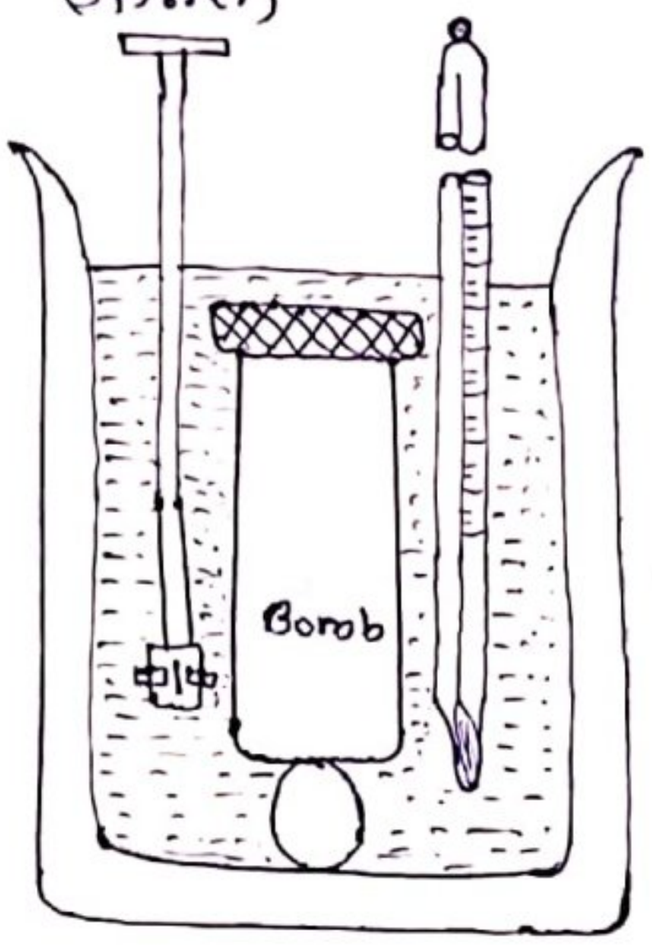
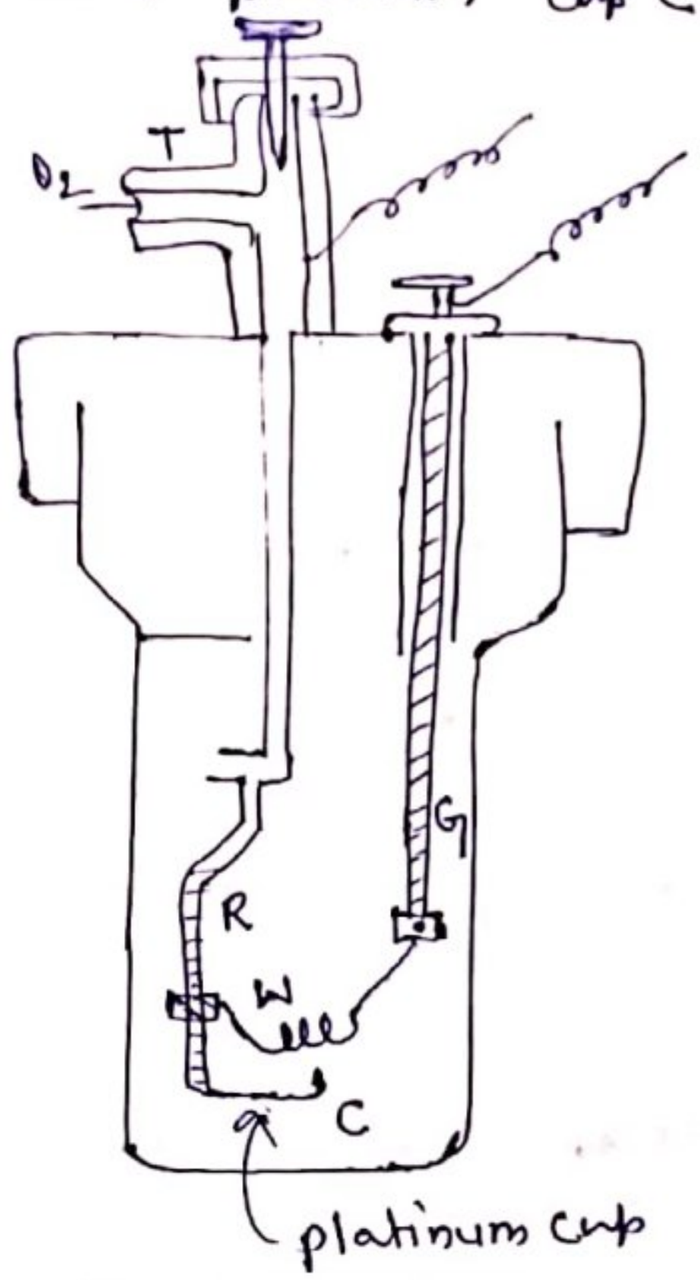
*. Bomb Calorimeter :—

A calorimeter is a device for measuring energy transfered as heat. The most common device for measuring ΔU is the adiabatic bomb calorimeter. In this device the inner vessel or the bomb and its cover are made of strong steel coated inside with gold or platinum or some other non-oxidisable material. The cover can be fitted tightly to the vessel by means —

- of a metal lid screwed down on a lead washer. A weighed amount of the substance is taken in a platinum cup 'C' which is supported on a rod 'R'.



The Bomb calorimeter.



— The Bomb —

A thin Pt wire W is connected between the rods R & G. This server to Initiates combustion when heated electrically. The bomb is tightly closed and Oxygen introduces through the inlet tube T at a pressure of about 20-25 atm. The bomb is then lowered in water placed in a double jacketed and polished metallic calorimeter so as to minimise error due to radiation. The arrangement ensure that there is no net loss of heat from the calorimeter to the surrounding and hence that the process is adiabatic. A mechanical stirrer is provided as passing electric current through the 'Pt' wire lid. The rise of temperature of the water in the calorimetre is noted after every minutes by means of the water has becomes steady. The heat capacity —

— of the calorimeter system, called the Calorimeter Constant 'C' is obtained by burning a known mass of a substance of known enthalpy of Combustion.

Suppose, the thermal capacity of the calorimeter system including water is C & θ is the change in temperature produced by burning a quantity 'm' of the given substance of molar mass M. Then the constant Volume heat of Combustion q_r of the substance is given by —

$$C \times \theta \times \frac{M}{m} .$$

The enthalpy of Combustion q_p is then obtained with the help of the equation —

$$q_p = q_r + \Delta n_g RT .$$

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