Dec. 15, 1936. A. M. BALOGH 2,064,720

FUEL MIXER

Filed Oct. 2, 1934

Fig. 1.

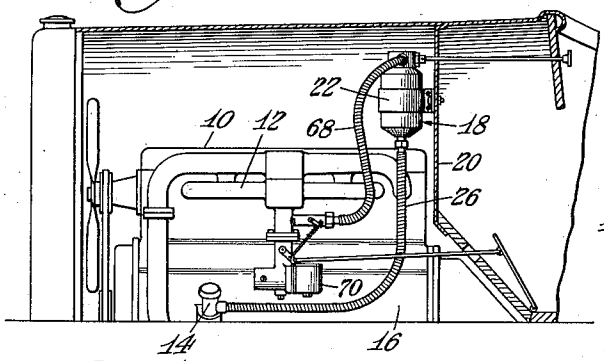


Fig. 2.

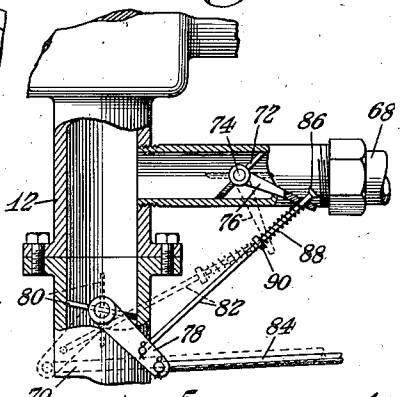


Fig. 3.

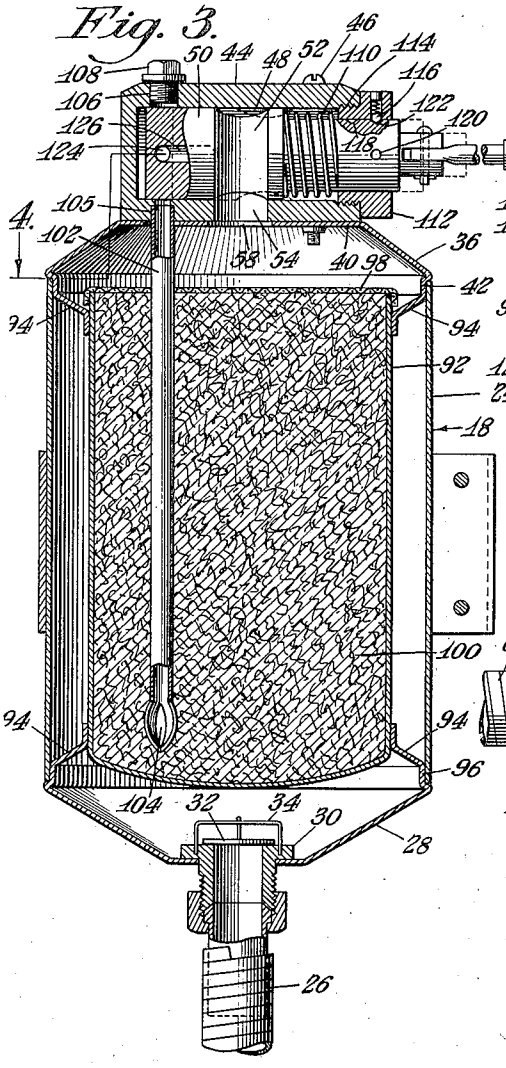


Fig. 4.

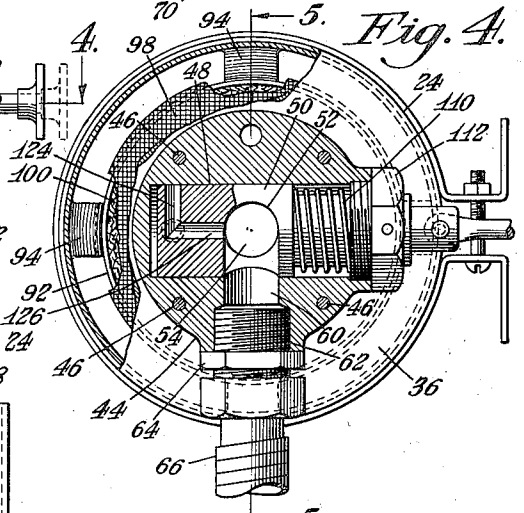
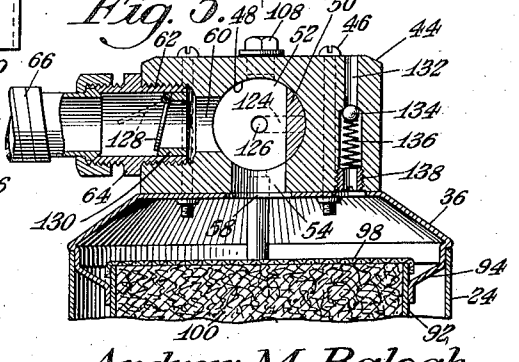


Fig. 5.



Andrew M. Balogh
INVENTOR

BY Victor J. Evans & Co.
ATTORNEY

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FUEL MIXER

Andrew M. Balogh, Chicago, Ill., assignor of one-half to Earl L. Hoyles, Chicago, Ill.

Application October 2, 1934, Serial No. 746,569

14 Claims. (Cl. 123—119)

My invention relates to internal combustion engines, and has among its objects and advantages the provision of improved means for reclaiming fuel passing to the crank case by reason of leakage between the pistons and their cylinders. The invention also embodies means whereby highly explosive fuel vapors are mixed with the fuel delivered to the engine.

In the accompanying drawing:

Fig. 1 is a side elevation of an engine embodying the invention;

Fig. 2 is a sectional view illustrating a valve control for the device;

Fig. 3 is an enlarged sectional view of the invention;

Fig. 4 is a sectional view along the line 4—4 of Fig. 3; and

Fig. 5 is a sectional view along the line 5—5 of Fig. 4.

In the embodiment selected to illustrate my invention, I make use of an internal combustion engine 10 provided with the usual intake manifold 12 and a breather pipe 14 for the crank case 16. My invention comprises a tank structure 18 mounted upon the wall 20 through the medium of a bracket 22.

The tank structure comprises an outer drum 24 having communication with the breather pipe 14 through the medium of a conduit 26. In Fig. 3, I illustrate the drum 24 as being provided with a tapered bottom 28 having a valve plug 30 connected with the conduit 26. The valve plug is provided with a valve plate 32 arranged to permit vapors from the crank case to enter the drum. The disc comprising the valve 32 is freely housed between two wire loops 34 fastened to the valve plug 30.

The opposite end of the drum 24 comprises a top 36 having a flat part 40 and a flange 42 pressed into the open end of the drum 24. I mount a valve head 44 upon the flat part 40 through the medium of bolts 46. This valve head is provided with a bore 48 within which I position a rotary valve plug 50. I provide the plug 50 with a transverse opening 52 arranged to communicate with a bore 54 in the head 44. In Fig. 3, I illustrate the flat part 40 as being provided with an opening 58 in alignment with the bore 54 so that communication is established with the interior of the drum 24.

Referring to Fig. 4, the head 44 is provided with a bore 60 communicating with the bore 48 and having an enlarged threaded opening 62 for the reception of a connecting element 64 having a threaded connection with a conduit 66 communicating with the fuel conduit 68 connecting the carburetor 70 with the manifold 12. Thus, it will be seen that the interior of the drum 24 may be arranged in communication with the manifold when the valve 50 is adjusted according to Figs. 3, 4, and 5.

The structure thus far described provides means whereby the fuel passing to the crank case 16 by reason of leakage between the pistons and the cylinder walls may be reclaimed. This fuel, together with other hot vapors, usually passes to the atmosphere through the medium of the breather pipe 14. I provide a control for the material flowing through the conduit 66. This control comprises a butterfly valve 72 arranged within the conduit 66 for rotation about the axis 74 through the medium of an arm 76.

The free end of the arm 76 is connected with the arm 78 associated with the conventional throttle valve 80 through the medium of a link 82. Adjustment of the throttle valve 80 is made in the usual way through the medium of the foot operated rod 84. In the idling position of the throttle valve 80, the valve 72 is closed. I prefer to arrange the link 82 so that the throttle valve 80 will be open partly before the valve 72 is moved. To this end, the free end of the arm 76 is provided with an opening for loosely receiving the headed end 86 of the link 82. I mount a spring 88 upon the link 82 and position one end in abutting relation with a fixed collar 90 and the opposite end in abutment with the arm 76.

It will be noted that the head of the end 86 is positioned in spaced relation with the free end of the arm 76 so that the shifting of the arm 78 associated with the throttle valve 80 does not move the arm 76 until the throttle valve has been opened partly. The valve 72 provides an effective closure during the throttle adjustment of the valve 80 so that no material can enter the conduit 68 during the throttle adjustment. To secure efficient operation of the engine, I find it advantageous to defer the opening of the valve 72 until the throttle valve has been opened partly. In other respects the two valves are adjusted simultaneously through the medium of the foot operated apparatus.

Within the outer drum 24 I mount an inner drum 92 secured in place by brackets 94 comprising integral reaches of the bottom 28 and the top 36. The bottom 28 is provided with a flange 96 of the same type as the flange 42. The upper brackets 94 may be welded to the inner drum 92, while the ends of the cylindrical part of the drum 94 may be welded to the flanges 42 and 96. How-

ever, I prefer to make the top **36** removable which may be accomplished by providing a snug liquid-tight relation between the flange **42** and the drum **24**.

I place a screen **98** over the open end of the inner drum **92** and fill the drum with a sponge **100**. The drum is provided with a supply of highly volatile fuel. I have found a mixture made up of the following ingredients and proportions to provide satisfactory results:

	Ounces
Ether	1
Gasoline (high test)	35
Machine oil	4

This fuel is supplied to the inner drum **92** through a tube **102** which has its lower end positioned close to the bottom of the inner drum. The bottom of the tube is closed, slightly enlarged, and slotted at **104** to provide inlet openings for the fuel mixture. The other end of the tube is firmly secured within a bore **105** in the head **44** and may be placed in communication with the bore **48** when the valve plug **50** is moved longitudinally to the dotted line position of Fig. 3.

In the dotted line position of the valve, the fuel mixture may be poured through the opening **106** closed by the cap **108**. Normally the valve **50** is held in the position of Fig. 2 by a coil spring **110** having one end abutting against the enlarged part of the valve and its other end abutting the end of the screw plug **112** fastened within the threaded part of the bore **48**.

To hold the valve **50** in various adjusted positions, I provide a spring pressed ball **116** arranged to lie within recesses **118**, **120**, and **122** in the plug. This ball yields upon the application of a predetermined force upon the valve plug to permit rotation and longitudinal shifting.

In operation, the valve **50** is adjusted to the position of Fig. 3 at which time the vapors originating in the crank case of the engine are sucked into the conduit **68** and delivered to the engine with the fuel from the carburetor. During such normal operation, vapors generated in the inner drum **92** pass through the screen **98** and commingle with the vapors coming from the crank case. The addition of the vapors from the inner drum **92** to the fuel delivered to the engine provides a highly efficient fuel mixture and results in improved engine efficiency.

Over a long period of use some of the oil in the vapors passing through the device from the crank case may condense and settle in the inner drum **92**. Any large accumulation of such oil may be removed by rotating the valve **50** to establish communication with the tube **102**, through the bores **124** and **126**, while the engine is operating, so that the accumulated oil will be sucked out of the container.

In Fig. 5, I illustrate a flap valve **128** movably connected with a tubular support **130** arranged within the element **64**. The valve is arranged to permit free movement of vapors to the intake manifold, but provides an effective closure in the event of back pressure, such as back firing.

Without further elaboration, the foregoing will so fully explain my invention that others may, by applying current knowledge, readily adapt the same for use under various conditions of service.

I claim:

1. The combination with an internal combustion engine having an intake manifold and a crank case, of a double drum structure, one of said drums having communication with the crank case and the intake manifold, the other of said drums having communication with the intake manifold, the latter drum being arranged to contain a highly volatile fuel, and a single valve for cutting off communication between either of the drums and the intake manifold.

2. The combination with an internal combustion engine having an intake manifold and a crank case, of a double drum structure, one of said drums having communication with the crank case and the intake manifold, the other of said drums having communication with the intake manifold, the latter drum being arranged to contain a highly volatile fuel, a single valve for cutting off communication between either of the drums and the intake manifold, and a tube operatively associated with said valve and having an end arranged in operative relation with the lower end of the said other of said drums.

3. The combination with an internal combustion engine having an intake manifold and a crank case, of an inner drum and an outer drum, the outer drum having communication with the crank case and the intake manifold, the inner drum having communication with the intake manifold, the inner drum being arranged to contain a highly volatile fuel, a single valve for cutting off communication between either of the drums and the intake manifold, and a tube operatively associated with said valve and having an end arranged in operative relation with the lower end of the said inner drum.

4. The combination with an internal combustion engine having an intake manifold and a crank case, of an inner drum and an outer drum, the outer drum having communication with the crank case and the intake manifold, the inner drum having communication with the intake manifold, the inner drum being arranged to contain a highly volatile fuel, a single valve for cutting off communication between either of the drums and the intake manifold, a tube operatively associated with said valve and having an end arranged in operative relation with the lower end of the said inner drum, and flap valves controlling the communication between the outer drum and the crank case and the communication between the two drums and the intake manifold.

5. The combination with an internal combustion engine having an intake manifold and a crank case, of a double drum structure, one of said drums having communication with the crank case and the intake manifold, the other of said drums having communication with the intake manifold, the latter drum being arranged to contain a highly volatile fuel, a single valve for cutting off communication between either of the drums and the intake manifold, and a tube operatively associated with said valve and having an end arranged in operative relation with the lower end of the said other of said drums, to feed said volatile fuel to the intake manifold.

6. A device of the type described comprising an outer drum arranged for communication with the crank case of an automobile, a valve controlled outlet for said outer drum, a conduit associated with said valve controlled outlet to establish communication with the intake manifold of the automobile, an inner drum arranged within said outer drum in spaced relation therewith, and means arranged for establishing communication between the inner drum and said valve controlled outlet, the valve being construct-

ed and arranged to cut off the communication between either of the drums and the intake manifold.

7. A device of the type described comprising an outer drum arranged for communication with the crank case of an automobile, a valve controlled outlet for said outer drum, a conduit associated with said valve controlled outlet to establish communication with the intake manifold of the automobile, an inner drum arranged within said outer drum in spaced relation therewith, means arranged for establishing communication between the inner drum and said valve controlled outlet, the valve being constructed and arranged to cut off the communication between either of the drums and the intake manifold, said means comprising a tube having one end arranged in operative relation with said valve controlled outlet and its opposite end arranged in closed relation with the bottom of the inner drum, and a filler body positioned within said inner drum.

8. A device of the type described comprising an outer drum arranged for communication with the crank case of an automobile, a valve controlled outlet for said outer drum, a conduit associated with said valve controlled outlet to establish communication with the intake manifold of the automobile, an inner drum arranged within said outer drum in spaced relation therewith, means arranged for establishing communication between the inner drum and said valve controlled outlet, the valve being constructed and arranged to cut off the communication between either of the drums and the intake manifold, said means comprising a tube having one end arranged in operative relation with said valve controlled outlet and its opposite end arranged in closed relation with the bottom of the inner drum, a filler body positioned within said inner drum, said outer drum being provided with a flap valve arranged in the path of communication between the drum and the crank case, and a flap valve arranged within said valve controlled outlet opening.

9. A device of the type described comprising an outer drum arranged for communication with the crank case of an automobile, a valve controlled outlet for said outer drum, a conduit associated with said valve controlled outlet to establish communication with the intake manifold of the automobile, an inner drum arranged within said outer drum in spaced relation therewith, means arranged for establishing communication between the inner drum and said valve controlled outlet, the valve being constructed and arranged to cut off the communication between either of the drums and the intake manifold, said means comprising a tube having one end arranged in operative relation with said valve controlled outlet and its opposite end arranged in closed relation with the bottom of the inner drum, and a filler body positioned within said inner drum, one end of said inner drum being open, and a screen arranged over the opening.

10. A device of the type described comprising an outer drum arranged for communication with the crank case of an automobile, a valve controlled outlet for said outer drum, a conduit associated with said valve controlled outlet to establish communication with the intake manifold of the automobile, an inner drum arranged within said outer drum in spaced relation therewith, means arranged for establishing communication between the inner drum and said valve controlled outlet, the valve being constructed and arranged to cut off the communication between either of the drums and the intake manifold, said means comprising a tube having one end arranged in operative relation with said valve controlled outlet and its opposite end arranged in closed relation with the bottom of the inner drum, a filler body positioned within said inner drum, and a spring pressed valve arranged in operative relation with said valve controlled opening to admit air thereto.

11. The combination with an internal combustion engine having an intake manifold and a crank case, of an inner drum and an outer drum, the outer drum having communication with the crank case and the intake manifold, the inner drum having communication with the intake manifold, the inner drum being arranged to contain a highly volatile fuel, a single valve for cutting off communication between either of the drums and the intake manifold, a tube operatively associated with said valve and having a closed and slotted end arranged in operative relation with the lower end of the said inner drum, and flap valves controlling the communication between the outer drum and the crank case and the communication between the two drums and the intake manifold.

12. In an internal combustion engine, the combination of an intake manifold having a fuel conduit associated therewith and provided with a throttle valve, a control for the throttle valve, a crank case, a first drum having a valve, a conduit between the first drum and the crank case, a conduit between the valve and said fuel conduit, a second drum, a conduit between said second drum and the valve, the valve being arranged to establish communication between either drum and said fuel conduit, a valve associated with the conduit between the valve and said fuel conduit, and an operating linkage between said last-named valve and said control.

13. An auxiliary fuel feeding apparatus for internal combustion engines, comprising a drum having a conduit for connection with the breather pipe of an internal combustion engine, an outlet valve associated with said drum, an inner drum having an open end and arranged in spaced relation with the first drum and containing an auxiliary fuel, and conduit means associated with the outlet valve for connection with the intake manifold of the engine.

14. An auxiliary fuel feeding apparatus for internal combustion engines, comprising a drum having a conduit for connection with the breather pipe of an internal combustion engine, an outlet valve associated with said drum, an inner drum having an open end and arranged in spaced relation with the first drum and containing an auxiliary fuel, conduit means associated with the outlet valve for connection with the intake manifold of the engine, and an open ended tube associated with the outlet valve and arranged within the inner drum, said valve being adjustable to establish communication between the tube and the conduit associated with the outlet valve.

ANDREW M. BALOGH.