Nov. 17, 1964 C. F. SMITH 3,157,171

GASOLINE ECONOMIZER

Filed Jan. 31, 1963 2 Sheets-Sheet 1

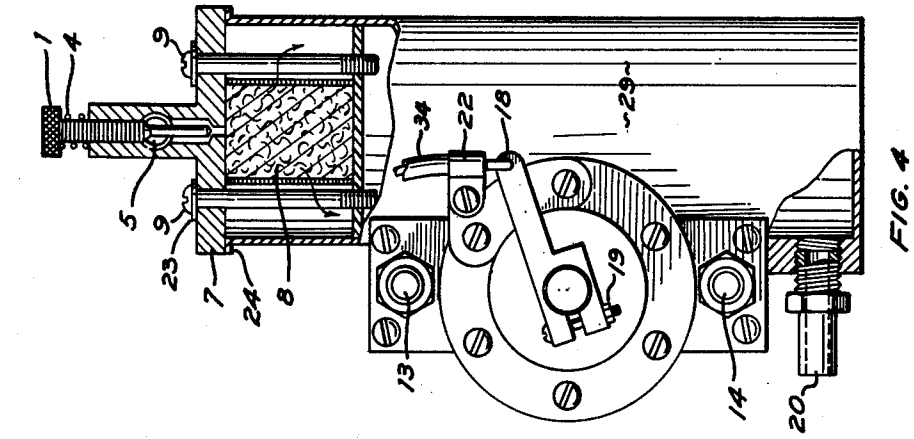


FIG. 4

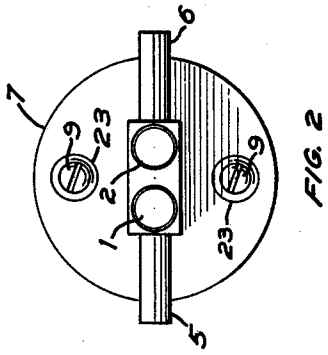


FIG. 2

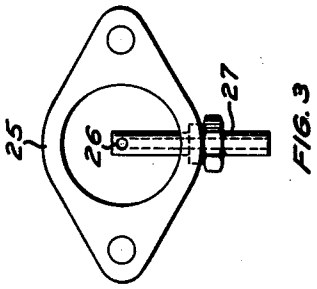


FIG. 3

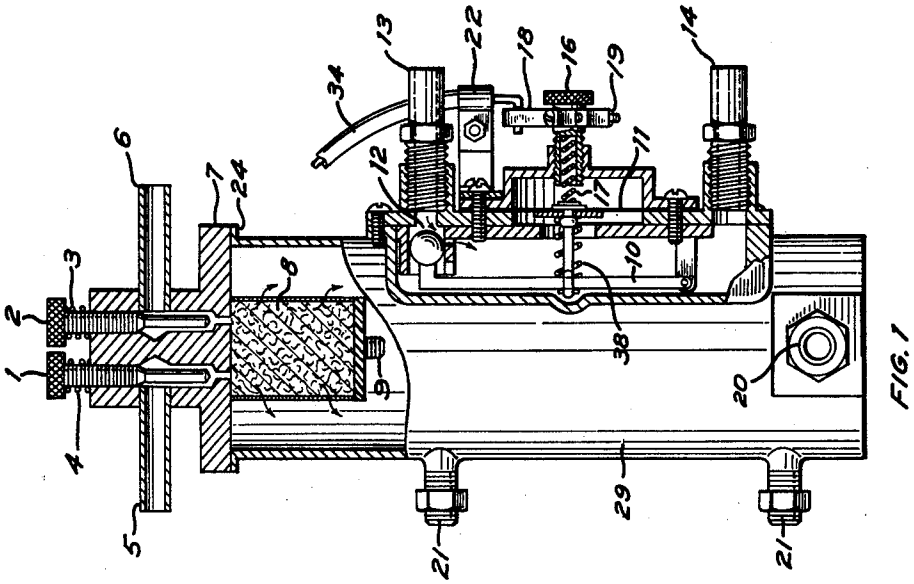


FIG. 1

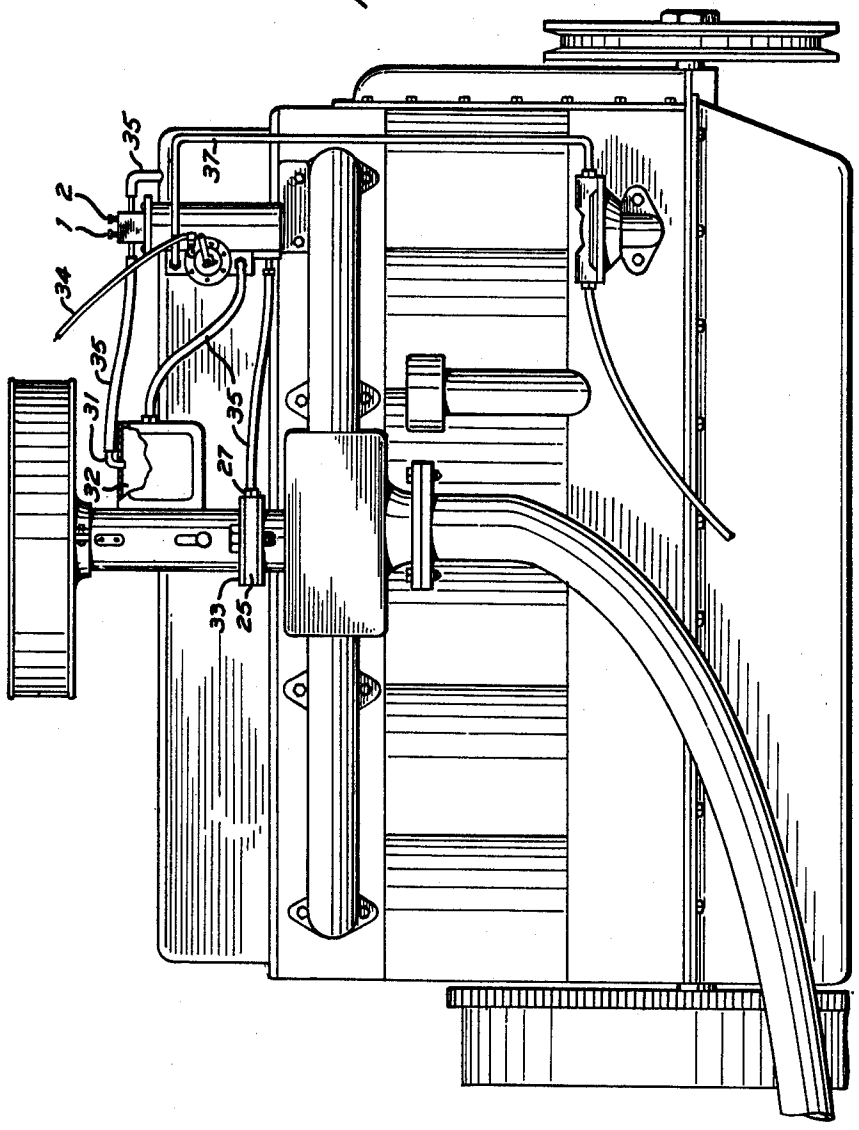
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FIG. 5



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GASOLINE ECONOMIZER

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This invention relates to internal combustion engines using gasoline as a fuel, and more particularly to an apparatus to be attached to the engine which reduces the amount or quantity of gasoline ordinarily supplied through the carburetor to the intake manifold of the engine.

Another primary object of this invention is to provide a new and approved apparatus to mix, in proper proportions, gasoline fumes from the carburetor and oil and engine waste vapors from the engine crank case or valve cover, and deliver the said mixture into the manifold.

Another object of this invention is a novel filter included in the apparatus to filter out carbon and noxious substances from the crank case vapors so they are not returned to the engine.

Another object of this invention is to lubricate pistons, rings and valves in an internal combustion engine.

Another object of this invention, by including in the apparatus an adjustable compensating constant pressure valve, is to reduce gasoline pressure to the carburetor resulting in economizing on quantity of gasoline required to efficiently operate the engine.

Still another object of the apparatus is to eliminate waste of gasoline through carburetor overflowing by means of the inclusion of the said adjustable compensating constant pressure relief valve.

With these and other objects in view, the invention consists in the novel construction, combination and arrangement and formation of parts, as will be hereinafter more specifically described, claimed and illustrated in the accompanying drawings, in which:

FIG. 1 is a sectional side view of the apparatus showing the mixing unit, control valves, the filter, the mixing chambers and the compensating constant pressure relief valve.

FIG. 2 shows a top view of the mixing unit, control valves, the cover on the mixing chambers, and the screws which fasten down the cover.

FIG. 3 is a top view of the adaptor unit which is installed on the engine between the carburetor flange and the manifold flange on the engine, and further shows the connector nipple to which a conduit tube connects to conduct the vapors from the mixing chamber to the engine manifold.

FIG. 4 is another sectional view of the apparatus showing the position of the screws holding down the cover on the mixing chambers and showing an outside view of the compensating control on the constant pressure relief valve.

FIG. 5 is a side sectional view of an internal combustion engine and shows the installation of the gasoline economizer apparatus and the hook-up of the respective connections of the said apparatus to the said engine.

More particularly referring now to the drawings the apparatus draws crank case vapors and fumes from the engine through conduit tube 35 (FIG. 5) into connector nipple 6 (FIG. 1), to be mixed with gasoline vapors from the carburetor float chamber 32 (FIG. 5), conducted through connector nipple 31 (FIG. 5) and conduit tube 35 (FIG. 5) and connector nipple 5 (FIG. 1). The vapors and fumes from both sources are mixed in proper quantities by two adjustable needle valves 1 and 2 (FIGS. 1, 2 and 4). The needle valves 1 and 2 are threaded into the cover 7 (FIG. 1) so that the needle end of the valves sets into the valve seats in the lower part of the cover 7

to control the flow of vapors and fumes passing into the primary mixing chamber and filter 8 (FIG. 1). The adjustable needle valves 1 and 2, when once adjusted to the type and size of engine, are locked in adjustment by locking springs 3 and 4 (FIG. 1), which locking springs circle the screw and are held at top end of the spring by the head of the needle valves and at the bottom end by the top of the cover 7 (FIG. 1). The cover 7 is fastened by hold down screws 9 (FIGS. 2 and 4) on chamber or tube 29 (FIGS. 1 and 4), with a sealing gasket 24 (FIGS. 1 and 4). Small gasket washers 23 (FIGS. 2 and 4) are placed under the heads of hold down screws 9. No. 8 is a filter and primary mixing chamber and is constructed of pressed fine filter material which is held in position under the adjustable needle valves 1 and 2 by the hold down screws 9 which screw into a narrow plate which is part of the mixing chamber 29.

The vapors pass through the pressed filter material 8 and are drawn into the secondary mixing chamber 29 where the mixture in highly combustible form, is drawn out of the secondary mixing chamber 29 at the outlet connector nipple 20 (FIGS. 1 and 4), where the mixed vapors are conducted through conduit tube 35 (FIG. 5) to connector nipple 27 (FIGS. 3 and 5), into adaptor plate 25 (FIGS. 3 and 5), and out through outlet nozzle 26 (FIG. 3) where the vapors mix with the normal gasoline mixture from the carburetor of the engine and pass into the manifold. The adaptor plate 25 (FIG. 5) is installed between the carburetor flange 33 (FIG. 5) and the manifold carburetor flange of the engine.

The compensating constant presssure relief valve section of the apparatus is shown by sectional view in FIG. 1 and by front view in FIG. 4. This, generally speaking, takes gasoline from the engine fuel pump under normal pressure and reduces the pressure under which the gasoline fuel is fed to the carburetor, thereby reducing carburetor activity in compensation for the added vapors produced and provided through the mixing section of the apparatus. The gasoline fuel leaves the fuel pump through usual gas line 37 into connecting nipple 13 (FIGS. 1 and 4), passing ball check valve 12 (FIG. 1) into pressure chamber of valve, and passes out through outlet connector nipple 14, (FIG. 1) to the carburetor of the engine through tubing 35 (FIG. 5). A rubber bellows diaphragm 11 (FIG. 1) fits over the pressure chamber and is held in place by a cover plate. The rubber diaphragm controls the fuel pressure to the carburetor by means of external tension spring 17 (FIG. 1). The tension on the spring is adjusted by means of pressure adjusting screw 16 (FIG. 1) which is adjusted at the time of installation of the apparatus depending on size and type of engine.

When increased pressure is required, adjusting screw 16 is turned in to increase tension on external pressure spring 17; and when decreased pressure is required adjusting screw 16 is turned in an outward direction, said adjustment screw having a right hand thread.

Lower tension internal spring 38 (FIG. 1) serves to eliminate chattering of ball valve 12 caused by pulsating of engine fuel pump. When external pressure on external pressure spring 17 (FIG. 1) is increased, ball check valve control arm 10 (FIG. 1) releases ball check valve 12 (FIG. 1) and allows engine fuel pump to build up fuel pressure to the increased setting on the adjusting screw 16 on the compensating valve. When external pressure on external pressure spring is decreased, the internal pressure in the compensating valve pressure chamber is increased, causing the control arm 10 (FIG. 1) to close ball check valve, and thusly return it to its low pressure setting.

Adjusting screw 16 is fitted with a remote control arm 18 (FIG. 1) directly under the knurled adjusting head,

said control arm 18 having a locking bolt 19 (FIG. 1) which when tightened, locks control arm 18 solid to adjusting screw 16 as shown in FIGS. 1 and 4. Said control arm is controlled by remote control cable 34 (FIGS. 1, 4 and 5) which is a standard automotive accessory flexible choke cable. Said control cable outer case is secured to the compensating valve by means of bracket 22 (FIGS. 1 and 4), said bracket having a clamp which is locked by clamp bolt to secure outer case of control cable solidly to compensating valve. The centre control wire of control cable 34 is connected to the control arm 18 (FIGS. 1 and 4) by means of a right angle bend at end of centre wire of control cable which is inserted into hole in end of control arm 18. The other end of control cable 34 is mounted on instrument panel of vehicle. With control cable 34 knob on the instrument panel of vehicle in the pulled out position, the compensating valve adjusting screw 16 (FIG. 1) is set at low fuel pressure setting with motor at operating temperature and locked in this setting by means of locking bolt 19 in control arm 18 (FIGS. 1 and 4). As oil vapors do not develop until motor crank case oil reaches near operating temperature it is necessary to raise the fuel pressure sufficient to compensate for the absence of the oil vapor. This is accomplished by pushing in on knob of remote control cable 34 (FIGS. 1, 4 and 5), which screws the adjusting screw 16 and increases the tension on external pressure spring 17 (FIG. 1), which allows engine fuel pump to raise fuel pressure to the carburetor sufficiently to compensate for the absence of oil vapors during warm up period. After the motor has reached operating temperature the knob on remote control cable 34 is pulled out to allow the compensating valve to return to its low pressure setting. Unit mounting bolts 21 (FIG. 1) are welded to body of mixing bowl of unit for securing economizer device to motor of vehicle.

Having thus described my invention, what I claim as new is:

1. In combination, an apparatus or device for internal combustion engines and a new and improved fuel supply system therefor comprising a mixing chamber mixing in two stages crank case vapors and fumes with gasoline vapors from the carburetor, a crank case vapor collecting tube, a tube for collecting gasoline vapors from the carburetor, adjustable valves to control intake of crank case vapors and gasoline fumes respectively and independently, a filter chamber comprising fine filter material therein, a sealed mixing chamber and an outlet nipple and tube to conduct highly combustible vapors into an adaptor plate contining an intake nipple and outlet nozzle to discharge mixture into manifold of engine.

2. In combination, a compensating constant pressure relief valve, a nipple connecting with gasoline fuel line, a passing ball check valve, a pressure chamber, an outlet connecter nipple and connecting conduit tube to the carburetor, a rubber diaphragm, an external tension spring controlled by an adjusting screw, a lower tension internal spring, a remote control arm to which is attached flexible cable leading to control knob, a ball check valve control arm motivated automatically by the rubber diaphragm, or manually by the flexible cable control arm assembly, a compensating valve pressure control screw and locking bolt.

3. In combination, an apparatus as in claim 2, in which said adjustable valves provide means to allow entry of proportionate amounts of crank case vapors and gasoline fumes from carburetor into mixing chamber, means of filtering from said mixture carbons and other noxious substances, means of delivering highly combustible mixture with lubricating qualities into manifold of engine.

4. In combination, an apparatus as in claim 3, to control pressure to the carburetor by compensating constant pressure relief valve, means formed in said valve for high frequency adjustment and regulation of pressure, the construction being such that when pressure increases rubber diaphragm becomes concave in pressure chamber, whereby means provided to close intake ball valve and reduce pressure, means, when pressure reduces in valve chamber, of opening ball valve and regain desired pressure.

5. In combination, an apparatus as in claim 1 providing means of automatically regulating mixture of gasoline fumes and crank case vapors once engine is at working temperature, means of manual control or regulating mixture to the manifold for cold engines and until engine attains normal operating temperature.

6. In combination, an apparatus as in claim 2 providing means of automatically regulating mixture of gasoline fumes and crank case vapors once engine is at working temperature, means of manual control for regulating mixture to the manifold for cold engines and until engine attains normal operating temperature.

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