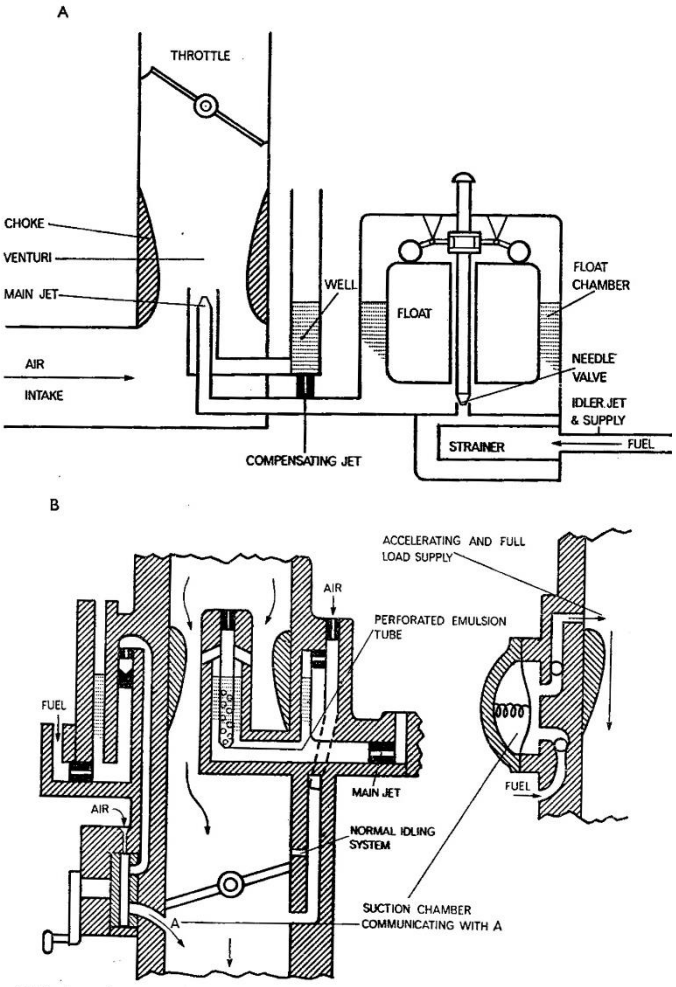
THE CARBURATION SYSTEM

Since it is essential to secure rapid and complete combustion in the cylinder of an internal combustion engine, the fuel and air mixture must be thoroughly mixed; and further, it must be in the correct proportions for all running conditions of the engine. This is accomplished by means of a device **called** a carburettor. In this carburettor, a stream of air **blown** over a jet mixes intimately with a spray of petrol **drawn** out of it. The jet is inserted into a choke or venturi in the intake manifold, and is supplied with petrol at atmospheric pressure.

During the suction stroke of the piston, the pressure in the intake manifold is below atmospheric, and air is induced through the intake and over the jet. *As there is a further drop* in pressure at the venturi, the pressure difference **produced** is large enough to draw petrol up out of the jet and atomise it. The level of the petrol in the jet is kept constant by the float and needle valve in the float chamber, which acts as a reservoir for the fuel. Above the verturi there is a throttle valve **operated** by the accelerator pedal, which controls the amount of mixture **admitted** to the cylinder.

However, this simple form of single-jet carburettor will not give correct mixture strength for all engine speeds. The chief difficulty **encountered** is that, at high running speeds, the amount of petrol **taken** up at the jet will increase faster than the increase in air-flow. Therefore a carburettor **set** to give correct mixtures at low speed will give a progressively richer mixture as the speed increases. To compensate for this, a second jet is provided, **fed** from a well open to the atmosphere and **supplied** with petrol from the float chamber. *Owing to the fact that this compensating jet is larger* than the main jet, it can supply petrol at a quicker rate than the main jet until the well is emptied. As the speed is increased, more and more of the petrol **required** is drawn from the main jet. The compensator jet can now supply only as much petrol as can pass through the small compensator orifice in the float chamber.



(A) Early carburettor with simple compensating jet
(B) Downdraught carburettor

Another problem **to be solved** is that of starting. In order to obtain the rich mixture **required** for starting, the throttle must be almost closed. *As the air velocity is then very low* in the venturi, insufficient petrol is drawn out of the jet. This difficulty is overcome by the provision of an idler jet in the wall of the intake manifold near the throttle valve. This jet will only function when the throttle is nearly closed. When it is opened for faster running, the suction round the edge of the throttle decreases, and the idler automatically ceases to act.

PATTERNS

1. Explanations of Cause (1)

Since the compensating jet is larger, it can supply more petrol. The compensating jet can supply more petrol, since it is larger. In these statements, the part which begins with since is a clause explaining why the main event took place.

2. Contracted Relative: Passage

Look at these three sentences. Each one contains a relative clause with a passive verb.

The petrol mixes with a stream of air which is blown over it.

There is a throttle valve which is operated by the accelerator.

The locomotive which was invented by Trevithick revolutionized transport.

This type of statement is very common indeed in technical writing and speech, and it is usually shortened by leaving out the words Which is and Which was:

The petrol mixes with a stream of air blown over it.

There-is a throttle valve operated by the accelerator.

The locomotive invented by Trevithick revolutionized transport.

EXERCISE

Change these statements in the same way:

1. The exhaust steam is passed over tubes which are filled, with cold water.
2. The tube area which is exposed to the incoming steam is relatively large.
3. The efficiency of an engine is the ratio of the work which is done to the heat which is received.
4. The power which is demanded from modern turbines is continually increasing.
5. The research which is being carried out on this subject is extensive.
6. The steam which is extracted from the turbine is passed through a condenser.
7. The manufacturing process which was adopted was a revolutionary one.
8. Generators which are not required for service are stopped.
9. The steel which is obtained in this way is suitable for machine tools.

1. Comprehension

A. Write a simple definition of carburetor.

B. How does it work?

C. Identify the topic of the second paragraph.

D. What is the impression of the writer about single-jet carburetor?

E. According to the writer what is the main weakness of single-get carburetor and how can it be prevented?

F. Tell the difference between the main jet and the compensating jet?

G. What type of relationship is there between the speed and the amount of petrol drawn.

H. What might be the topic of the paragraph that precedes the first paragraph?

2. Short questions

A. Summarize the text in your own words as far as practicable.

B. Write a simple verbal description of 'Early carburetor with simple compensating jet' expressed in diagram 'A'.

3. Long Discussion questions

A. Think about any other mechanical or electrical system that you came across in your life and compare that to the carburetion system.

B. How careful you should be to follow each and every step in a procedure to make it successful. In case, one step is missed in functioning a carburetor what might be its outcome?

C. Talk about the use of diagrams in technical passages and tell how did the diagrams help you to understand this passage.