



V. FUEL SYSTEMS IN IC ENGINES

I. CARBURETING AND CARBURETORS IN SI ENGINES

IC ENGINES – 3rd Stage

University of Basrah

Mechanical Engineering Department

CARBURETION

- The carburetor, or the injection system, of the SI engine meters the fuel into the air stream of amount dictated by the speed and load.
- Carburetion is the process of formation of a combustible fuel - air mixture by mixing the proper amount of fuel with air before admission to engine cylinder.
- **Factors affecting carburetion:**
 - i. The engine speed.
 - ii. The vaporization characteristics of the fuel.
 - iii. The temperature of the incoming air.
 - iv. The design of the carburetor.



FUNCTIONS OF CARBURETORS

- To evaporate the liquid fuel (petrol) into vapor.
- To mix with the correct quantity of air at all speeds and loads.
- To give extra rich mixture for starting.
- Provision to vary the load and speed.

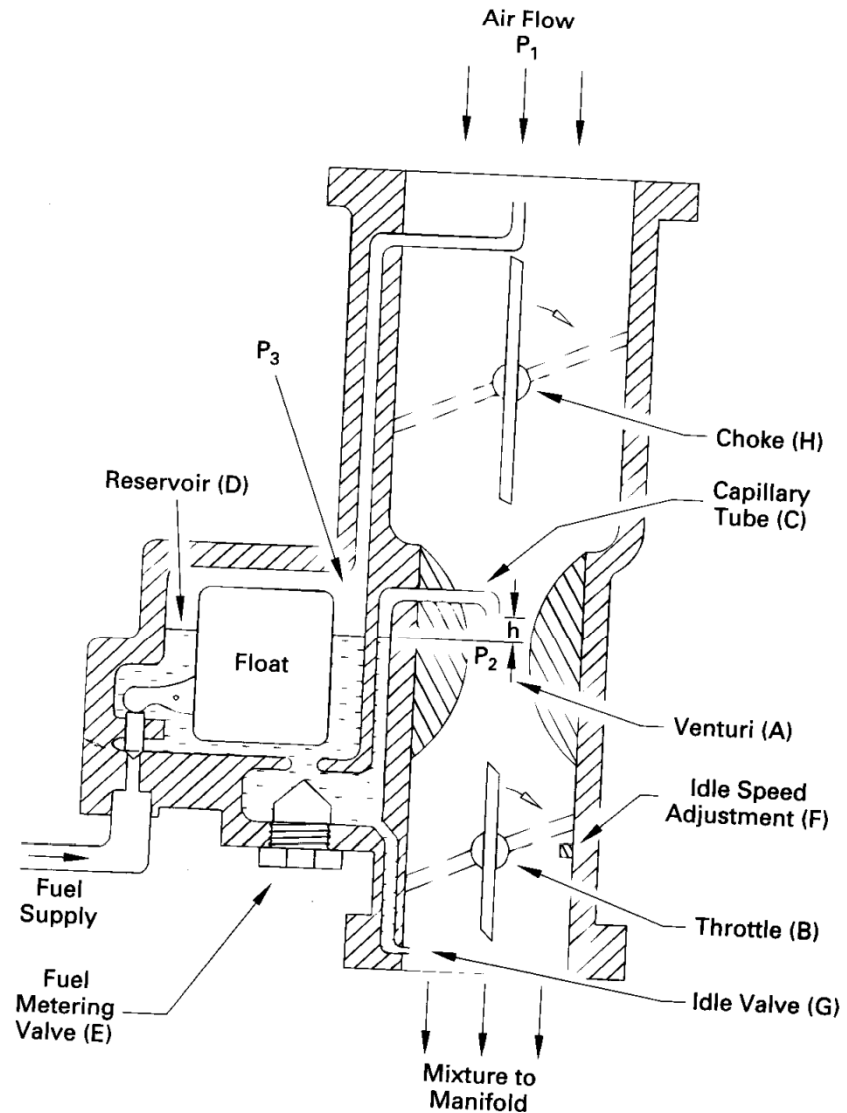
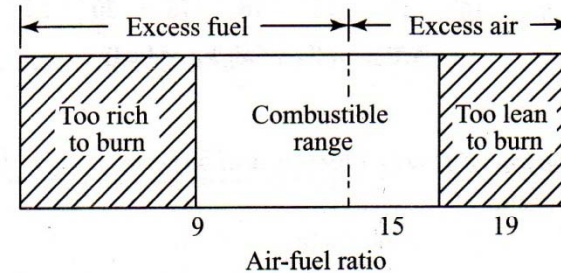


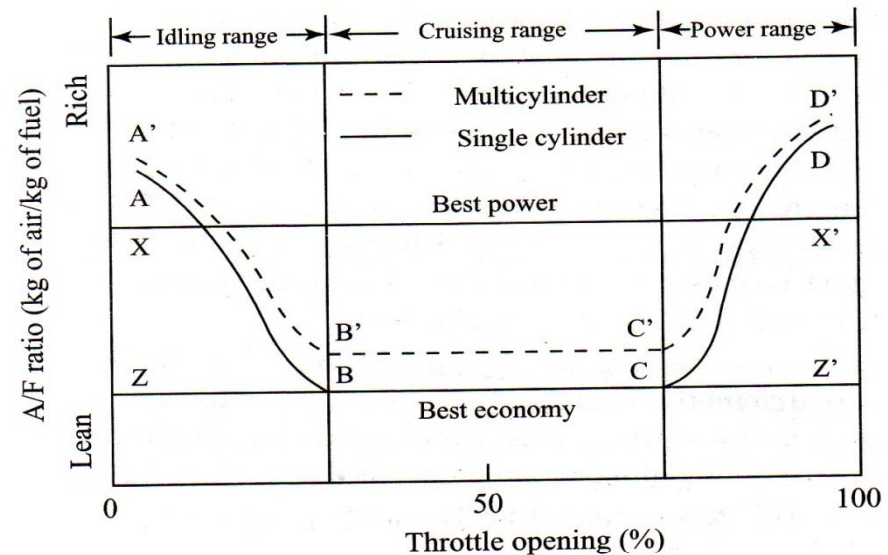
Figure 5-5 Basic automobile carburetor showing (A) venturi, (B) throttle valve, (C) fuel capillary tube, (D) fuel reservoir, (E) main metering valve, (F) idle speed adjustment, (G) idle valve, and (H) choke.

AUTOMOTIVE ENGINE AIR-FUEL MIXTURE REQUIREMENTS

- **AB** – Idling and (low load / low speed) range: for idling and slow speed, a very rich mixture is needed to overcome frictional resistance at various engine parts.
- **BC** – Normal running (medium load) range: for normal running AF of about 17 – 17.5 .
- **CD** – High load or power range (WOT): rich mixture is needed.



ig. 8.1 Useful Air-Fuel Mixture Range of Gasoline



ig. 8.3 Anticipated Carburetor Performance to fulfill Engine Requirements

SIMPLE CARBURETOR

○ Essential parts:

1. Fuel strainer
2. Float chamber
3. Main fuel metering and idling nozzle
4. Choke and throttle

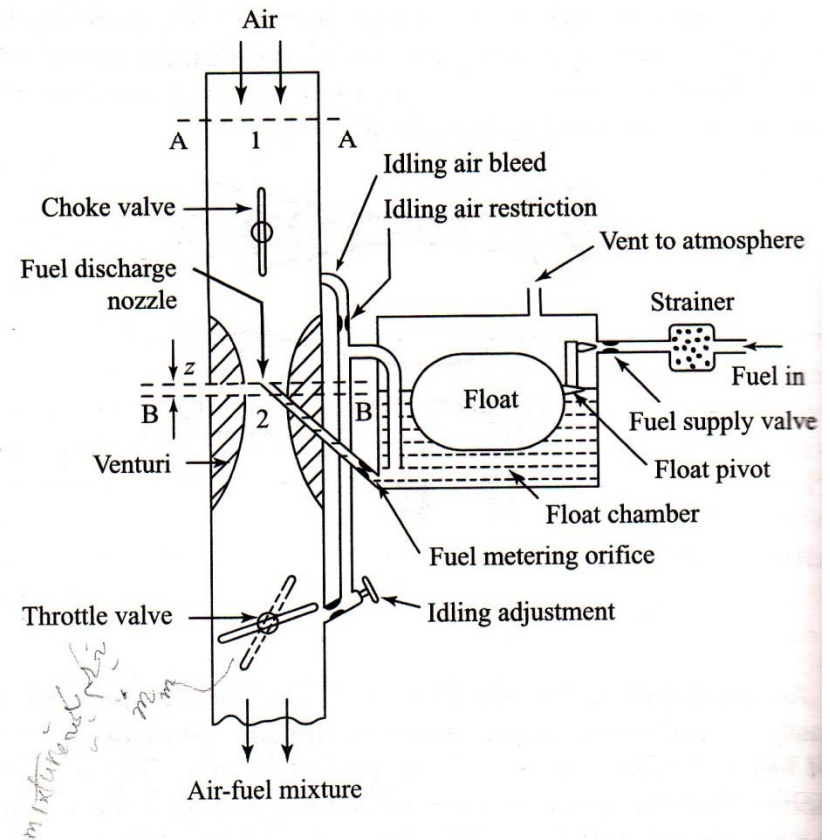
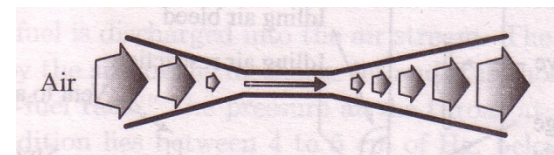


Fig. 8.7 The Simple Carburetor



DEFECTS OF A SINGLE JET CARBURETOR

1. At higher speed, the mixture becomes richer. At slow speed, the mixture becomes weaker.
2. At starting, speed of the engine is slow (weak mixture), but for starting, an extra-rich mixture is needed, thus, there will be starting difficulty. / **the idling system is used.**
3. When the throttle is pressed suddenly, the mass of air flow is increased at once, but there will be a delay in the increase of the fuel rate, so there will be an undesirable temporary weakening of the mixture. / **the accelerating pump is used.**

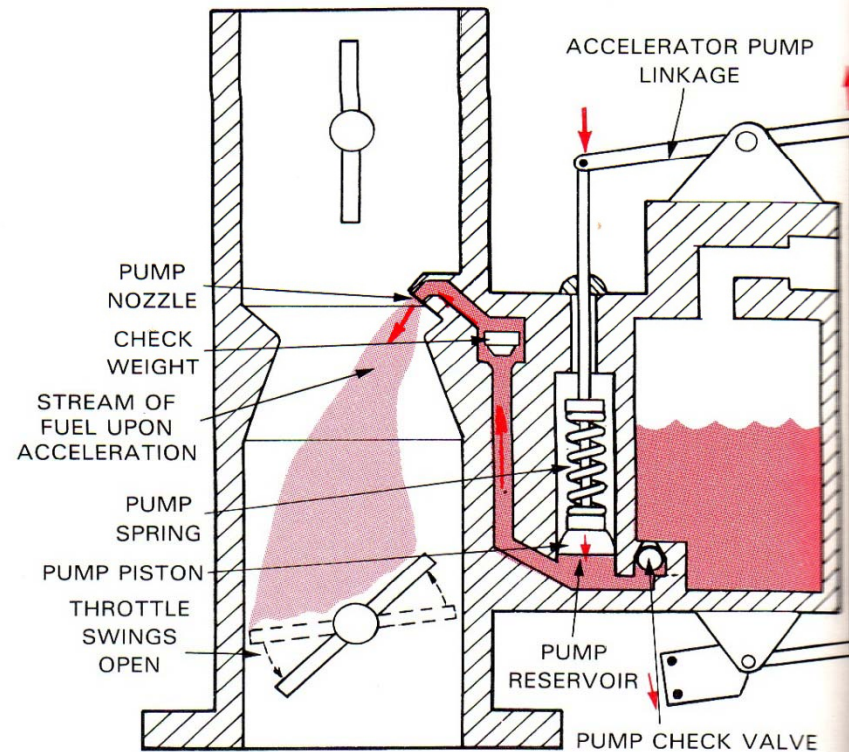


Fig. 19-14. Accelerator pump system squirts fuel into air horn every time throttle is opened. This adds fuel to rush of air entering engine and prevents temporary lean condition. Study parts names.

