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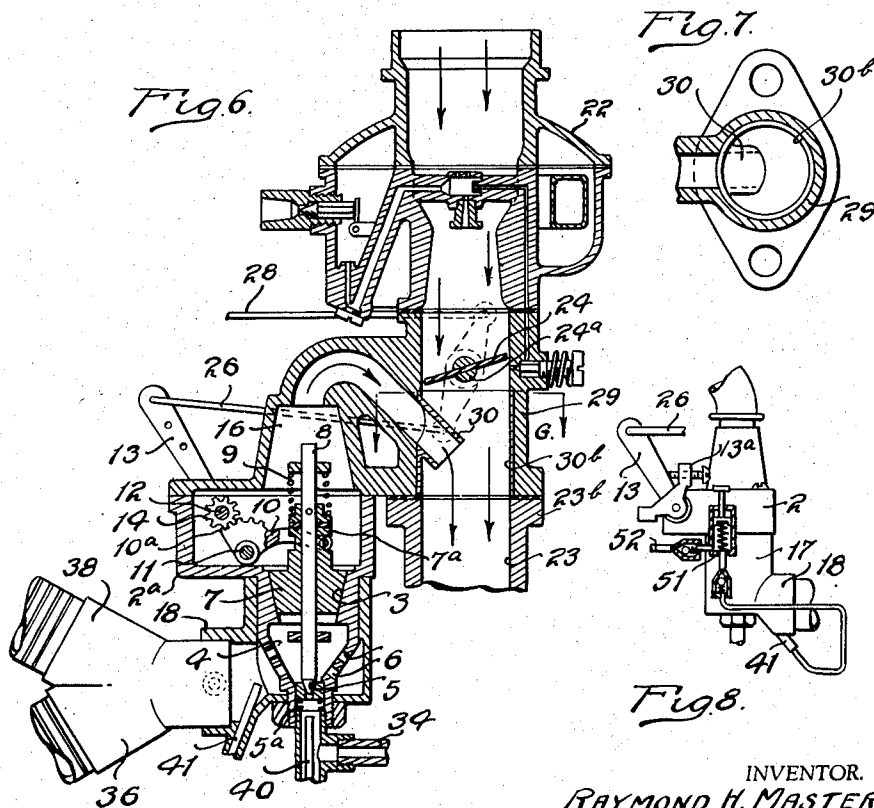
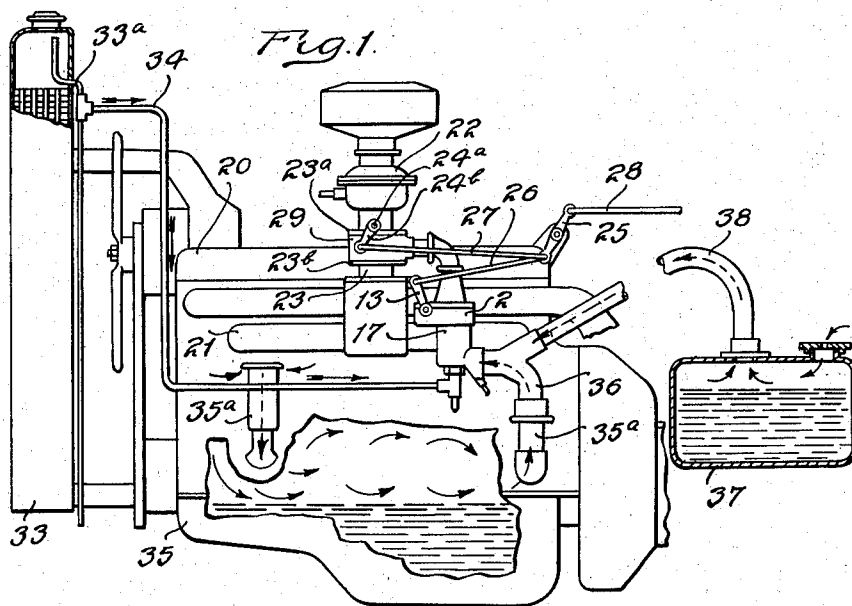
R. H. MASTERS

2,128,154

INTERNAL COMBUSTION ENGINE

Filed Jan. 11, 1937

2 Sheets-Sheet 1



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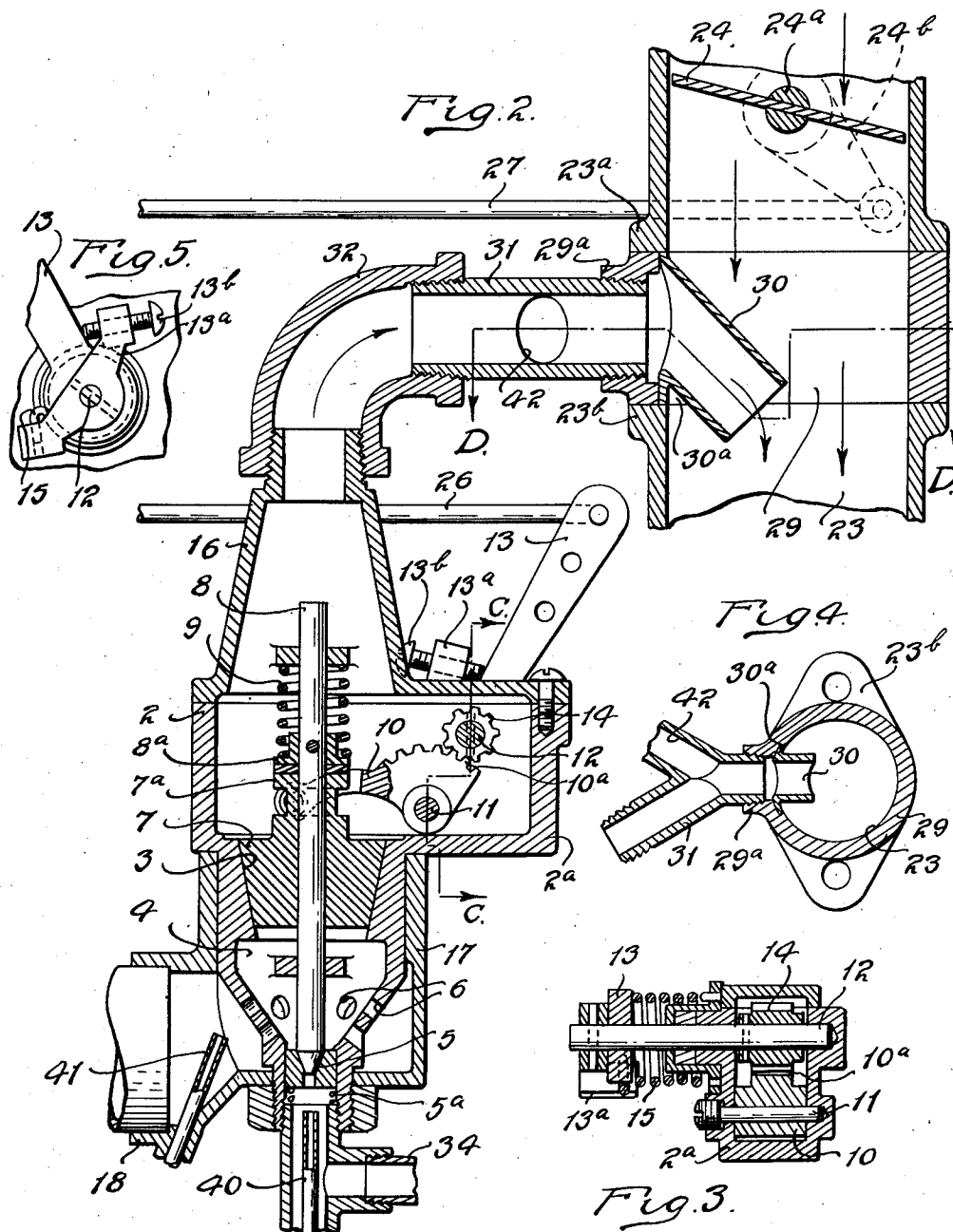
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INTERNAL COMBUSTION ENGINE

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2 Sheets-Sheet 2



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INTERNAL COMBUSTION ENGINE

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3 Claims. (Cl. 123—119)

My invention relates to a device for the useful and beneficial dissipation of vapors and waste gases and an introduction of the same into the intake of an internal combustion engine, as well as moisture as required, and also to the means for connecting said device to existing constructions.

Through extensive tests I have found that by the use of a device embodying my invention which I call a "vaporator" as hereinafter described, I can materially decrease the consumption of gasoline or fuel in an internal combustion engine.

To these ends I utilize, in part, the subject matter of United States Letters Patent Number 1,934,987 granted to me November 14, 1933 for an auxiliary air device.

In the accompanying drawings:

Figure 1 is a side elevation of so much of a conventional power plant as is necessary to illustrate the connection of my invention therewith partly broken away to show the interior of the crank case.

Figure 2 is a detail sectional elevation to an enlarged scale of apparatus embodying my present invention and a portion of the intake to the engine in connection with said auxiliary air device.

Figure 3 is a detail section on the line C—C, Fig. 2.

Figure 4 is a detail section on the line D—D, Fig. 2.

Figure 5 is a detail elevation illustrating the operation of the adjusting lever.

Figure 6 is a view similar to Figure 2 to a reduced scale, showing a modified construction connected to a down-draft carburetor.

Figure 7 is a detail section on the line G—G, Fig. 6.

Figure 8 is an elevation of a device embodying my invention to a reduced scale looking from the rear of Fig. 1, showing a fuel pump attached thereto in section.

2 is housing having a valve seat 3 in the lower wall thereof, and 4 is an air chamber forming a downward extension of the housing 2 into which the port of the valve seat 3 opens. 5 is a needle valve seat in the nipple extending below the air chamber 4 and coaxial with the valve seat 3. 6 indicates air intake ports through the wall of the chamber 4 between the valve seats 3 and 5. 7 is a valve adapted to coact with the seat 3 and having a coaxial upward extension 7a with a groove formed around it. 8 is a rod fitting and passing through a coaxial bore in the valve 7 and the extension 7a and having its lower end formed to coact with the needle valve seat 5. The valve 7 is free to slide on the rod 8. 8a is a collar pinned to the rod 8 just above the extension 7a from the valve 7. 9 is a compression spring acting upon the collar 8a to force the rod 8 downward, and

thereby the valve 7 to its seat, the lower end of said rod engaging the needle valve seat 5 to close its port.

10 is a lever arm and yoke upon a shaft 11 passing transversely across an extension 2a of the housing 2. The free end of the arm 10 engages through a suitable roller or boss in the groove of the extension 7a of the valve 7 and is provided with an arcuate rack 10a. 12 is a shaft passing transversely across the extension 2a of the housing 2 and bearing in the wall-bosses of the same. One end of the shaft 12 protrudes from the wall of the extension 2a and has pivoted thereon a lever arm 13. 14 is a pinion upon the shaft 12, its teeth engaging the teeth of the rack 10a to oscillate the arm 10.

There is a cushioning washer between the collar 8a and the top of the extension 7a from the valve 7, when said valve is on its seat and the rod 8 is at the lower end of its travel.

13a (Fig. 5) is a two-armed lever secured upon the shaft 12 so that said shaft can be rotated thereby. There is a set screw 13b in one, or it may be in each, of said levers. The arm 13 turns freely about the shaft 12 a short distance before engaging the lever 13a, or the end of the screw 13b thereon, and then contacts one of said arms or the end of a screw 13b to effect the turning of the lever 12 to actuate the arm 10 through the pinion 14 and arcuate rack 10a thus moving the valve and rod 8.

The extent of free movement of the lever 13 may be adjusted by the screw 13b. 15 is a torsion spring surrounding the shaft 12 outside of the extension 2a, one end engaging the wall of said extension and the other engaging the two-armed lever 13a to turn the shaft 12 to position the parts as shown in the drawings.

16 is a conical upward extension from the housing 2, which affords a delivery passage from said housing and a means for securing said housing to other apparatus.

17 is an inverted cap secured over and enclosing the air chamber 4, so that all the air drawn into said chamber must come through the nipple 18 extending from one wall of said cap.

The above is mainly the construction of my above named patent to which reference is made for fuller description.

Referring more particularly to Figure 1 of the accompanying drawings, 20 indicates an internal combustion engine, and 21 is the intake manifold. 22 is a down-draft carburetor and 23 is a pipe or passage leading from said carburetor to the manifold 21. Said pipe or passage has two parts which may be connected together by flanges 23a and 23b.

24 is a throttle valve in the passage 23 and 24a is the stem of the same adapted to turn in bearings in the walls of said passage. 24b is a

lever arm on the outer end of the stem 24a. 25 is a bell-crank lever. 26 is a connecting rod joining the outer end of the lever 13 with the outer end of one of the arms of the bell-crank lever 25. 27 is a connecting rod joining the outer end of the lever arm 24b to the same lever arm of said bell-crank lever as the connecting rod 26. 28 is a pull-rod leading from the bell-crank lever 25 to the operators seat. 29 is annulus adapted to be bound between the flanges 23a and 23b and form a part of the passage 23. 30 is a nipple, its upper end opening through a wall of the annulus 29 and extending inward and downward until the upper portion of its inner end comes at about the center of the passage 23 its bore opening downward and inward in said passage. 29a is an internally screw-threaded attaching flange extending outward from around the opening in the wall of the annulus 29 which opens to the bore of the nipple 30.

The nipple 30 may be part of a plate 30a adapted to fit into a dove-tailed groove as shown in Figures 2 and 4, or it may be formed as a part of annulus insert 30b as shown in Figures 6 and 7. In the latter case the wall of the annular insert may be made of the thickness required, or a number of such annuli may be kept on hand for use with different conventional apparatus.

In Figure 6, the cone 16 is shown as cast integral with the annulus 29.

31-32 are pipe sections joining the interior of the housing 2 to the nipple 30 through the interior of the conical projection 16. 33 is the radiator and 33a the overflow pipe therefrom. 34 is a pipe leading from the overflow pipe 33a near the top thereof to the inlet passage to the port of the valve 5. 35 is the crank case of the engine. 35a-35a are breather or filler pipes opening from the outer air to the interior of the crank case. Said pipes are spaced a distance from each other so that air entering one of said pipes and passing to, and out of, the other would travel through the entire space enclosed by said case. 36 is a pipe connecting the nipple 18 with one of the breather pipes 35 as shown in Figure 1.

37 is the fuel tank. 38 is a pipe connecting the nipple 18 with the interior of the gasoline tank 37 above the level of the gasoline therein.

In Figure 2, the valve seat 5 has a limited vertical movement to secure a certain engagement with the end of the rod 8 and is yieldingly pressed upward by a spring 5a.

40 is a fuel supply pipe opening to the passage leading to the port of the valve 5 and 41 is a similar pipe leading to the entrance to the cap 17 and therethrough to the air chamber 4.

A passage 42 (Fig. 2) is provided by which connection may be made to the vacuum brake operating apparatus, or wherever a vacuum is required.

As noted in my patent above referred to as the throttle 24 moves toward open position, it will also act to rotate the pinion 12 and cause the arm 10 to operate the valve 7 and rod 8 and open both ports of said valves. This allows the vacuum in the intake to draw auxiliary air into the engine which has been moistened by water vapor entering through the pipe 34.

The annulus 29 greatly facilitates the installation of the above apparatus to existing constructions.

The nipple 30 utilizes the passing gases in the

intake 23 to draw a vacuum and materially aids in the proper functioning of the device, and forming a positive vacuum independent of the throttle opening.

By drawing air from the crank chamber the gases passing the piston and the vapors and gases formed therein, which are there often injurious, are conveyed to the combustion chamber where they aid combustion and thereby economize fuel. The lubricating oil in the crank case is kept cooler and free from contamination and acidity. The oil is carried to the cylinder and furnishes cylinder top oiling.

I have also found that a liquid or vapor as from fuel oil may be introduced through the pipe 40 or 41 and will be properly burned in the mixture and especially that heavy oils introduced at 40 where it is mixed with moisture, is completely and efficiently burned in the operation of the engine.

I also find that by the use of the above apparatus the deposit of carbon is lessened and knocking largely obviated.

Much gasoline is wasted by evaporation in the fuel tank. By drawing this vapor to the engine this waste is avoided.

Referring to Figure 8, 51 is a small pump which will be connected to the carburetor, or fuel tank 37 by its supply pipe 52, the plunger of which will be actuated by the lever 13a, to force liquid fuel through the delivery pipe 41 into the nipple 18.

What I claim is:

1. In combination, an internal combustion engine having an intake passage, a part adapted to be inserted into said passage having a wall adapted to form a portion of the wall of said passage and having an aperture through its wall, a second part adapted to fit within said first part and having an aperture through its wall adapted to register with the aperture through the wall of the first named part, the aperture through said second part extending inward in a nipple and in the direction of flow of gas in said passage and opening at its inner end in the direction of flow of said gas.

2. In combination, an internal combustion engine having an intake passage, a part adapted to be inserted into said passage having a wall adapted to form a portion of the wall of said passage and having an aperture through its wall and a longitudinal groove in its inner wall including said aperture, a second part adapted to be removably inserted in said groove and having an aperture adapted to register with the first named aperture and extending inward in a nipple and in the direction of flow of gas in said passage and opening at its inner end in the direction of flow of said gas.

3. In combination, an internal combustion engine having an intake passage, a part adapted to be inserted into said passage having a wall adapted to form a portion of the wall of said passage and having an aperture through its wall, an annular part adapted to fit and be removably inserted in the first mentioned part having an aperture adapted to register with the first mentioned aperture and extending in a nipple and in the direction of flow of gas in said passage and opening at its inner end in the direction of flow of said gas.

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