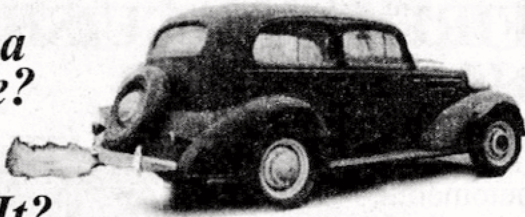


## What is a Backfire?

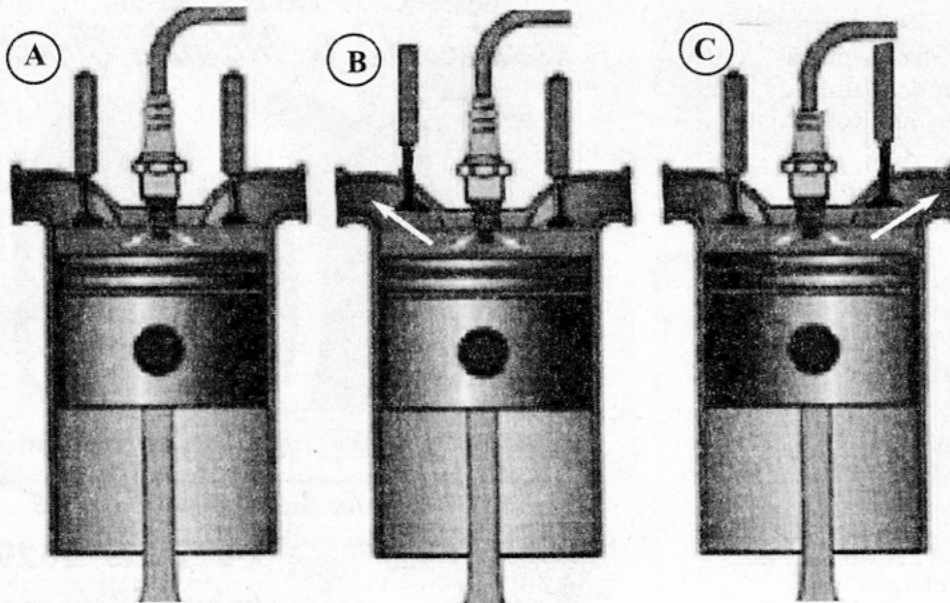
## What Causes It?



A backfire is combustion or an explosion within an internal combustion engine that occurs in the air intake or exhaust system rather than inside the combustion chamber.

When the 'explosion' occurs in the exhaust system, the cause may be either ignition or carburetion. With an ignition backfire, the problem generally occurs when the spark ignites the mixture when it is outside the combustion chamber. Timing the spark is a critical adjustment. If the spark does not occur at the exact moment that the piston is in its optimum position, unburned fuel could be pumped from the cylinder into the exhaust manifold or the muffler. If the concentration of fuel and air is right, the heat within the exhaust system could ignite the mixture – outside the combustion chamber.

With a fuel backfire there are a number of causes. Too lean a fuel mixture will burn too slowly. The flame will continue as the intake valve opens admitting additional fuel.



**A. The ideal condition: at the time of the spark, both inlet and exhaust valves are fully closed.**

**B. The inlet valve is open at time of spark, allowing the explosion to escape into the inlet manifold and out through the carburetor.**

**C. At the time of spark the exhaust valve is partially open allowing the explosion to escape into the exhaust manifold**

Leaking exhaust valves can cause a similar problem. Rather than the fuel mixture being sealed into the combustion chamber, as the piston compresses the mixture on the compression stroke, some of the air/fuel is forced out of the leaking valve into the exhaust manifold/exhaust system where an explosion can take place.

On the other hand, a backfire through the carburetor can be caused by a similar problem – a leaking intake valve. Again, the piston will force some of the mixture out of the combustion chamber into the intake manifold. Along with the mixture is the source of ignition: the spark and subsequent explosion.

But a valve leak, although a very common cause of a backfire, is not the only cause. If the valve timing is wrong, both inlet and exhaust valves may open or close too soon or too late allowing unburned fuel to ignite in places where it shouldn't.

In general though, backfiring is caused by 1) a very slow explosion or lean fuel mixture, 2) a very late explosion (ignition timing), 3) a spark occurring during the intake stroke, 4) the intake valve being (partially) open during the power stroke, or 5) premature ignition.

S.K.