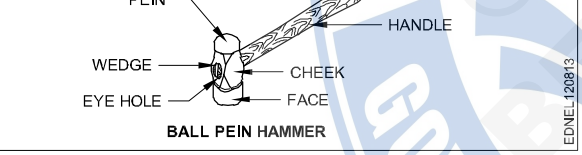
Hacksaw (Fig 2)

Fig 2



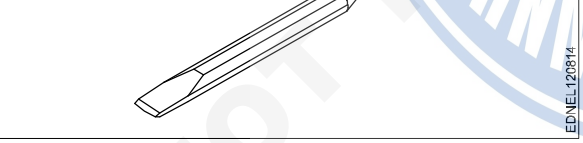
Ball pein hammer (Fig 3)

Fig 3



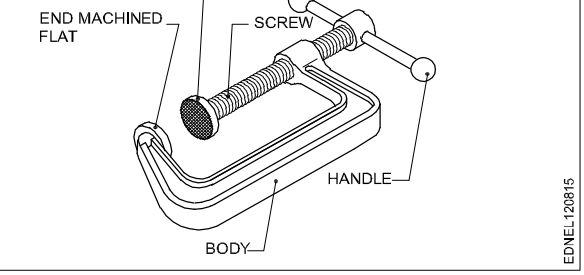
Chisel (Fig 4)

Fig 4



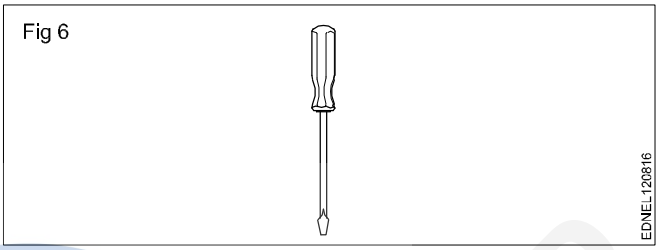
'C' clamp (Fig 5)

Fig 5



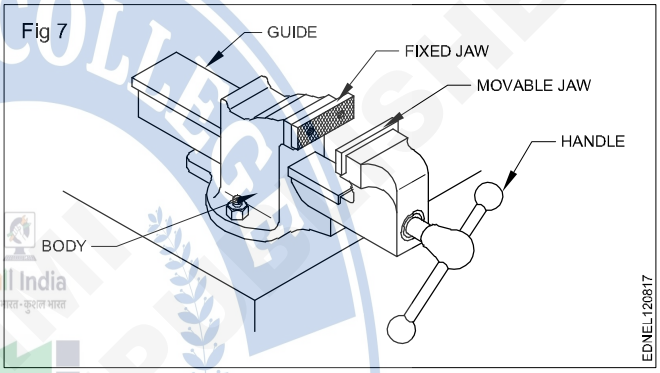
Screw driver (Fig 6)

Fig 6



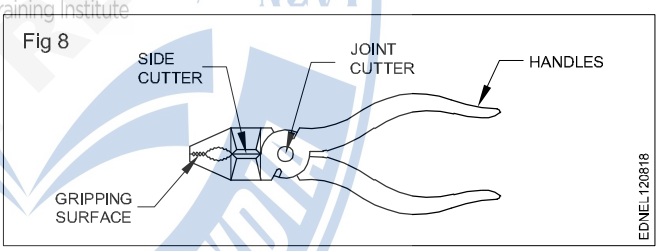
Bench vice (Fig 7)

Fig 7



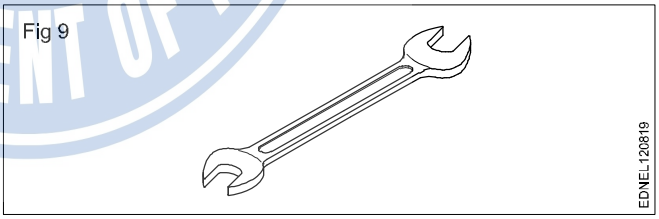
Cutting plier (Fig 8)

Fig 8



Open end spanner (Fig 9)

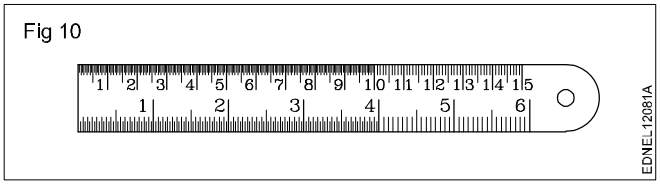
Fig 9



Measuring Tools

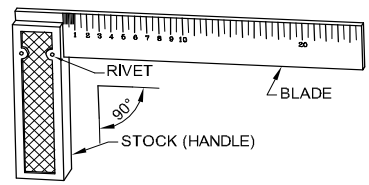
Steel rule (Fig 10)

Fig 10



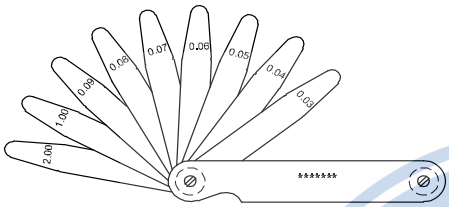
Try square (Fig 11)

Fig 11



Feeler gauge (Fig 12)

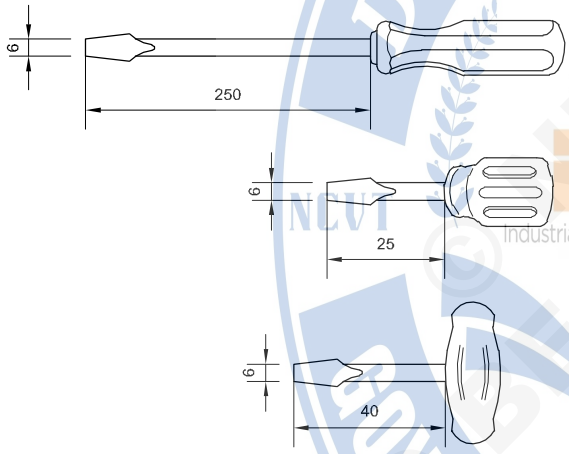
Fig 12



Hand Tools

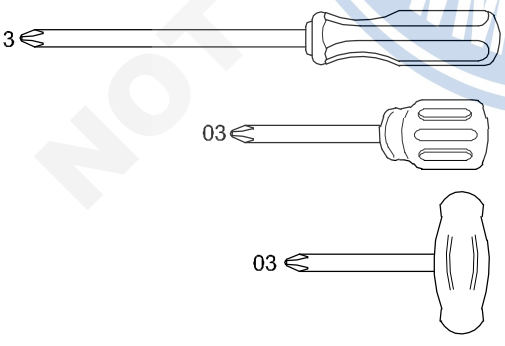
Screw driver (Fig 13)

Fig 13



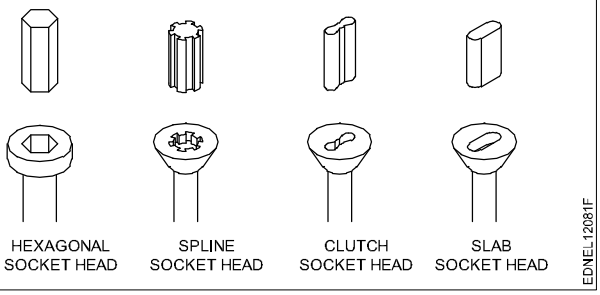
Screw driver with cross type tips (Fig 14)

Fig 14



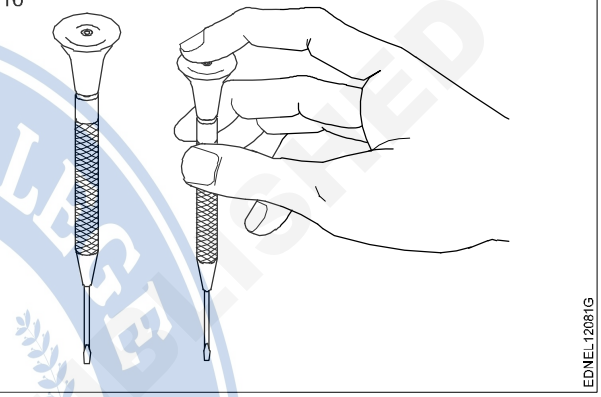
Screw tips aided screw heads (Fig 15)

Fig 15



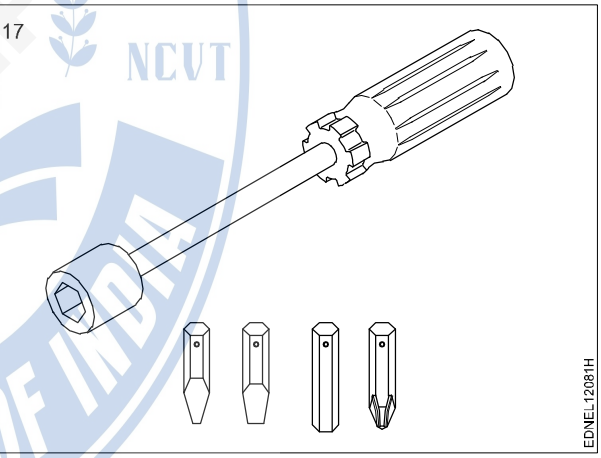
Instrument screw driver (Fig 16)

Fig 16



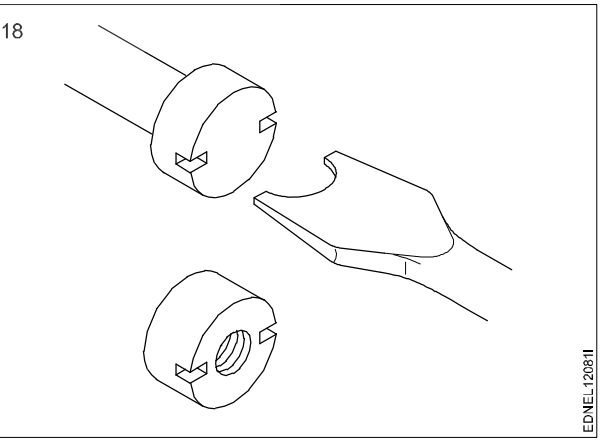
Screw driver interchangable tips (Fig 17)

Fig 17



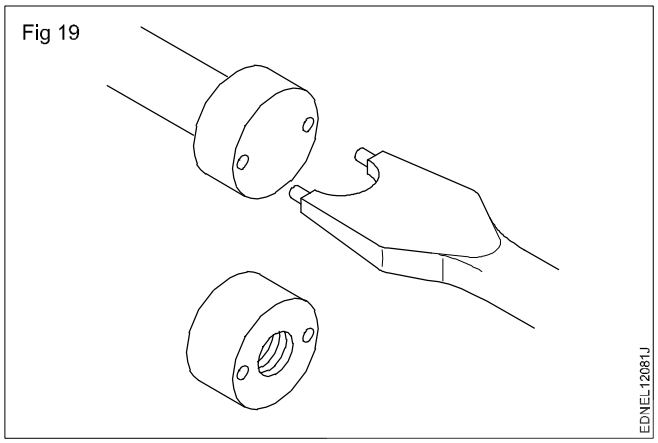
Special type screw driver (two rectangular recesses) (Fig 18)

Fig 18



Special type screw driver (two round recesses) (Fig 19)

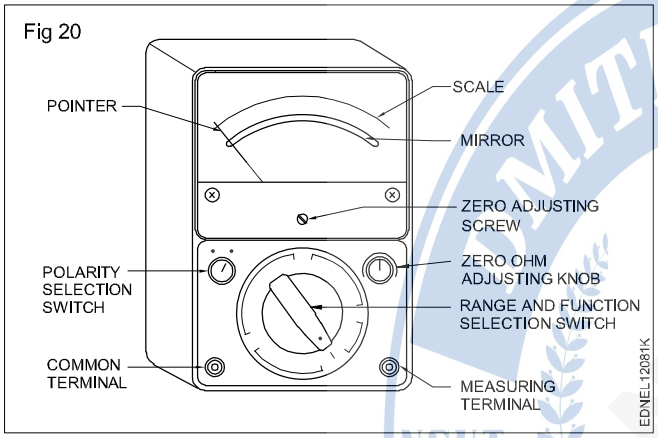
Fig 19



EDNEL12081J

Analog multimeter (Fig 20)

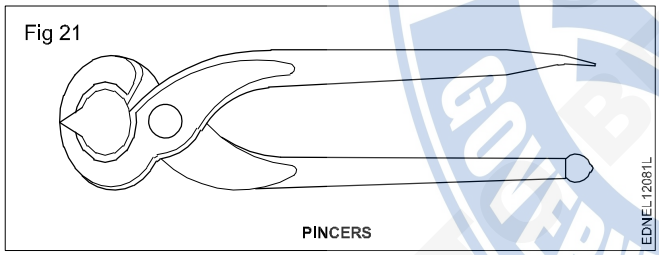
Fig 20



EDNEL12081K

Pincers (Fig 21)

Fig 21

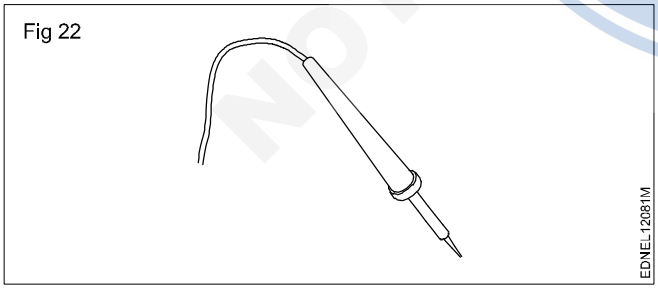


PINCERS

EDNEL12081L

Soldering iron (Fig 22)

Fig 22



EDNEL12081M

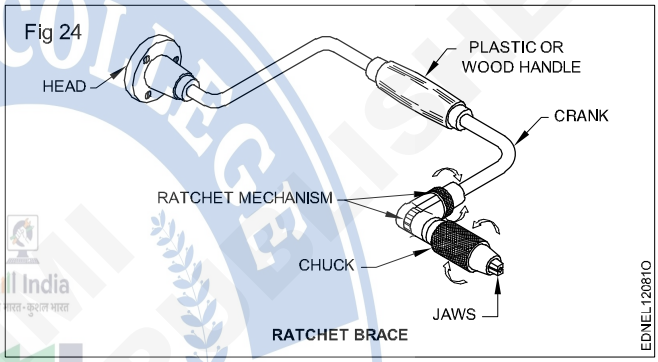
Soldering work station (Fig 23)

Fig 23

EDNEL12081N

Ratchet brace (Fig 24)

Fig 24

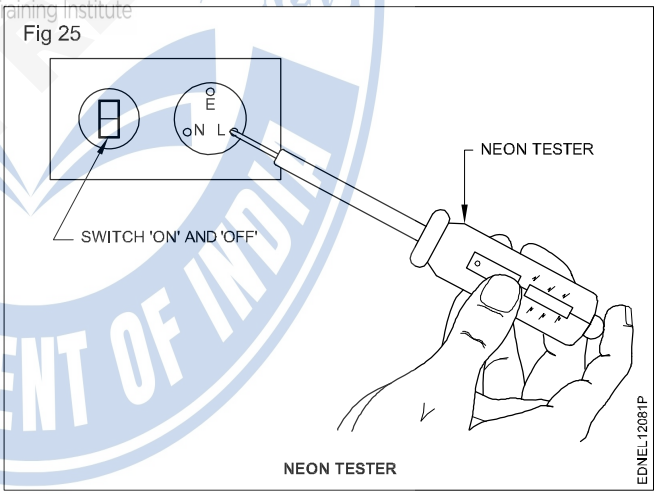


RATCHET BRACE

EDNEL12081O

Neon Tester (Fig 25)

Fig 25

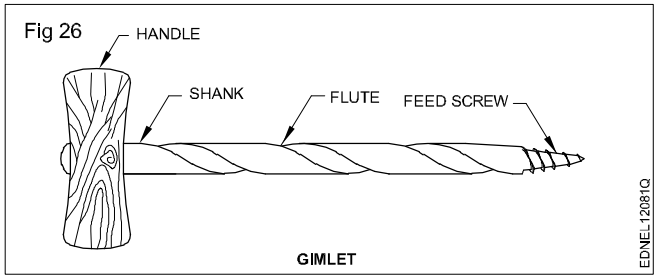


NEON TESTER

EDNEL12081P

Gimlet (Fig 26)

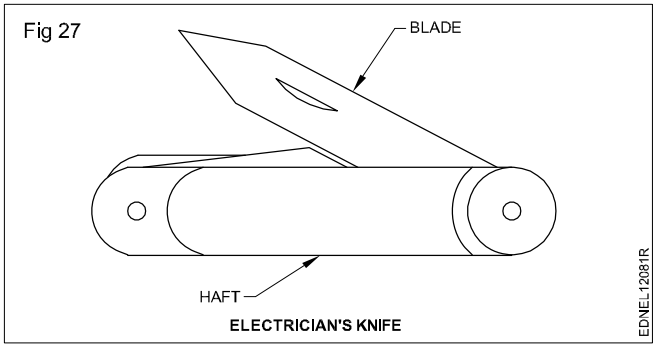
Fig 26



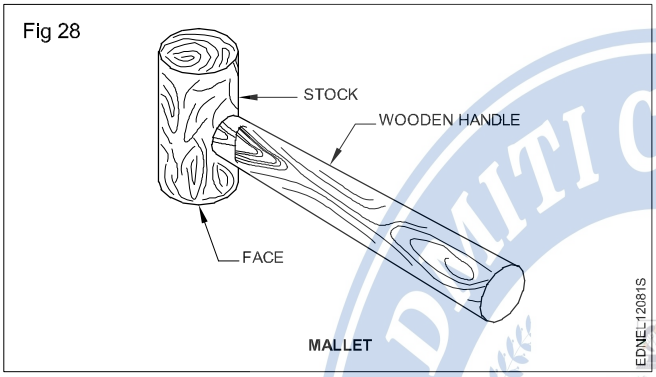
GIMLET

EDNEL12081Q

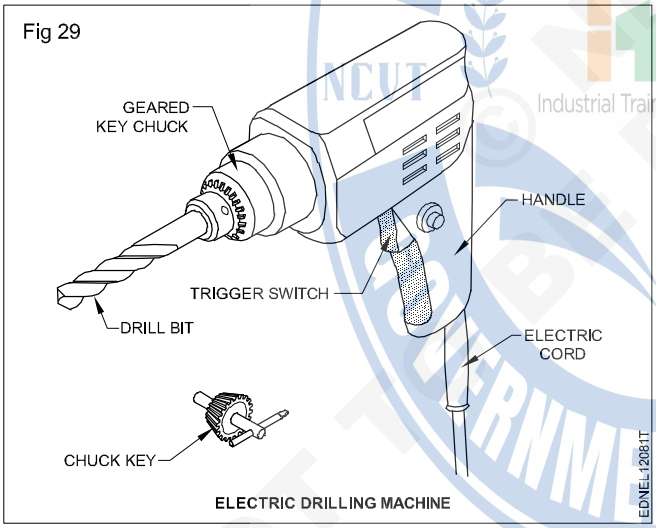
Electrician’s knife (Fig 27)



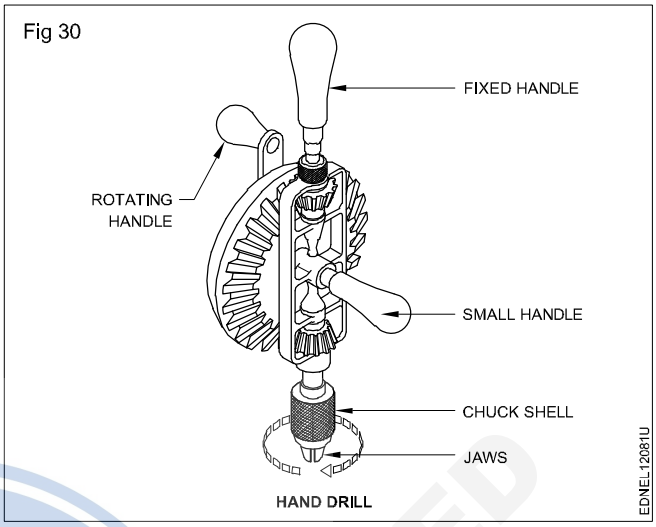
Mallet (Fig 28)



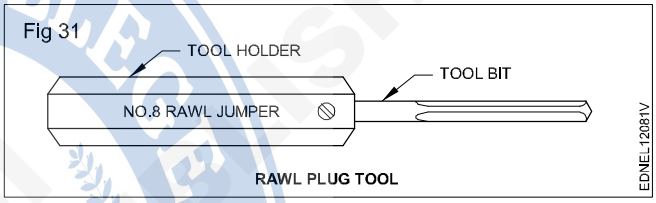
Electric drilling machine (Fig 29)



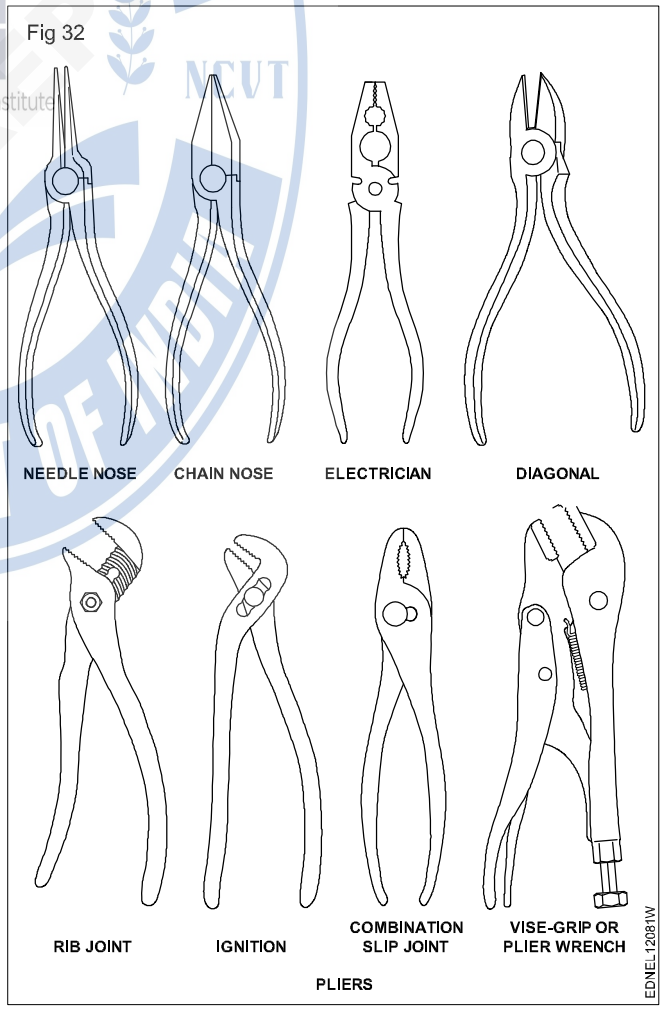
Hand drill (Fig 30)



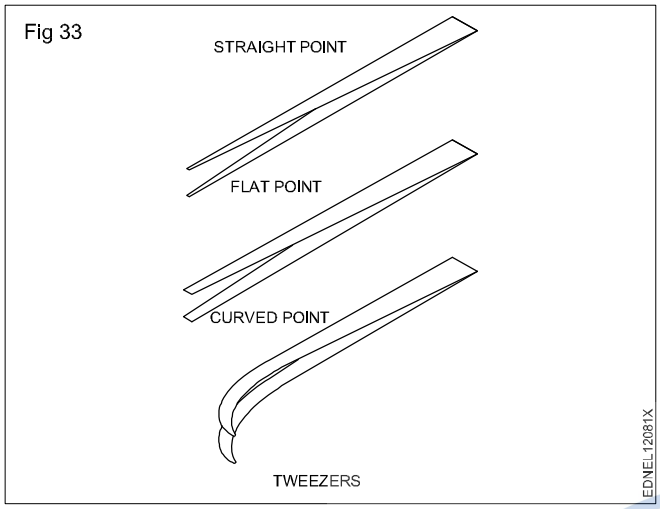
Rawl plug tool (Fig 31)



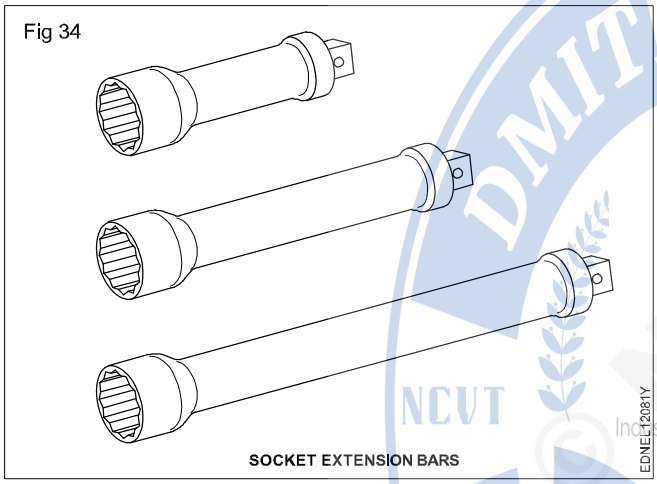
Pliers (Fig 32)



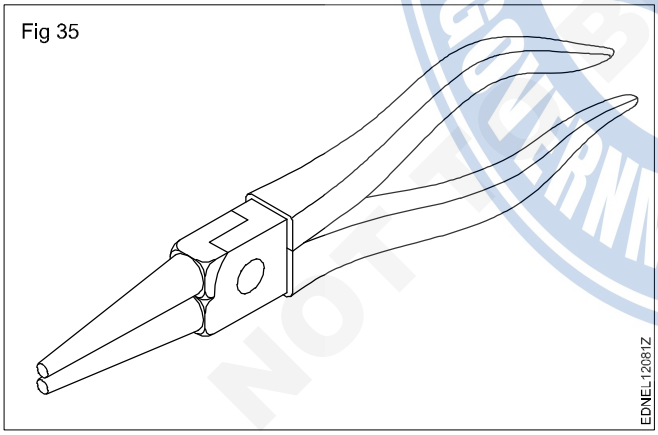
Tweezers (Fig 33)



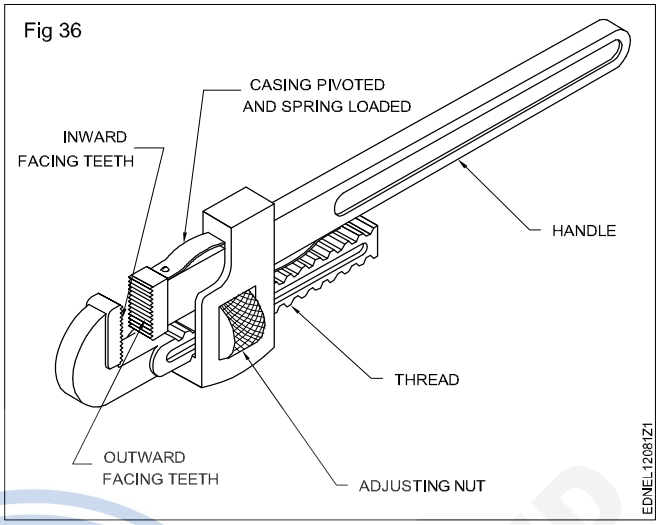
Socket extension bars (Fig 34)



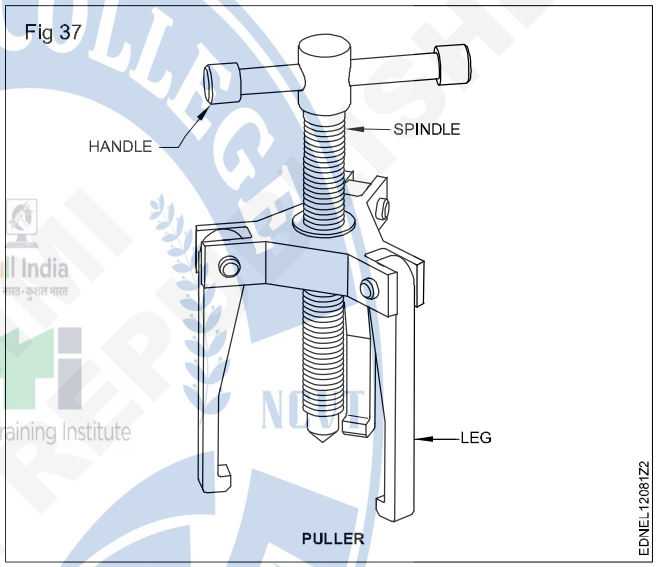
Round nose plier (Fig 35)



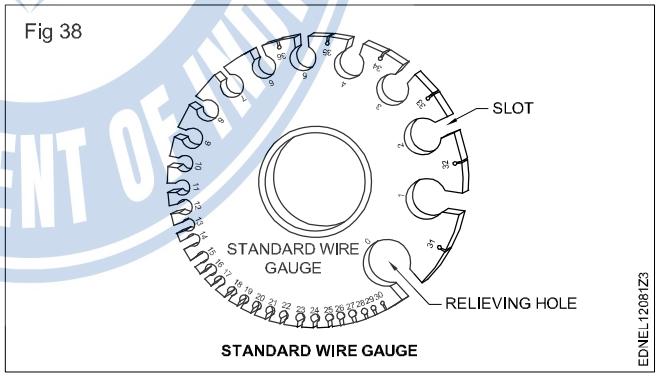
Stillson pipe wrench (Fig 36)



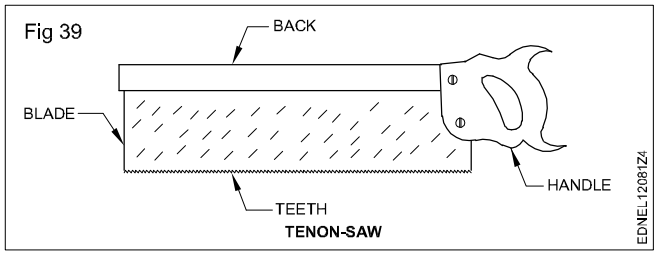
Puller (Fig 37)



Standard wire gauge (Fig 38)

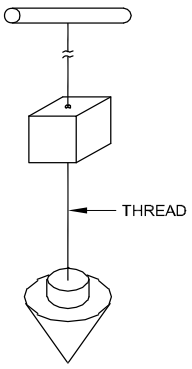


Tenon-saw (Fig 39)



Plumb bob (Fig 40)

Fig 40

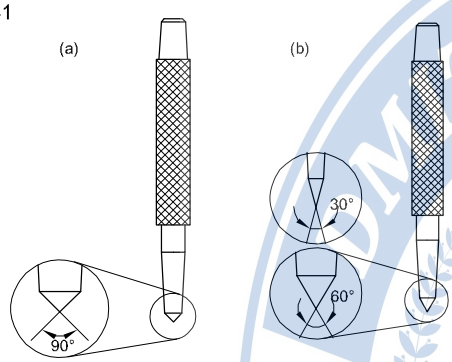


PLUMB BOB

EDNEL120812Z5

Centre punch (Fig 41)

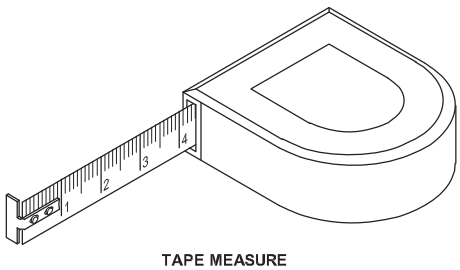
Fig 41



EDNEL120812Z6

Tape measure (Fig 42)

Fig 42

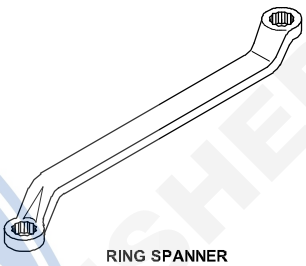


TAPE MEASURE

EDNEL120812Z7

Ring spanner (Fig 43)

Fig 43

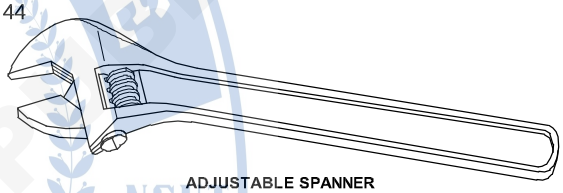


RING SPANNER

EDNEL120812Z8

Adjustable spanner (Fig 44)

Fig 44



ADJUSTABLE SPANNER

EDNEL120812Z9