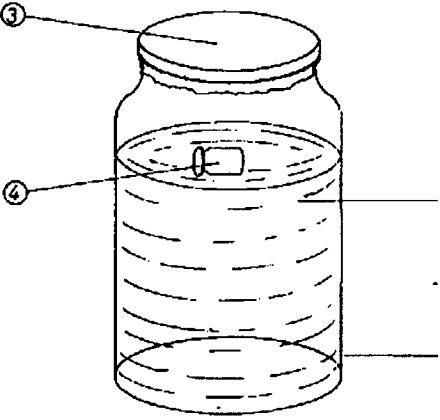


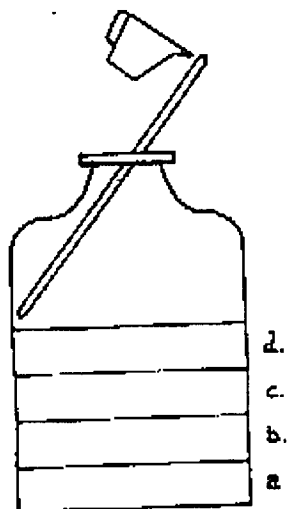
BUOYANCY APPARATUS

1- ITEM			
BUOYANCY APPARATUS			
2.-PURPOSE			
To demonstrate the effect of changing atmospheric pressure on buoyancy.			
3- INFORMATION SUBMITTED BY			
National Educational Equipment Centre, Lahore 16, Pakistan.			
4- LINE DRAWING OF PROTOTYPE			
			
5- MATERIALS FOR CONSTRUCTION			
Components	Qty	Materials Required	Dimensions
1. Container	1	Glass Jar.	
2. Liquid.		Water.	
3. Membrane	1	Rubber Sheet. (from a balloon).	
4. Floating Object.	1	Vaccine Injection bottle with air-tight rubber lid.	
6- CONSTRUCTION DETAILS			
<p>Half fill the glass jar with clean water.</p> <p>Ensure that the small vaccine (medicine) bottle is clean and that the rubber lid is air-tight. Put the bottle into the jar and it should float in the water. From the rubber balloon cut out a flat piece of rubber to go over the neck of the jar. Place the rubber over the jar mouth and stretch it tight. Fix it in place using a rubber band, as shown in Fig A., to form a taut diaphragm.</p>			
7- METHOD OF USE			
Using your hand apply pressure to the rubber diaphragm. The air pressure inside the jar will increase (as also will that in the small bottle). The bottle will be seen to sink lower in the water.			
8- COMMENTS			
It may be necessary to 'weight' the small bottle so that it is partially submerged, using lead shot. Ensure that the lid is air-tight after adding the weights.			

DENSITY OF LIQUIDS APPARATUS

1- ITEM			
DENSITY OF LIQUIDS APPARATUS			
2.-PURPOSE			
To demonstrate that objects can sink in some liquids and float in others.			
3- INFORMATION SUBMITTED BY			
National Educational Equipment Centre, Lahore 16, Pakistan.			
4- LINE DRAWING OF PROTOTYPE			
5- MATERIALS FOR CONSTRUCTION			
Components	Qty	Materials Required	Dimensions
1. Container. 2. Kerosene. 3. Water. 4. Carbon tetrachloride. 5. Mercury. 6. Nail. 7. Ebonite Block. 8. Wax Block. 9. Cork Stopper. 10. Rubber Stopper.	1	Glass Bottle	

6- CONSTRUCTION DETAILS



Ensure that the glass bottle is clean and dry. Pour into the bottle an amount of mercury (See Fig. 1a). Lower a nail into the bottle such that it rests on the surface of the mercury. Using a stirring rod (or similar rod) slowly introduce the carbon tetrachloride onto the top of the mercury as shown in Fig. 1.b. Lower a piece of Ebonite onto the surface of the carbon tetrachloride.

Using the same procedure slowly pour some water up to level c. and then lower a wax block to float on the surface of the water. Again, using the rod, slowly pour some kerosene onto the surface of the water and lower a cork which will float on the water. Finally insert a stopper into the bottle.

7- METHOD OF USE

By carefully preparing this apparatus it can be used to introduce the idea of liquids having different densities/ relative densities, as well as introducing the idea of densities of solids.

8- COMMENTS

Ensure that the wax used will float on the water and not on the Kerosene as well. This demonstration apparatus could be made using other liquids.

BOILING POINT AND PRESSURE APPARATUS

1- ITEM

BOILING POINT AND PRESSURE APPARATUS.

2.-PURPOSE

To study the relationship between the boiling point of water and pressure.

3- INFORMATION SUBMITTED BY

Beijing Teaching Aids Centre, Hengshui Prefecture, Hebei Province, China.

4- LINE DRAWING OF PROTOTYPE

4- LINE DRAWING OF PROTOTYPE

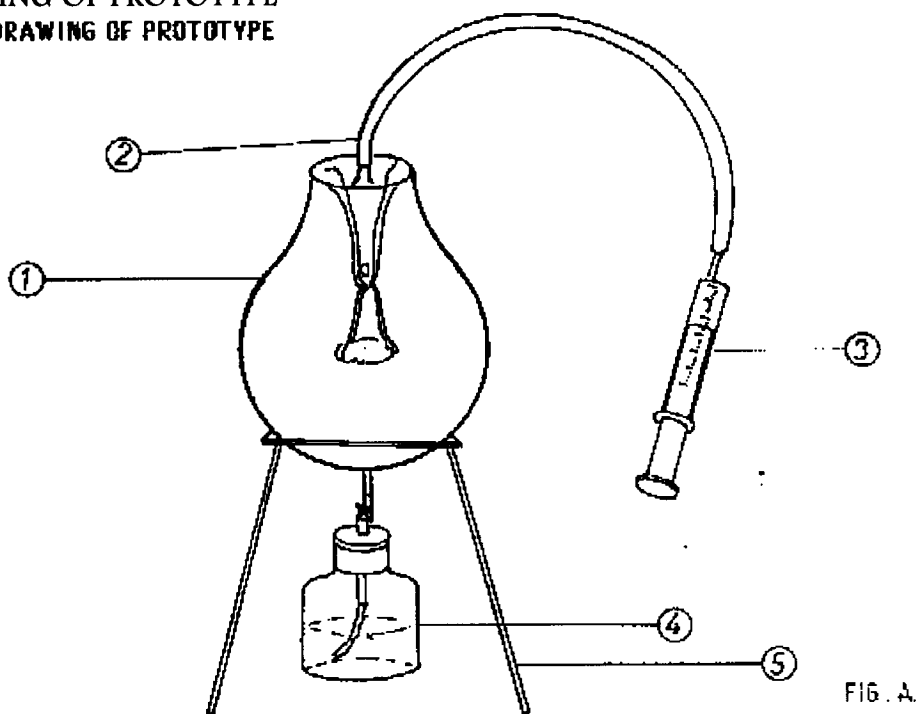


FIG. A.

5- MATERIALS FOR CONSTRUCTION

Components	Qty	Materials Required	Dimensions
1. Container.	1	Electric Light Bulb.	as available
2. Connecting tube.	1	Rubber tube small bore.	approx. 350mm
3. Pressure adjustor.	1	Syringe.	as available
4. Heater.	1	Spirit Burner.	
5. Stand	1	Tripod.	
		Tools: Long-nosed pliers, small file.	

6- CONSTRUCTION DETAILS

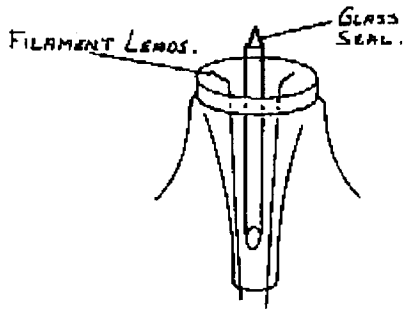


Fig 1

Gently heat the base of an old bulb over a spirit burner. Gently twist the bulb whilst heating and gradually pull the base off from the bulb. Take care not to break the air exhaust tube when removing the cap. With a pair of long nosed pliers gently remove the glass seal from the end of the air exhaust tube. (Fig. 1.

Using a syringe, inject water into the bulb via the air exhaust tube. Connect a length of rubber tube to the air exhaust tube.

Stand the bulb on a tripod over a spirit lamp. Remove the needle from the syringe and connect the syringe to the rubber tube

7- METHOD OF USE

Remove the syringe from the rubber tube. Light the burner to heat the water. Adjust the syringe plunger to the half way position. The Higher the Pressure the Higher the Boiling Point. When the water is boiling attach the syringe to the rubber tube. Push the plunger forward a little to give a higher pressure within the bulb and the water will be seen to stop boiling. After continued heating (higher temperature) the water will again boil. This procedure could be repeated. The Lower the Pressure the Lower the Boiling Point. When the water is boiling remove the burner and wait until the water stops boiling. Attach the syringe to the rubber tube and pull back the plunger a little to give a lower pressure in the bulb. The water will be seen to be boiling again (lower temperature), This procedure could be repeated.

8- COMMENTS

Wear eye protectors when working with glass.

SIMPLE HYDRAULICS APPARATUS

1- ITEM

SIMPLE HYDRAULICS APPARATUS.

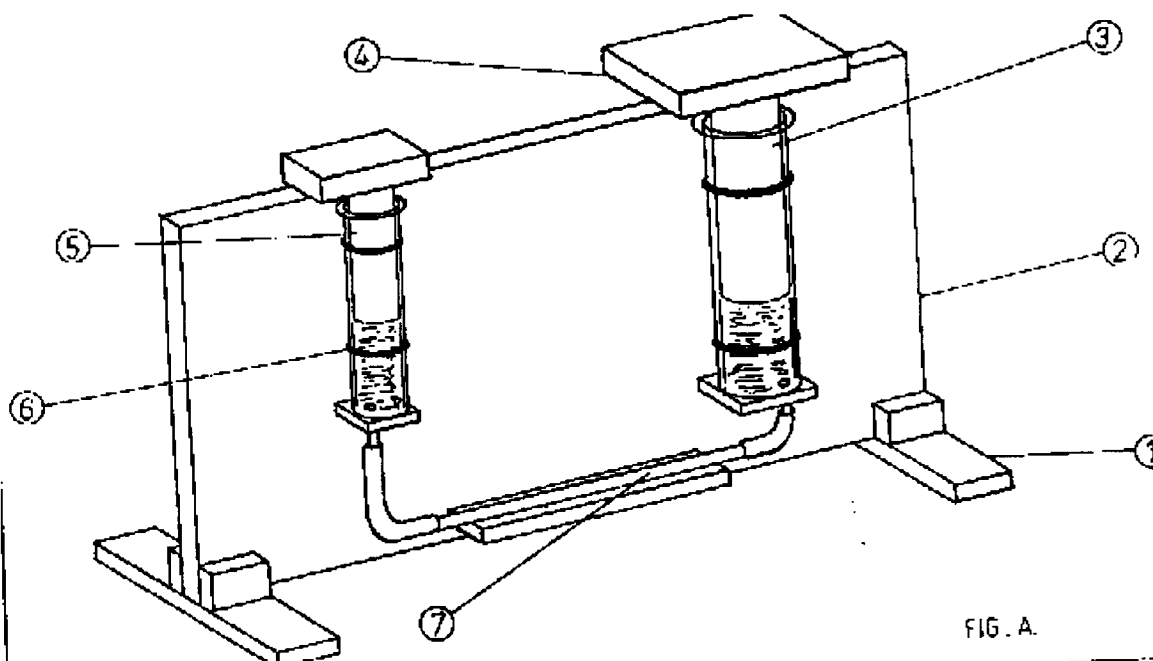
2.-PURPOSE

To demonstrate the principle of hydraulics.

3- INFORMATION SUBMITTED BY

Beijing Teaching Aids Centre, Hengshui Prefecture, Hebei Province, China.

4- LINE DRAWING OF PROTOTYPE



5- MATERIALS FOR CONSTRUCTION

Components	Qty	Materials Required	Dimensions
1. Stand.	2	Plywood.	140mm X 20mm X 10mm
2. Baseboard.	1	Plywood.	300mm x 150mm x 10mm
3. Piston	1	Syringe	size: 50ml.
4 Masses.	2	Iron (or other suitable material)	One of 100g.
5. Piston.	1	Syringe	One of 50g.
6. Clamps.	4	Iron wire.	Size: 10ml
7. Connecting tube.	1	Glass tube.	approx. 4mm i.d. x 30cm long.
		Rubber tubing.	
		Tools: Woodsaw, hammer, nails, pliers, drill and drill bit, chisel, wood glue	

6- CONSTRUCTION DETAILS

6- CONSTRUCTION DETAILS

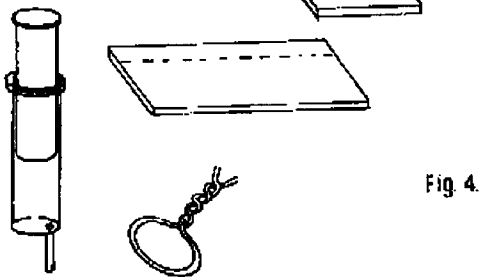
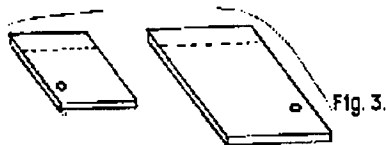
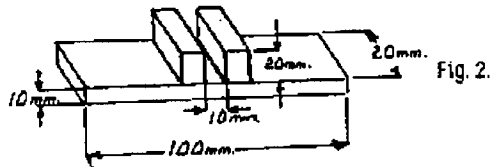
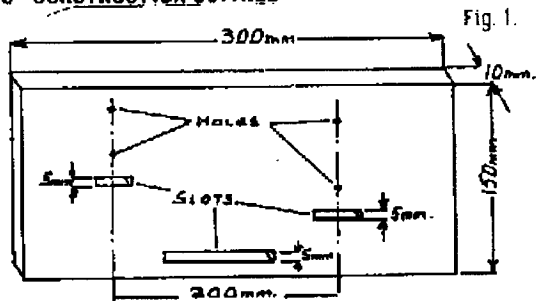


Fig 1.

From a 10mm sheet of plywood cut out the baseboard as shown in Fig. 1. Using a drill and chisel cut out the syringe and glass tubing support slots. Also drill the holes for the stiff wire syringe clamps. (The size of the slots will depend upon the diameters of the two syringes).

Fig 2.

From a piece of 10mm wood construct two stands for the baseboard as shown in Fig. 2.

Fig 3.

From a suitable piece of wood cut the supports to the required sizes, as shown in Fig. 3. The dotted lines indicate the extra 10mm required for gluing the supports into the slots.

Fig 4.

Fig. 4. indicates a suitable form of wire clamp for the syringes. The loose ends of the wire are bend outwards et the back of the baseboard.

7- METHOD OF USE

Having assembled the apparatus fill the syringes with water to approximately the half way position. Hold the plunger of the 50ml syringe and place a 50g. weight on the 1ml. syringe. Then place a 100g. weight on the 50ml. syringe which will be seen to rise when you remove your hand from holding the plunger.

8- COMMENTS