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VAPORIZER FOR COMBUSTION ENGINES

This invention relates to fuel vaporising devices for combustion engines and more particularly, is concerned with improvements in devices of the kind where provision is made for using the exhaust gasses of the engines as a heating medium to aid in the vaporisation of the fuel.

One object of the invention is to provide a device which will condition the fuel in such a manner that its potential energy may be fully utilised, thereby ensuring better engine performance and a saving in fuel consumption, and preventing the formation of carbon deposits in the cylinders of the engine and the production of carbon monoxide and other objectionable gasses.

A further object is to provide a device which is so designed that the fuel is delivered to the cylinders of the engine in a highly vaporised, dry and expanded state, this object contemplating a device which is available as an exhaust box in which the vaporisation and expansion of the liquid components is effected at sub-atmospheric pressures and prior to their being mixed with the air component.

A still further object is to provide a device which will condition the components of the fuel in such a manner that they be uniformly and intimately mixed without the use of a carburettor.

A still further object is to provide a device which will enable the use of various inferior and inexpensive grades of fuel.

DESCRIPTION OF THE DRAWINGS

Fig.1 is an elevational view of the device as applied to the engine of a motor vehicle.

Fig. 1.

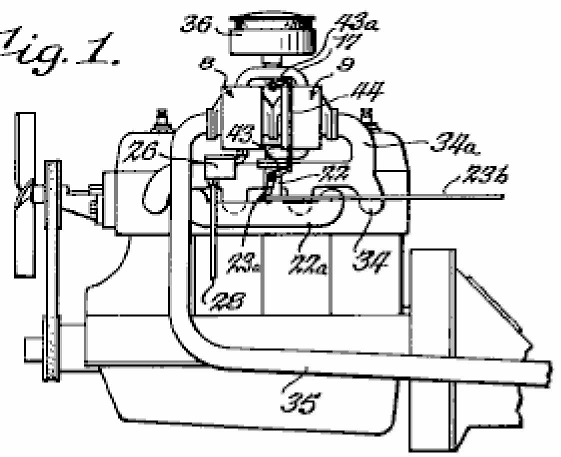


Fig.2 is an enlarged view of the device, partially in elevation and partially in section.

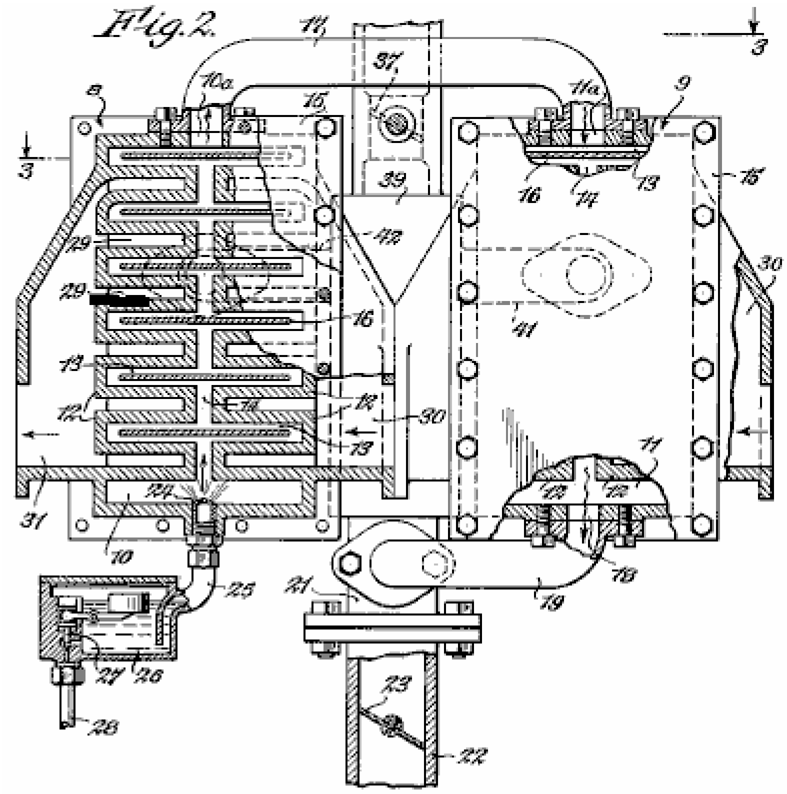


Fig.3 is a section taken along line 3--3 of Fig.2

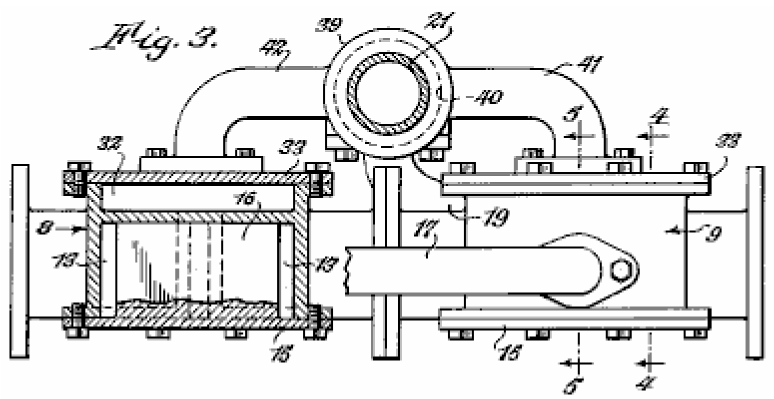


Fig.4 is a section taken along line 4--4 of Fig.3

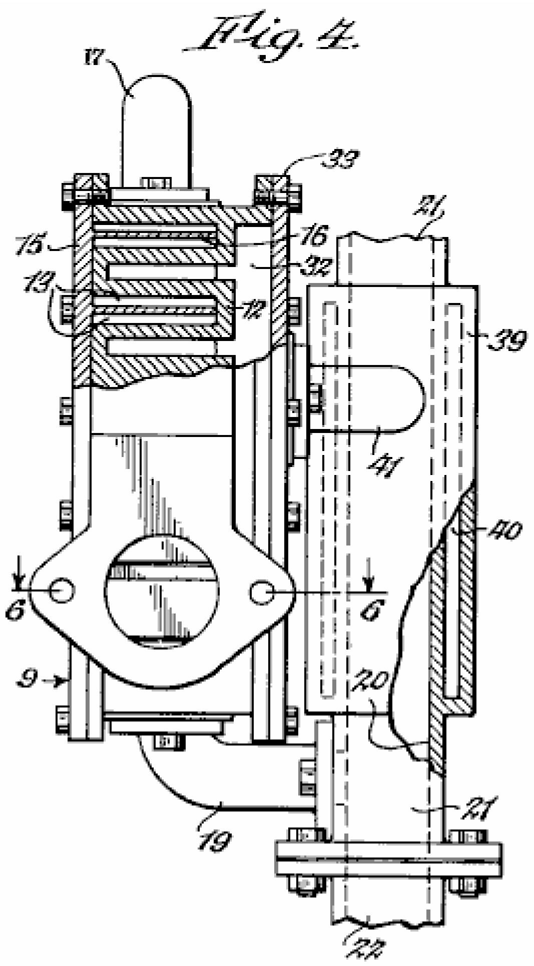


Fig.5 is a fragmentary section taken along line 5--5 of Fig.3

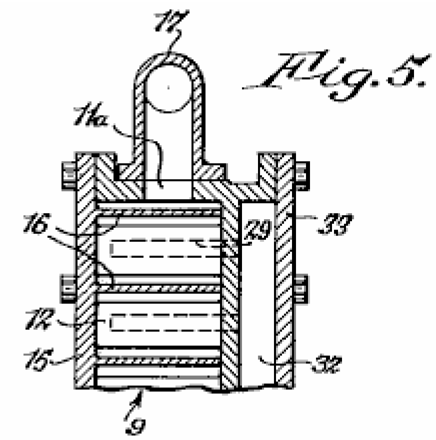
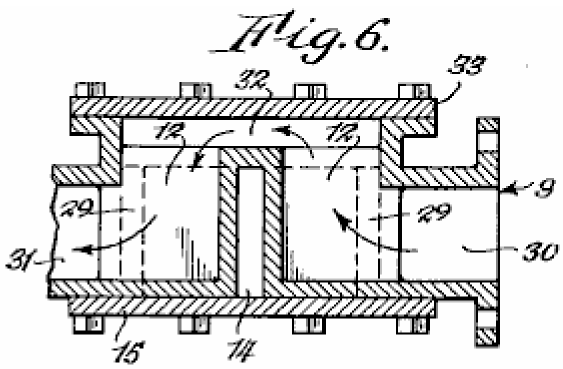


Fig.6 is a section taken along line 6--6 of Fig.4



DESCRIPTION

The device as illustrated, includes similar casings **8** and **9** which are secured together as a unit and which are formed to provide vaporising chambers **10** and **11**, respectively, it being understood that the number of casings may be varied. Two series of ribs **12** are formed in each of the vaporising chambers, the ribs of each series being spaced from one another so as to provide branch passages **13** and being spaced from the ribs of the adjacent series to provide main passages **14** with which the branch passages communicate.

The vaporising chambers are closed by cover plates **15**. The cover plates carry baffles **16** which are supported in the spaces between the ribs **12**. The baffles extend across the main passages **14** and into, but short of the ends of the branch passages **13** to provide tortuous paths. Outlet **10a** of chamber **10** is connected by conduit **17** to inlet **11a** of chamber **11**. Outlet **18** of chamber **11**, is connected by conduit **19** with mixing chamber **20** which is located at the lower end of pipe **21** which in turn is connected to and extension **22** of the intake manifold **22a** of the engine. Extension **22** contains a valve **23** which is connected by a lever **23a** (**Fig.1**) and rod **23b** to a conventional throttle (not shown).

The liquid fuel is introduced into the vaporising chamber **10** through nozzle **24** which is connected by pipe **25** to a reservoir **26** in which the fuel level is maintained by float-controlled valve **27**, the fuel being supplied to the reservoir through pipe **28**.

In accordance with the invention, ribs **12** are hollow, each being formed to provide a cell **29**. The cells in one series of ribs open at one side into an inlet chamber **30**, while the cells of the companion series open at one side into an outlet chamber **31**. The cells of both series of ribs open at their backs into a connecting chamber **32** which is located behind the ribs and which is closed by a cover plate **33**. Casings **8** and **9** are arranged end-to-end so that the outlet chamber of **9** communicates with the inlet chamber of **8**, the gasses from the exhaust manifold **34** being introduced into the inlet chamber of casing **9** through extension **34a**. The exhaust gasses enter the series of cells at the right hand side of the casing, pass through the cells into the connecting chamber at the rear and then enter the inlet chamber of casing **8**. They pass successively through the two series of cells and enter exhaust pipe **35**. The exhaust gasses leave the outlet chamber **31**, and the path along which they travel is clearly shown by the arrows in **Fig.6**. As the gasses pass through casings **8** and **9**, their speed is reduced to such a degree that an exhaust box (muffler) or other silencing device is rendered unnecessary.

It will be apparent that when the engine is operating a normal temperature, the liquid fuel introduced into chamber **10** will be vaporised immediately by contact with the hot walls of ribs **12**. The vapour thus produced is divided into two streams, one of which is caused to enter each of the branch passages at one side of the casing and the other is caused to enter each of the branch passages at the opposite side of the casing. The two streams of vapour merge as they pass around the final baffle and enter conduit **17**, but are again divided and heated in a similar manner as they flow through casing **9**. Each of the vapour streams is constantly in contact with the highly heated walls of ribs **12**. This passage of the vapour through the casings causes the vapour to be heated to such a degree that a dry highly-vaporised gas is produced. In this connection, it will be noted that the vaporising chambers are maintained under a vacuum and that vaporisation is effected in the absence of air. Conversion of the liquid into highly expanded vapour is thus ensured. The flow of the exhaust gasses through casings **8** and **9** is in the opposite direction to the flow of the vapour. The vapour is heated in stages and is introduced into chamber **20** at its highest temperature.

The air which is mixed with the fuel vapour, enters pipe **21** after passing through a conventional filter **36**, the amount of air being regulated by valve **37**. The invention also contemplates the heating of the air prior to its entry into mixing chamber **20**. To this end, a jacket 39 is formed around pipe **21**. The jacket has a chamber **40** which communicates with chamber **32** of casing **9** through inlet pipe **41** and with the corresponding chamber of casing **8** through outlet pipe **42**. A portion of the exhaust gasses is thus caused to pass through chamber **40** to heat the air as it passes through conduit **21** on its way to the mixing chamber. Valve **37** is connected to valve **23** by arms **43** and **43a** and link **44** so that the volume of air admitted to the mixing chamber is increased proportionately as the volume of vapour is increased. As the fuel vapour and air are both heated to a high temperature and are in a highly expanded state when they enter the mixing chamber, they readily unite to provide a uniform mixture, the use of a carburettor or similar device for this purpose being unnecessary.

From the foregoing it will be apparent that the components of the fuel mixture are separately heated prior to their entry into mixing chamber **20**. As the vapour which is produced is dry (containing no droplets of liquid fuel) and highly expanded, complete combustion is ensured. The potential energy represented by the vapour may thus be fully utilised, thereby ensuring better engine performance and a saving in fuel consumption. At the same time, the formation of carbon deposits in the combustion chambers and the production of carbon monoxide and other objectionable exhaust gasses is prevented. The device has the further advantage that, owing to the high temperature to which the fuel is heated prior to its admission into the combustion chambers, various inferior and inexpensive grades of fuel may be used with satisfactory results.