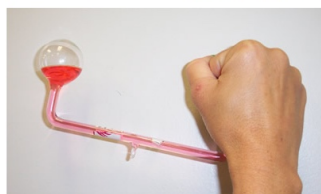


目的 Objectives	1) 気体の性質を理解する（温度による膨張、断熱圧縮、断熱膨張） 2) エンジンの構造と働きを理解する a) ビー玉スターリングエンジン b) スチームエンジン c) ガソリンエンジン	4 グループ
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### 1) Simple Experiments on the Properties of Gas

#### Charles' Law

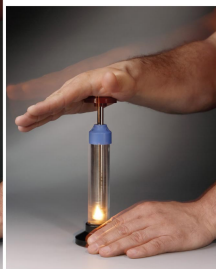


##### Explanation of principles involved

Charles' Law states that the volume of a given amount of dry ideal gas is directly proportional to the temperature if the amount of gas and the pressure remains fixed. A plot of the volume of a gas against the temperature it forms a straight line. The mathematical statement is that the  $V/T = \text{a constant}$ .

The pulse glass contains a volatile liquid and vapor sealed in glass container at a low pressure. Heating one bulb with your hand increases the vapor pressure in the bulb, forcing the liquid through a connecting tube into the other bulb in a series of bubbles or pulses.

#### Adiabatic Heating

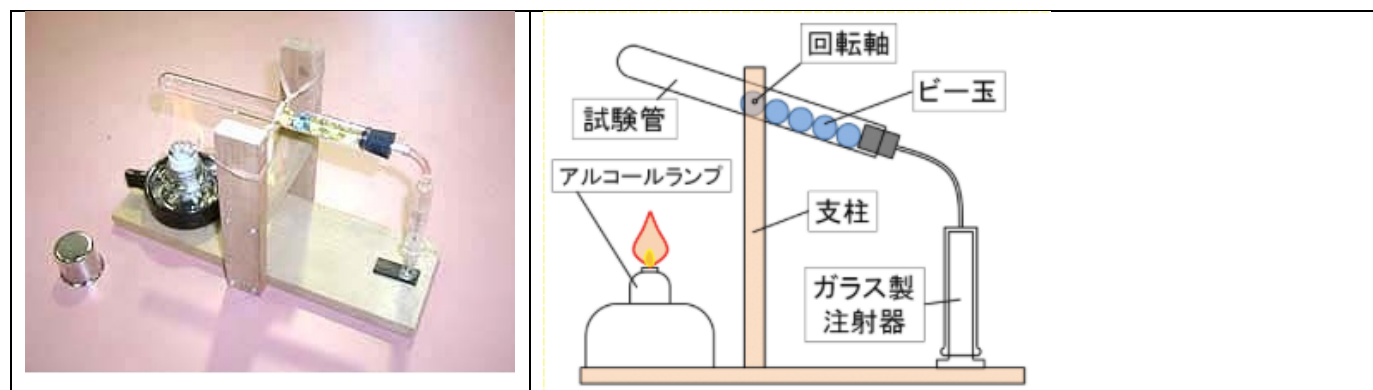


When a piston that fits snugly inside a cylinder is pushed downward rapidly, the temperature of the gas within the cylinder increases before there is time for heat to flow out of the system. Thus, the process is essentially adiabatic or 断熱過程.

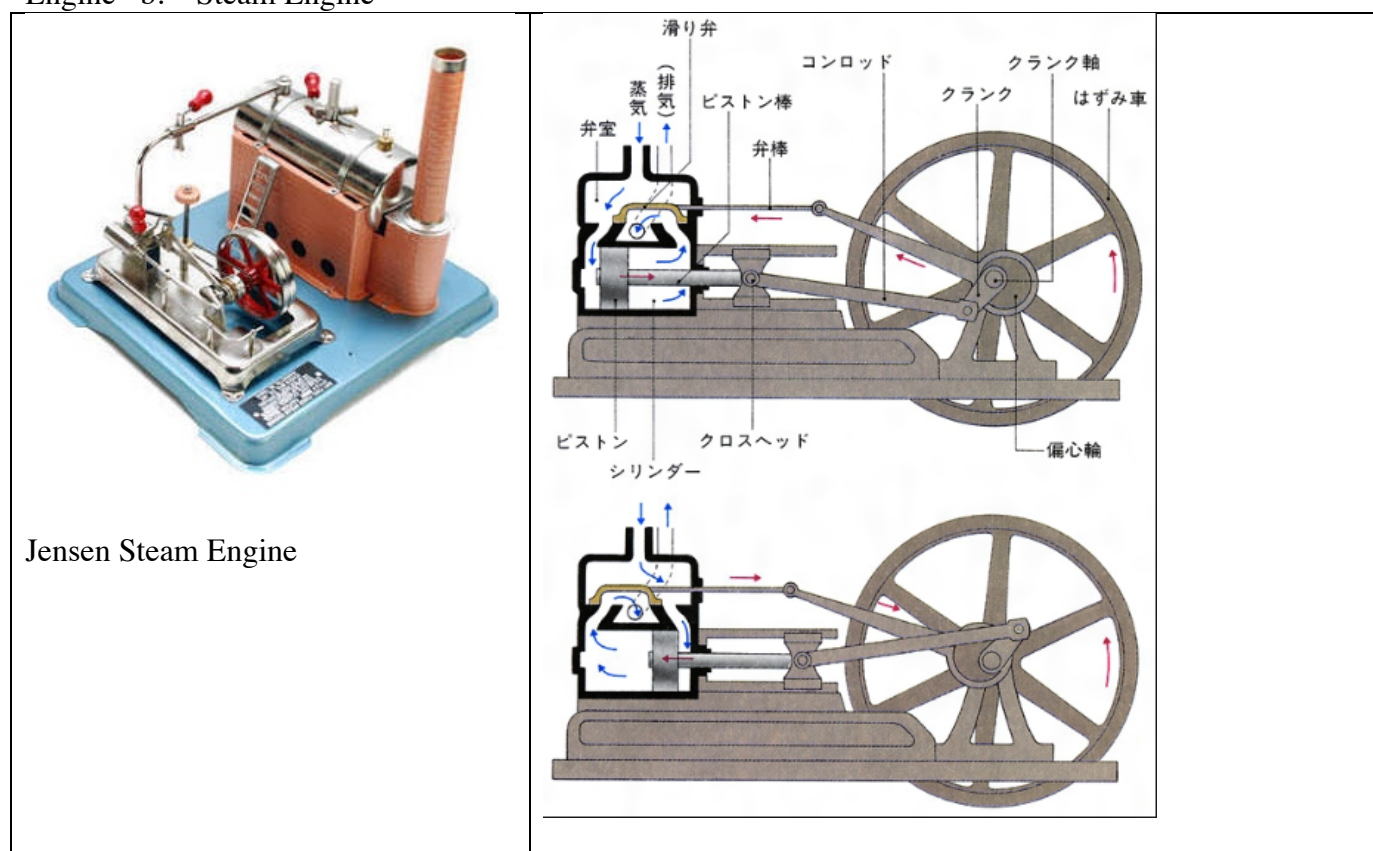
#### Formation of Cloud in a Bottle



## Engine –a Marble/Test-Tube Stirling Engine



## Engine –b. Steam Engine



Jensen Steam Engine

## Engine –c Gasoline Engine

