July 3, 1934. C. W. NOVOTNY 1,964,892

GAS SAVER AND DECARBONIZER

Filed July 16, 1932 4 Sheets-Sheet 1

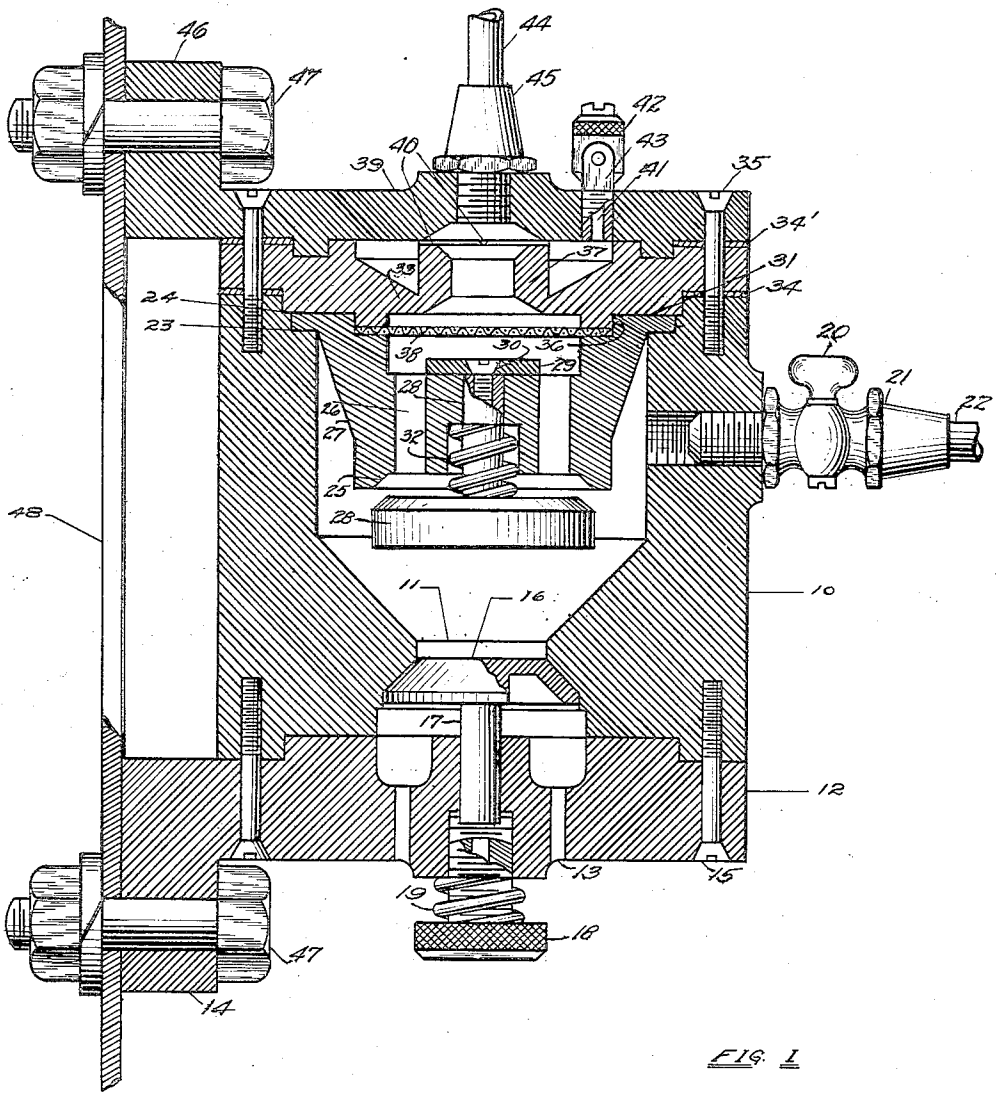


FIG. 1

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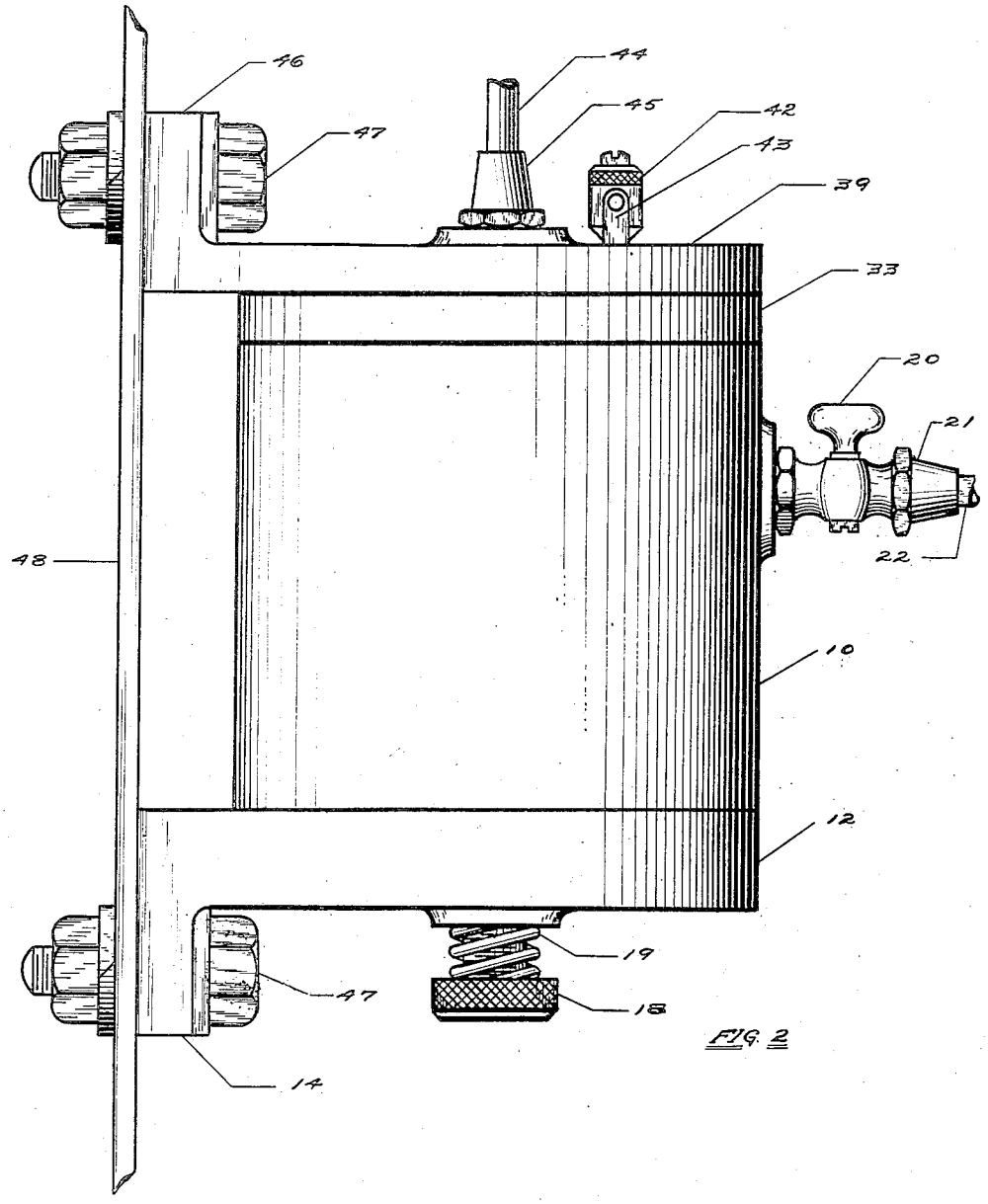


FIG. 2

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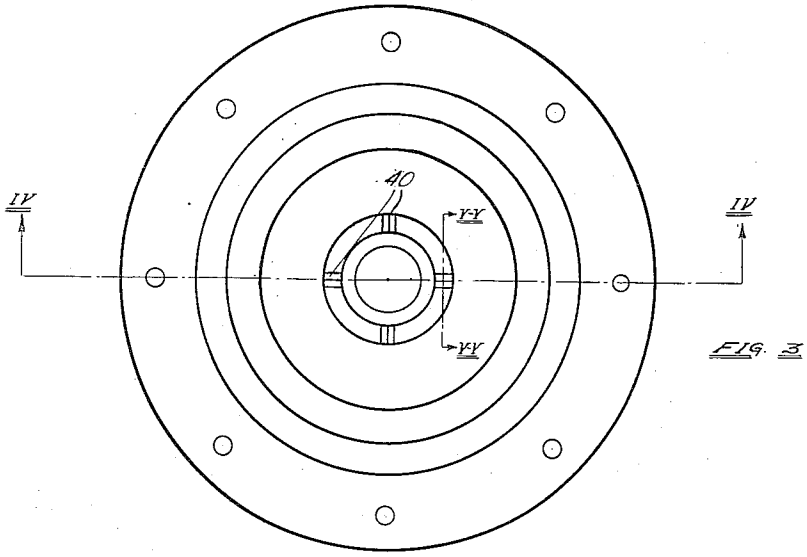


FIG. 3

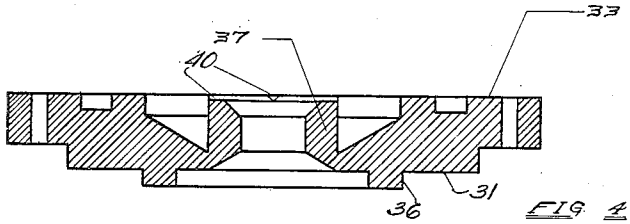
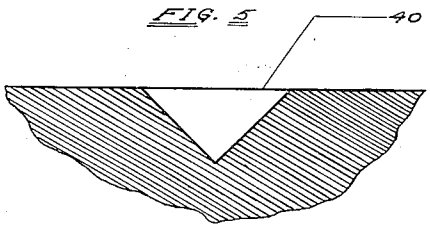


FIG. 4

FIG. 5



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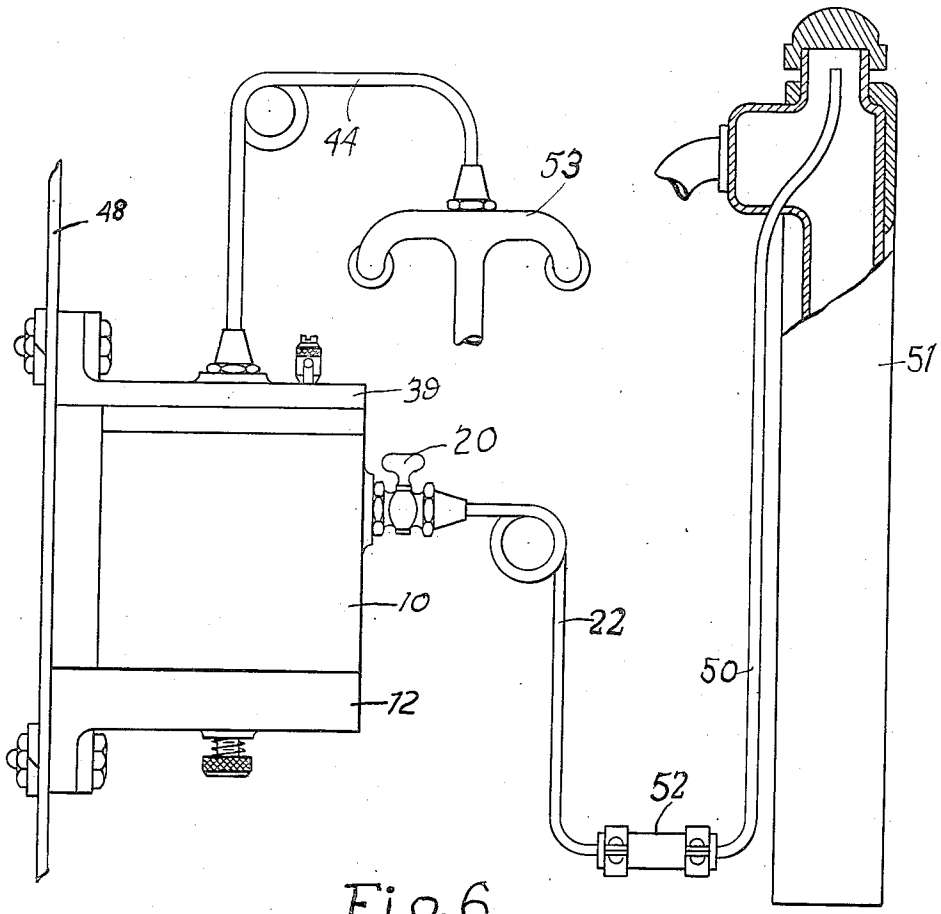


Fig. 6

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UNITED STATES PATENT OFFICE

1,964,892

GAS SAVER AND DECARBONIZER

Charles William Novotny, Cicero, Ill., assignor of one-half to John Manak

Application July 16, 1932, Serial No. 622,892

9 Claims. (Cl. 123—25)

This invention relates to a compact and practical device which is attachable to an internal combustion engine in such a way that it is adapted to selectively accumulate therein and then introduce into the internal combustion chambers of the engine a desired amount of either water vapor or the vapors of a carbon solvent, or both in proportions which effect the highest possible degree of efficiency in the combustion of the fuel introduced into the combustion chambers, and effect a considerable saving in the volume of such volatile combustion fuel, and at the same dissolve the carbon caused by combustion to permit its immediate ejection from the combustion chambers and from the exhaust valves thereof.

An important object of this invention is the provision of a device attachable near an internal combustion engine which is connected to the water cooling compartment of the radiator of the internal combustion engine and to the intake manifold thereof and in which a partial vacuum is maintained by the engine to draw a desired amount of water vapor from the radiator and convey the same to the engine intake manifold and at the same time to contain a volatile carbon solvent, the vapors of which are introduced in desired volume into the water vapor and the intake manifold of said engine, said carbon solvent being adapted to maintain the combustion engine and the valves thereof free from an objectionable amount of carbon.

A further object of the invention is the provision of a gas saver which has connections to the radiator and the intake manifold of the internal combustion engine and which includes a container for a carbon solvent therein and separated from the main chamber of the device, said container containing a volatile carbon solvent adapted to be introduced into the water vapor which is drawn out through the main chamber of my device into the intake manifold of the engine, and adjustable valve means for manually adjusting and controlling the volume of volatization of said carbon solvent.

A further object of my invention is the provision of a gas saver adapted to introduce water vapor and carbon solvent into the intake manifold of an internal combustion engine and which has a manually adjustable gravity valve in a lower opening thereof which is adapted to open to permit escape of water of condensation or overflow water which may intermittently form in my device, said valve being normally maintained in closed position by atmospheric pressure due to partial vacuum within the housing, said valve being adapted to be opened by gravity when water formed by condensation is formed about said gravity valve.

A further object of my invention is the provision of a device embodying the features set forth in the immediately preceding object and which also includes valve means within the housing which will close the housing vapor outlet by gravity action when my device is inverted, as in the case of an airplane or the like.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

This invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

Fig. 1 is a view taken in cross section through the center of my device, in showing the internal structure.

Fig. 2 is a view taken inside elevation showing my device as amended on the partition plate of the automobile body and showing the inlet and outlet conduit broken away.

Fig. 3 is a top plan view of the carbon solvent container which is shown in cross section in Fig. 1.

Fig. 4 is a cross sectional view taken on line IV—IV of Fig. 3.

Fig. 5 is a fragmentary cross sectional view taken on line V—V of Fig. 3. Fig. 6 is a side elevational view of my device illustrating the manner in which it is connected to the intake manifold and radiator.

As shown on the drawings:

The reference numeral 10 indicates a cylindrical housing preferably made of metal, the lower inners walls of which are conical and converged to an outlet port 11 as indicated in Fig. 1. A base cap 12 having a plurality of outlet ports 13 and an apertured downwardly extending mounting flange 14 is hermetically secured to the cylindrical housing 10 by means of a plurality of screws 15 which pass therethrough and threadingly engage the cylindrical housing 10. The wall of the cylindrical housing near its juncture with said base cap 12 is made to form an inverted conical valve seat as indicated in Fig. 1. A gravity valve 16 having a beveled periphery is adapted to snugly seat in the conical valve seat formed in the inner walls of the cylindrical housing 10 as clearly shown in Fig. 1. The valve has a central downwardly extending stud 17 formed integral therewith which is slidably mounted in a central

aperture formed in said base cap 12, said valve and stud being so constructed as to permit vertical movement thereof from opening to closing position and vice versa. The degree to which the valve 16 may be opened is manually regulated by a knurled headed adjusting screw 18 which threadingly and rotatably engages an enlarged threaded portion of the central aperture formed in said base cap. The adjusting screw 18 has a central longitudinal passageway therethrough, as indicated in Fig. 1, to permit the escape of any water which may flow thereinto through the aperture in which the stud 17 slides. A coil spring 19 is preferably interposed about said adjusting screw 18 between the knurled head thereof and the lower surface of the base cap 12. The operative position of the adjusting screw 18 is such that gravity will normally hold the valve 11 in open position when no partial vacuum is maintained within the cylinder 10.

A threaded side inlet port is formed in the side wall of the cylinder 10 and has threaded therein the threaded end of a manually operable cock 20, said cock 20 having connected to its other end, by means of a suitable threaded fitting 21, a conduit 22. The other end of said conduit is preferably attached to the lower end of the overflow pipe of the radiator indicated by the reference numeral 51 in Fig. 6 of the internal combustion engine by means of clamp and hose connection 52 shown in Fig. 6, or may be inserted in the upper portion of the radiator where it may receive water vapor formed within the radiator 51.

The upper and inner annular periphery of the cylinder 10 has a pair of superposed annular recesses which form a pair of superposed annular shoulders 23 and 24. An annular valve housing 27 having an external annular flange is adapted to seat in the recess of the shoulder 23, the main portion of said valve housing 27 extending downwardly. The lower periphery of said valve housing terminates in a conical valve seat 25 and has therein a plurality of normally vertical passageways 26. The valve housing 27 also has a normally vertical central aperture therethrough in which is slidably mounted the stud of a beveled gravity valve 28 which is adapted to seat in the conical valve seat 25 of said valve housing when the device is inverted. To limit the downward movement of the gravity valve and to maintain the same in open position a short distance from its valve seat, I provide a washer 29 which is secured to the upper end of the slidable stud of the valve 28 by means of a screw 30, said washer being adapted to rest upon the upper surface of the valve housing as indicated in Fig. 1. The lower end of the central aperture of the valve housing is enlarged for the convenient reception of one end of a spiral spring 32 which is mounted about the stud of the valve 28 and the tension of which is overcome by the weight of the valve 28 and the atmospheric pressure created by partial vacuum when the device is inverted to close said valve. Said spring 32 normally holds said valve in open position solely against the action of atmospheric pressure.

A metal circular ring, of the same diameter as the cylinder 10 and having an annular recess and a central aperture therein, forms a liquid receptacle 33, the annular periphery of which rests upon the upper periphery of the cylinder 10 and is hermetically sealed thereto by means of a gasket 34 and a plurality of screws 35 which also hermetically secure a cover cap which will be later described. A gasket 34' is interposed between said cap and said receptacle 33 whereby the same is hermetically sealed. The lower surface of said receptacle 33 also has a downwardly extending annular flange 36 which seats in an annular recess in the valve housing 27, a screen 38 being interposed between said flange and said seat. The liquid containing portion of the receptacle 33 being circular in shape about the central opening, the center of said receptacle 33 extends upwardly to form an annular flange 37 about the central opening. The upper periphery of said flange has a plurality of grooves 40 therein, preferably four in number, which grooves form passageways when the metal cover cap 39 is mounted therein in the manner herein described and as clearly shown in Figs. 3 and 5. The passageways formed by the grooves 40 permit restricted escape of vapor from within the circular receptacle 33 into the central opening. The metal cap 39 is circular in shape and has a central threaded outlet port which is immediately above the central opening in the receptacle 33. An inlet port 41 is formed in the cap 39 at a point where the same will communicate with the circular liquid receptacle 33 and which permits manual introduction of a liquid carbon solvent or the like into the receptacle 33. A manually operable valve 42 is mounted in said inlet port 41 and has an outer rotatable shell and a central downwardly extending portion 43 thereof which is threaded in the threaded aperture in the cap 39, said valve being adjustable to control the volume of air which may pass therethrough and through the port 41, over the surface of the volatile carbon solvent, and outwardly through passageways 40 into the central opening. Said valve is also of a construction to enable it to be moved to completely open the port 41 when liquid solvent or the like is to be poured into the receptacle 33.

A metal pipe 44 is secured in the central outlet port of the cap 39 by means of a suitable threaded fitting 45, the other end of said pipe 44 communicating with the intake manifold 53 of the engine (not shown), said pipe forming a conduit for the passageway of the vapors from within my device into the intake manifold.

An apertured flange 46 is formed integral with one end of the cap 39 and this flange, together with the apertured flange 14, provides means whereby my device is secured by bolts 47 to an apertured mounting plate 48, which in my preferred form is the dash of the vehicle body. It will be apparent that by mounting same upon the dash of the vehicle body the pipe 44 leading to the intake manifold may be relatively short, and the conduit 22 leading to the radiator may be conveniently mounted along the frame of the chassis.

The operation of my device is as follows. When the internal combustion engine to which my device is attached is at a standstill, the lower gravity valve 16 is in lowered and open position. When the engine is started and a partial vacuum is created in the intake manifold, likewise a partial vacuum is created within the cylinder 10 of my device and the conduit 44 connecting the same to the intake manifold. As quickly as such partial vacuum is created the gravity valve 16 closes and water vapor is sucked into the chamber of my device from the upper portion of the radiator and through conduit 22. Such flow of water vapor is continuous and the same passes out of my device through valve housing 25, screen 38 and through central apertures in receptacle 33 and cap 39 and into the intake manifold. The partial vacuum

maintained in the central opening in receptacle 33 and the flow of gas therethrough continually draws the vapor of the volatile carbon solvent, which is contained in the annular chamber of the container 33, the volume of such gas flow being restricted due to the size of the recesses 40. The degree to which the valve 42 is open likewise regulates the volume of air which is drawn over the surface of the volatile carbon solvent to increase its evaporation, and such influx of air also regulates the volume of volatile carbon solvent to be sucked into the intake manifold. While partial vacuum is maintained in my device, atmospheric pressure holds the valve 16 in its upper seated and closed position as long as the partial vacuum has direct contact with the inner face of said valve. A small percentage of the water vapor drawn from the radiator will condense in my device and water of condensation will accumulate until the entire surface of valve 16 is covered, thereupon causing the valve 16 to drop downwardly a short distance into open position due to the cessation of atmospheric pressure caused by the accumulation of sufficient water above the valve. When the valve 16 opens the water will immediately flow out by gravity through passageways 13.

When my device is attached to operate with an aeroplane engine it is desirable that water, either of condensation or that which may be drawn from an inverted radiator, be excluded from passage to the intake manifold. Upon inversion of the aeroplane the valve 28 will seat in the beveled recess 25 to close the openings 26 and prevent any passage of water through the passageways 26 in the valve housing. Said valve will remain in closed position until the aeroplane is inverted to normal upright position.

I am aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted hereon otherwise than necessitated by the prior art.

I claim as my invention:

1. A device for introducing carbon solvent and vapor into the cylinders of a water cooled internal combustion engine, comprising a cylindrical housing having a vapor intake port and a lower opening therein; a cap secured on said cylinder having an outlet port and an inlet port; a conduit forming communication means between the radiator and said intake port; a pipe connecting said cap outlet port and the intake manifold of the internal combustion engine; an annular receptacle having a central opening secured within said housing and adapted to contain carbon solvent; said receptacle having a central annular recessed flange whereby vapor may escape to said cap outlet port; a manually operable and adjustable valve in said cap inlet port, and an overflow gravity actuated valve adjustably mounted in the lower opening of said housing and adapted to be normally held in closed position by partial vacuum maintained within said housing.

2. A decarbonizer and vapor conveying device attachable to a water cooled internal combustion engine and adapted to introduce carbon solvent and vapor thereinto, comprising a cylindrical housing having a side inlet port and upper and lower outlet ports; a conduit connecting said inlet port and the radiator of said engine; a conduit connecting said upper outlet port and the intake manifold of the engine; an annular receptacle in said housing having a central aperture and a central annular flange extending to the ceiling housing, said flange having recesses formed therein to form restricted passageways between said receptacle and said outlet port, and a screen mounted on the lower surface of said receptacle, the internal combustion engine being adapted to maintain a partial vacuum in said housing to draw the vapor from the radiator and the volatilized carbon solvent from said annular receptacle.

3. A decarbonizer and vapor conveying device attachable to a water cooled internal combustion engine and adapted to introduce carbon solvent and vapor thereinto, comprising a cylindrical housing having a side inlet port and upper and lower outlet ports; a conduit connecting said inlet port and the radiator of said engine; a conduit connecting said upper outlet port and the intake manifold of the engine; an annular receptacle in said housing having a central aperture and a central annular flange extending to the housing ceiling, said flange having recesses formed therein to form restricted passageways between said receptacle and said outlet port; an annular valve housing mounted in said first mentioned housing; a screen between said valve housing and said receptacle, and a gravity valve slidably mounted in said valve housing adapted to close the central opening therein when the complete device is inverted.

4. In a device attachable to a water cooled internal combustion engine having a radiator and adapted to selectively and adjustably introduce water or chemical vapor into the cylinders thereof; a cylinder having an inlet port; a bottom cap hermetically secured thereto and having outlet ports and a central opening; a gravity valve adjustably mounted in said bottom cap adapted to be in closed position when partial vacuum is maintained in said cylinder and to open when liquid is formed in said cylinder; a conduit connecting said inlet port of said cylinder and the radiator chamber; an annular liquid receptacle mounted in the upper end of said cylinder and having a central opening, the central portion of said receptacle terminating in a flange having restricted recesses connecting the central opening and said receptacle whereby volatilized vapor may escape; a cap hermetically secured on said cylinder having an inlet port communicating with said receptacle, and having a central outlet port; a conduit connecting said cap outlet port and the intake manifold of said engine, and a manually adjustable valve in said cap inlet port for selectively controlling the vaporization of the receptacle contents.

5. A decarbonizer and vapor conveying device attachable to a water cooled internal combustion engine and adapted to introduce carbon solvent and vapor thereinto, comprising a cylindrical housing having a side inlet port and upper and lower outlet ports; a conduit connecting said inlet port and the radiator of said engine; a conduit connecting said upper outlet port and the intake manifold of the engine; an annular receptacle in said housing having a central aperture and a central annular flange extending to the housing ceiling, said flange having recesses formed therein to form restricted passageways between said receptacle and said outlet port; a gravity valve slidably and adjustably mounted in said lower port of said cylindrical housing and adapted to be held in closed position by atmospheric pres-

sure when a partial vacuum is maintained within said housing.

6. A decarbonizer and vapor conveying device attachable to a water cooled internal combustion engine and adapted to introduce carbon solvent and vapor thereinto comprising a cylindrical housing having a side inlet port and upper and lower outlet ports; a conduit connecting said inlet port and the radiator of said engine; a conduit connecting said upper outlet port and the intake manifold of the engine; an annular receptacle in said housing having a central aperture and a central annular flange extending to the housing ceiling, said flange having recesses formed therein to form restricted passageways between said receptacle and said outlet port; an annular valve housing mounted in said first mentioned housing; a screen between said valve housing and said receptacle; a gravity valve slidably mounted in said valve housing adapted to close the central opening therein when the complete device is inverted, and a gravity valve slidably and adjustably mounted in said lower port of said cylindrical housing and adapted to be held in closed position by atmospheric pressure when a partial vacuum is maintained within said housing.

7. A device attachable to a water cooled internal combustion engine adapted to selectively introduce water or chemical vapor thereinto, comprising an annular cover cap having an outlet port and an inlet port; a conduit connecting said outlet port and the engine intake manifold; a cylinder having its inner walls tapering downwardly to form a restricted opening and having an inlet port; an annular liquid receptacle mounted between said cap and said cylinder and having a central annular flange forming a central aperture, said flange having peripheral recesses therein to form vapor outlets; a conduit connecting said cylinder inlet port and the upper compartment of the radiator; a base cap secured to said cylinder having a central opening; a gravity valve in the opening of said base cap adapted to be held in closed position when partial vacuum is maintained in said cylinder.

8. A device for introducing carbon solvent and vapor into the cylinders of a water cooled internal combustion engine, comprising a cylindrical housing having a vapor intake port and a lower opening therein; a cap secured on said cylinder having an outlet port and an inlet port; a conduit forming communication means between the radiator and said intake port; a pipe connecting said cap outlet port and the intake manifold of the internal combustion engine; an annular receptacle having a central opening secured within said housing and adapted to contain carbon solvent, said receptacle having a central annular recessed flange whereby vapor may escape to said cap outlet port; a manually operable and adjustable valve in said cap inlet port; an overflow gravity actuated valve adjustably mounted in the lower opening of said housing and adapted to be normally held in closed position by partial vacuum maintained within said housing; a valve housing mounted on the upper part of said cylindrical housing; and a gravity valve slidably mounted in said valve housing adapted to be manually open and to be closed by gravity when the device is inverted.

9. In combination with a water cooled internal combustion engine having a radiator; a device for selectively introducing a water and a chemical vapor into the internal combustion chambers comprising a cylindrical housing having a bottom outlet port and a side inlet port; a cap having an inlet and an outlet port; a conduit connecting said cylinder side inlet and said radiator; a conduit connecting said cap outlet and the intake manifold of said engine; a manually adjustable valve in said cap inlet port, and a gravity valve in said bottom port adapted to be normally held in closed position by atmospheric pressure when partial vacuum is maintained in said cylinder, said valve being adapted to open when water accumulates in said cylinder.

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