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AUXILIARY AIR VALVE AND FUEL MODIFIER FOR INTERNAL COMBUSTION MOTORS

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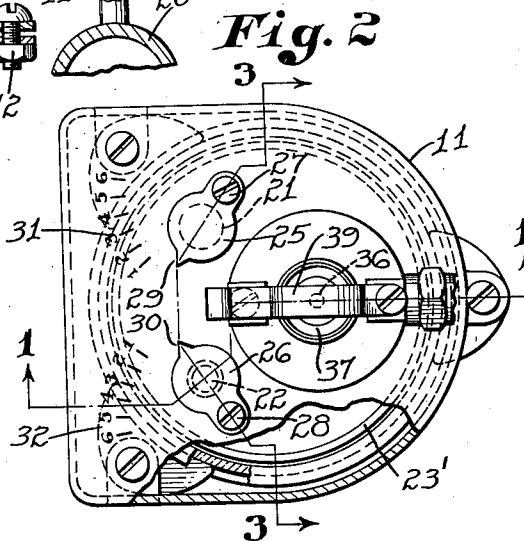
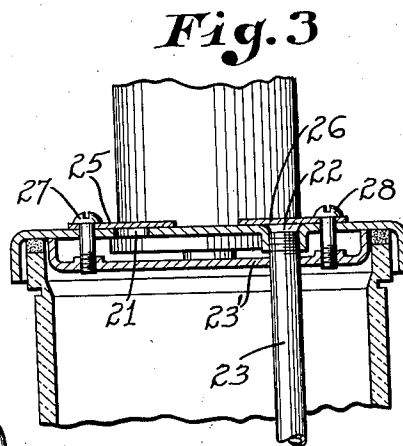
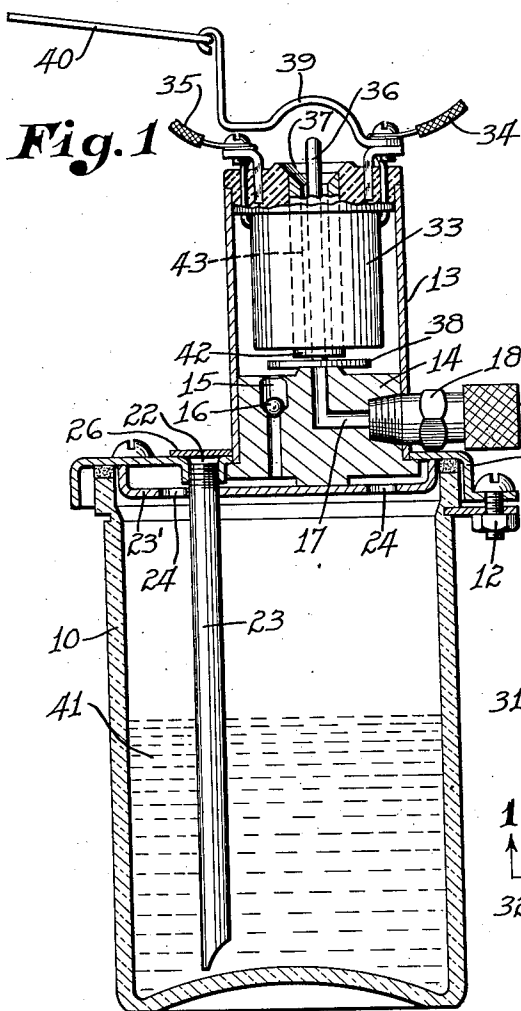
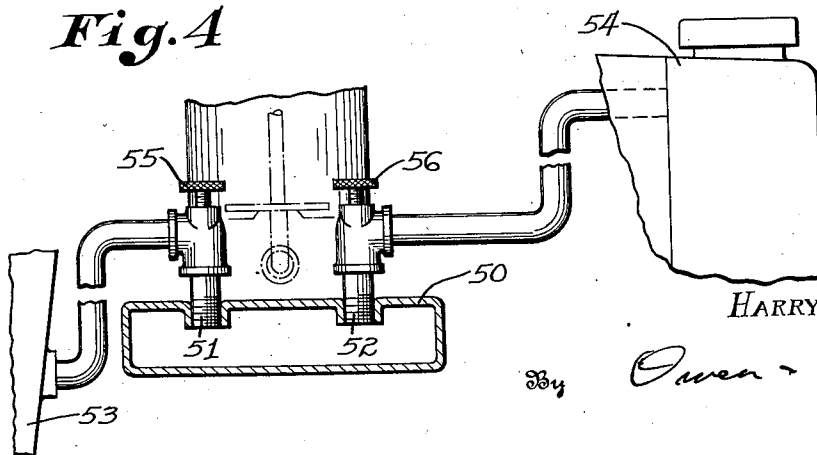


Fig. 4



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AUXILIARY AIR VALVE AND FUEL MODIFIER FOR INTERNAL COMBUSTION MOTORS

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This invention relates to a device for introducing auxiliary air into the manifold of an internal combustion motor, and modifying that air by additions of water, lubricating oil, or other mixtures.

The purpose of the invention is to provide a device whereby auxiliary air can be introduced when the motor is actuated at high speeds and cut off when the motor is actuated at low speeds, and to provide means whereby the auxiliary air may be combined with lubricating oil, water vapor, or other ingredients as desired, and in adjustable proportions. A further object of the invention is to provide means of the kind indicated, which can be utilized readily for priming purposes and also for the introduction of carbon remover when desired. Further objects and details of the invention will appear as the description proceeds.

In the accompanying drawing forming a part of this specification—

Figure 1 is a vertical section on the line 1—1 of Fig. 2 through a device embodying one form of the invention;

Figure 2 is a plan view of the device shown in Fig. 1, parts being broken away;

Figure 3 is a section substantially on the line 3—3 of Fig. 2; and

Figure 4 is a partial section and partial elevation of an alternative device, with parts broken away.

The device shown in Fig. 1 comprises a can 10 provided with a cover 11 which may be secured in place on the can by any suitable detachable means 12. Mounted upon cover 11 is a valve casing 13. In the lower part of casing 13 there is a plug 14 having a vertical bore 15 in the upper part of which there is a seat for a ball valve 16. There is also an L-shaped bore 17 from the central portion of the upper side of plug 14 and opening through one side of the plug. A nipple 18 passes through an opening in casing 13 and is screwed into plug 14 in line with the horizontal portion of bore 17. Nipple 18 may be connected by a pipe 19 to the intake manifold 20 of an internal combustion motor.

Cover 11 is provided with two openings 21 and 22. Into opening 22 there is screwed a

pipe 23 which extends downwardly to near the bottom of can 10. Beneath the cover plate there is a baffle plate 23' through which there are a plurality of perforations 24. Openings 21 and 22 are provided with covers 25 and 26 pivoted respectively at 27 and 28, the pivots being shown as the screws which fasten plate 23' to cover 11. The screws may be tightened to such a degree that friction ordinarily holds cover plates 25 and 26 in any position to which they are moved. By means of these cover plates the openings may be uncovered more or less as desired. For convenience each of the cover plates may be provided with a pointer, indicated as 29 and 30, and there may be provided markings on the cover 11 as indicated at 31 and 32, to assist in determining the degree to which the openings 21 and 22 shall be uncovered.

In the upper end of casing 13 there is an electro-magnet 33 having its terminals connected by lead lines 34 and 35 to the electrical system in such a way that the magnet is energized when the motor is running at considerable speed, but is not energized when the motor is running slowly. The electro-magnet may be connected in the generator circuit in series with the cut-out, to accomplish this purpose.

A non-magnetic valve stem 36 extends upward through the tube 42 of magnetic metal of the electro-magnet and through the flaring opening 37 above the tub. The lower end of stem 36 is attached to a disc 38 of magnetic metal which forms a valve closing bore 17 when it rests thereon by gravity and closing tube 42 when raised thereagainst by energizing the magnet.

A spring member 39 may be attached to a terminal of the electro-magnet and normally rest adjacent to but out of contact with the other terminal. A cord 40 attached to member 39 serves to bring the member in contact with the other terminal and short circuit the electro-magnet and the cord may be independently operable if desired, the connection to the choke being convenient as auxiliary air is not desired when the choke is being operated.

In the operation of the device described

above, can 10 is filled to a desired degree with liquid 41 which may be lubricating oil or water or both. Covers 25 and 26 are then adjusted to the desired positions and, the motor connected to intake manifold 20 being in operation the device will remain in operative while the motor is running slowly, but when sufficient speed is attained by the motor, solenoid 33 is energized and valve 38 rises. Thereupon valve plate 38 contacts tube 42 of the electro-magnet and thereby closes the channel 43 around stem 36, so that the space within casing 13 is closed. Thereupon, when the gases within casing 13 become sufficiently evacuated into the manifold, ball valve 16 is raised and allows air from above baffle plate 23 to enter casing 13 and pass from thence through bore 17 into the manifold. As this operation continues the air is exhausted from can 10 through openings 24 in the baffle plate until air is drawn in through pipe 23 and bubbles up through the oil or water or both in can 10. At the same time some air enters opening 21 and passes directly above the baffle plate into the lower end of bore 15. The adjustment of cover plates 25 and 26 obviously determines the proportion of air which passes directly into bore 15 from opening 21 to that which enters through opening 22 and bubbles up through the oil or water.

It will be readily seen that this construction provides a means by which auxiliary air may be supplied when the motor is running at high speeds and also the desired degree of overhead lubrication can be supplied at the same time, adjustment of cover plates 25 and 26 determining the degree of lubrication. It will be further understood that water may be used in place of oil in can 10 in order to supply the desired adjusted amount of water vapor to the motor. Also, if both water and oil are supplied to the can, the air bubbling up therethrough will carry both lubricant and water vapor, the relative amounts depending upon the relative depths of oil and water.

The device may also operate to prime the motor. With the motor at rest, the valves are in the position in which they are shown in Fig. 1, and priming fluid may be poured into conical cavity 37 and flow through cylindrical opening 43 around stem 36 into the cavity within casing 13. Thereafter valve 38 may be opened by raising stem 36, which extends upward through cavity 37 sufficiently to be manipulated for this purpose by the fingers. The priming fluid will then flow downward through bore 17 into the manifold. Such priming fluid as is trapped in the upper end of bore 15 above check valve 16 is sucked into the manifold as soon as the device is operated at sufficient speed.

When desired, the apparatus may be employed for injecting decarbonizing fluid into

the motor. If the motor is standing still or idling at a speed too slow to energize solenoid 43, the method of introducing the decarbonizing fluid may be substantially the same as described above in connection with priming the motor. If the motor is running at a speed sufficient to energize the solenoid and lift valve 38, the valve may be forcibly lowered by means of stem 36 while pouring the decarbonizing fluid into casing 13.

It will be readily understood that one or both of the air inlets may be connected to the upper part of the radiator if desired in order to add water vapor to the auxiliary air supply, and that one of the air inlets may be connected to the crank case or other source of lubricant instead of bubbling the air up through the oil in the can. In Fig. 4, an alternative form of the device is indicated diagrammatically in which the can is omitted and instead there is a casing 50 provided with openings 51 and 52, opening 51 being connected to a crank case diagrammatically indicated at 53, and opening 52 being connected to the upper portion of the radiator indicated diagrammatically at 54. Valves 55 and 56 are provided for adjusting the absolute and the relative inlet through openings 51 and 52. The control of the auxiliary air from casing 50 to the manifold, in a device such as shown in Fig. 3, may be the same as disclosed in Fig. 1 for the control of the air from can 10 into the manifold. It will be readily understood that, with a device such as shown in either Fig. 1 or Fig. 4, either of the openings may be connected to either the crank case or the radiator as desired. Therefore, any preferred combination of air, water vapor and lubricant can be utilized in this auxiliary feed device by making proper adjustment and connections.

In the preferred form of the device, the circuitous route imposed by the baffle plate upon the lubricant-carrying air aids in breaking up any sizeable drops of oil carried by the air, and the additional air introduced through opening 21 also mixes in the chamber above the baffle plate with air from beneath the plate. Furthermore, large drops of oil or unvaporized water entering the space above the baffle plate is dropped onto the plate by the air eddying thereabove, and is not taken up through channel 15 until vaporized or atomized, thus insuring that the modifying agent enters the manifold in suitable condition to mix with the fuel.

While I have shown one form of the device in considerable detail and somewhat diagrammatically indicated one possible variation, it will be readily understood that other changes may be made within the scope of this invention and the claims appended hereto.

What is claimed is:

1. A fuel modifying means for an internal

combustion motor having an inlet manifold and driving a generator, said means comprising a casing having a chamber therein, a container for oil removably attached to the underside of said casing, a connecting passage through the floor of said chamber into the upper part of said container, a tube carried by the casing, projecting downward into the container and providing a passage from the outer air to a point beneath the normal level of the oil in the container, means providing an outlet passage from the chamber to the manifold, a valve normally closing said outlet passage, and an electro-magnet connected with the wiring system of the generator and moving the valve to and maintaining it in open position during all the time the current from the generator is as great as a predetermined minimum.

2. Apparatus in accordance with claim 1 and having the casing provided with an opening from the outer air directly into the chamber in said casing.

3. Fuel modifying means for an internal combustion motor having a fuel manifold, comprising a valve, means for fully opening the valve when the motor operates above a predetermined speed and completely closing the valve when the motor operates below said speed, means providing a plurality of inlets for admitting to said valve a plurality of fluids of the class consisting of air, water and oil, means for adjusting the flow through each of said inlets to the valve, and means providing a passage from the valve to said manifold.

4. Fuel modifying means for an internal combustion motor having a fuel manifold, said means comprising a valve casing, a valve in said casing, a can, connections from one side of the valve to said manifold, connections from the other side of the valve to said can, said can being adapted to hold liquid, a tube open to the atmosphere at its upper end and opening at its lower end within the can and near the bottom thereof, means affording an inlet for fluid to the valve, in addition to that coming through said tube, and means for opening the valve while the motor operates above a predetermined speed.

5. Apparatus in accordance with claim 4 and including means for adjusting the opening through said tube.

6. Apparatus in accordance with claim 4 and including means for adjusting the effective area of said inlet.

7. Fuel modifying means for an internal combustion motor having a fuel manifold, said means comprising a casing having a valve chamber therein, means providing an outlet passage from said chamber to said manifold, a valve governing said outlet passage, a can beneath said casing and adapted to contain oil, means for admitting air into the can at a point below the normal level of

oil therein, a baffle plate above the normal level of the oil in the can and below the casing, there being an opening from said chamber into the space above said baffle plate, and means providing an air inlet into the space above said baffle plate and below said casing.

8. Fuel modifying means for an internal combustion motor having an inlet manifold, comprising a casing having a chamber therein, means providing an inlet opening through which carbon remover and fluids more readily inflammable than the normal fuel of the motor may be introduced into said chamber, means providing an outlet passage from said chamber to said inlet manifold, a container for oil, means providing a connecting passage from the upper part of the container into the lower part of the chamber, a valve in the chamber normally closing the outlet passage, but manually movable to open the outlet passage and close the inlet passage, automatic means for moving the valve to open the outlet passage and close the inlet passage when the motor operates above a predetermined speed, and a check valve in the connecting passage.

9. Fuel modifying means for an internal combustion motor, comprising a valve casing having an opening from its lower portion and a tubular inlet extending downward into the casing, said tubular inlet being adapted to receive priming fluids and carbon-removing fluids, a valve normally resting by gravity upon and closing said opening and having a stem extending upward through said inlet and sufficiently thereabove to be grasped by fingers, the upper end of said tube flaring to constitute a funnel, means other than said tube for admitting to the casing fuel-modifying fluid of the class comprising air, water and oil, and means lifting the valve against and closing said tube when the motor operates rapidly.

10. Apparatus in accordance with claim 9 and in which the last said means comprises an electro-magnet coil surrounding said tube and valve stem, and the tube is of magnetic metal and the stem is of nonmagnetic metal.

11. Apparatus in accordance with claim 9, and the next to the last said means comprising a plurality of relatively adjustable sources of fluid.

12. Apparatus in accordance with claim 9, and the next to the last said means comprising a can adapted to contain liquid and provided with an inlet from the atmosphere to a point below the level of the liquid and a relatively adjustable inlet for fluid at a point above the normal level of liquid in the can.

In testimony whereof I have hereunto signed my name to this specification.

HARRY W. PAINE.