Dec. 15, 1936. B. N. PIERCE 2,064,078

LUBRICATING SYSTEM FOR INTERNAL COMBUSTION ENGINES

Filed Jan. 7, 1935

FIG. 2.

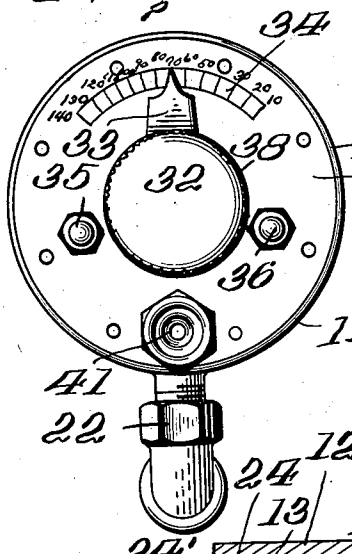


FIG. 3.

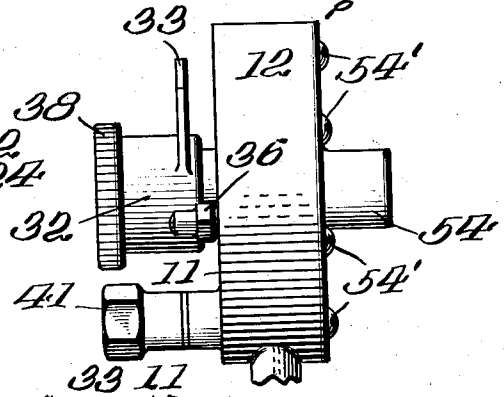


FIG. 1.

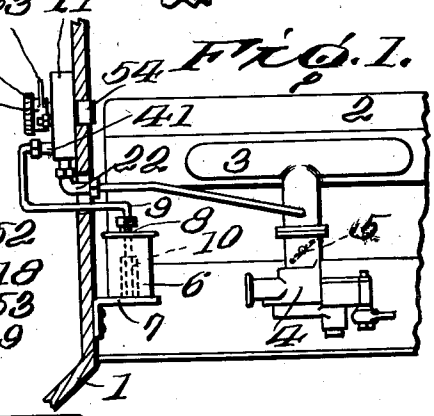


FIG. 4.

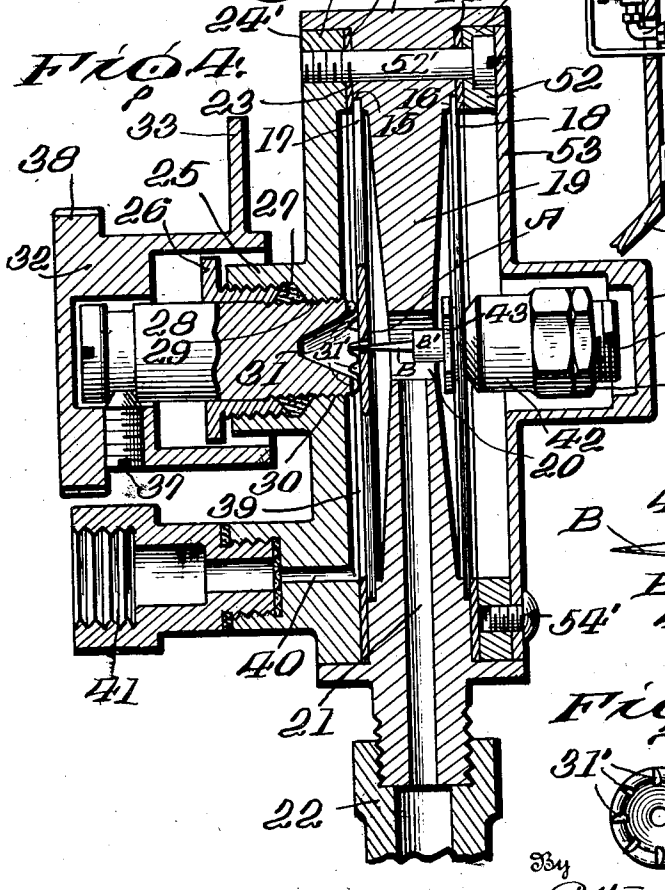


FIG. 5.

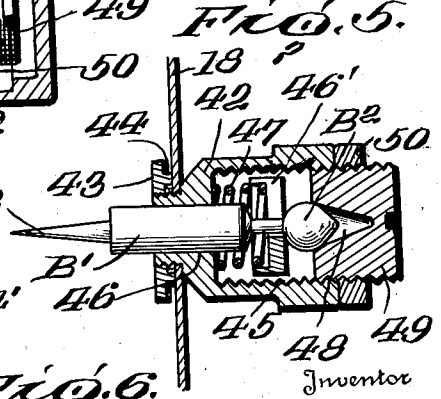


FIG. 6.

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LUBRICATING SYSTEM FOR INTERNAL COMBUSTION ENGINES

Burt Neulon Pierce, New York, N. Y.

Application January 7, 1935, Serial No. 760

15 Claims. (Cl. 123—196)

This invention relates to certain new and useful improvements in lubricating systems for internal combustion engines, and more particularly to a specific improvement on the construction of lubricating system disclosed in a patent No. 1,883,110, granted October 18, 1932 to Vernon W. Thompson and Burt N. Pierce.

The object of the invention is to simplify the construction of a fuel feeding system and to provide novel means for adjusting the apertured diaphragm so as to regulate the quantity of oil being fed to the engine.

Another object of my invention is to provide novel means for mounting the needle valve in the flexible diaphragm, whereby it will be held firmly in an adjustable position.

Other useful objects and advantages will be hereinafter set forth, and the novel features defined by the appended claims.

In the drawing,

Figure 1 is a side elevation of an internal combustion engine of a conventional type as used in connection with motor vehicles, partly in section, showing the application of my improved construction of auxiliary lubricating system thereto;

Figure 2 is an elevation showing the pointer working over the graduations for indicating the quantity of oil being fed to the engine;

Figure 3 is a side elevation;

Figure 4 is a vertical section showing the manner of securing the diaphragm in position for adjusting the bore of one diaphragm in respect to the needle valve carried by the other diaphragm;

Figure 5 is a vertical section with a portion of a diaphragm and a needle plug showing the manner of securing the same to the diaphragm and means for adjusting the same; and

Figure 6 is a detail view of the member for adjusting the apertured diaphragm showing the serrated end in order to form fuel passages.

In the drawing I have shown the application of my improved construction of lubricating system to a conventional type of internal combustion engine used in connection with the motor vehicle in which 1 indicates the dash of the motor vehicle; 2 the engine; 3 the intake manifold; 4 the charge forming device; and 5 the throttle valve therefor.

It is, of course, understood that I do not wish to limit myself to the use of my lubricating system to any particular type of engine.

In carrying out my invention I employ an auxiliary reservoir 6 adapted to contain lubricant which is herein shown supported on the dash of the vehicle by bracket 7 having removable cover 8 through which is adapted to pass a conduit 9 provided with a strainer 10 at its lower end disposed on the can for straining the lubricant which is drawn out of the can by the suction of the engine.

Disposed on the dash or under the hood at any desired point so that it can be readily controlled by the operator of the motor vehicle is a housing 11 formed of a circular body 12, which is reduced to form annular shoulders 13 and 14. The shoulders are annularly reduced as shown at 15 and 16 to form seats for the marginal edge of the diaphragms 17 and 18 as clearly shown in Figure 4.

The central portion of the body is reduced as shown at 19 and is provided with an aperture 20 from which extends an outlet passage 21 to which is adapted to be connected a conduit 22 extending to the manifold of the internal combustion engine which is hereinafter fully described.

The marginal edge of a flexible diaphragm 17 is engaged by a packing gasket 23 which is held against the shoulder by cover member 24 which is provided with a central apertured boss 25 internally threaded to receive a gland 26, which engages the packing 27 and in connection with the boss forms a stuffing box for an adjustable member 28 which is threaded at 29 and works in the threaded portion 30 of the boss 25.

The adjustable member 28 is provided with a conical socket 31, surrounded by a serrated edge 31′ which is adapted to engage the diaphragm 17 and move the same in one direction for adjusting the quantity of oil passing through the housing as will be hereinafter fully described.

Disposed over the member 28 is a cap 32 provided with a pointer 33 working over the graduations 34 formed on the cover 24, for indicating the position of the diaphragm so that the device can be set to control the quantity of lubricant passing through the same.

Suitable stops 35 and 36 are disposed on the cover adapted to be engaged by the pointer for limiting the movement of the pointer and the cap 32 is locked on the member 28 by a screw 37 as clearly shown in Figure 4, and the cap is milled as shown at 38 to facilitate the turning of the same, whereby when the cap is adjusted the member 28 will be moved into contact with the flexible diaphragm 17, so as to flex the same in order to adjust the same as will be hereinafter fully described.

The diaphragm 17 and cover 24 form a chamber 39 provided with an inlet port 40 to which is connected the conduit 9 by a coupling member 41.

The diaphragm 17 is provided with a central

aperture A which forms a valve seat for needle valve B carried by the diaphragm 18, which diaphragm is adapted to be flexed by the suction created by the piston displacement, so as to move the needle valve B back and forth in the valve seat A to regulate or control the passing of lubricant to the valves and the cylinders of the engine.

The aperture A of the diaphragm 17 forms an adjustable valve seat for the needle valve B and allows the same to be adjusted so that a predetermined quantity of lubricant will be fed to the cylinders and valves of the engine in accordance with the speed of the engine, whereby when the engine is idling a very small quantity of lubricant will be delivered to the cylinders and as the speed of the engine increases, the quantity of lubricant admitted is increased.

The needle valve B is mounted in a plug 42 secured within an aperture formed in a diaphragm 18 by a nut 43 which engages a packing 44 so as to form a fluid tight joint between the diaphragm 18 and the plug 42. The plug is provided with a threaded bore 45, terminating in a reduced bore 46 in which is slidably mounted the large portion B' of the needle valve B, said valve being reduced and provided with the head B^2, which is engaged by a split-washer 46' which in turn is held in contact with the head by a spring 47. The head B^2 of the needle valve B is provided with a pointed portion and extends into a conical socket 48 formed in a threaded screw plug 49 mounted in the threaded boss 45 of the plug 42, whereby the position of the needle valve B in respect to the diaphragm and the seat A can be adjusted and held in that position by a lock nut 50 working on the plug 49 as clearly shown in Figure 5.

The diaphragm 18 is more flexible than the diaphragm 17 and is adapted to be acted upon by the suction of the engine so as to adjust the needle valve in the seat A to control the passing of fuel to the engine.

The diaphragm 18 is engaged by a packing 14 along its marginal edge, which packing is engaged by a ring 52 secured to the body by screw bolts 52', the threaded ends of which work in threaded bores 24' formed in the cover 24, so that when these screw bolts are tight, the cover 24 and the ring 52 will be drawn toward one another so as to clamp the diaphragms 17 and 18 in position within the seats 15 and 16 to form a fluid tight joint.

Disposed against the ring 52 is a cover 53 which is provided with a hollow boss 54 to receive the plug 42 in which the needle valve B is mounted and this cover is secured in position by screws 54' as clearly shown.

It will be seen by constructing a housing as above described, by removing the cover 53 the needle valve can be adjusted by turning the screw plug 49 with a screw driver in order to adjust the position of the point of the needle valve in respect to the aperture A forming the valve seat in the diaphragm 17, whereby the device can be set so that as the diaphragm 18 is flexed a predetermined quantity of fuel is allowed to pass therethrough, whereby the device can be adjusted to allow the lubricant to be fed to the valves and cylinders of the engine at any predetermined engine speed.

By adjusting the plug 28, the aperture forming the valve seat A will be adjusted in respect to the needle valve B, so that the quantity of the lubricant can be regulated irrespective of the vacuum, and this diaphragm 17 has sufficient rigidity to prevent it from being affected by the vacuum so that the adjusting of this diaphragm regulates the quantity of lubricant fed to the engine.

From the foregoing description it will be apparent that the operation of my improved construction of lubricating system for internal combustion engines can be readily understood, and the broad operation is substantially the same as disclosed in the patent referred to above.

It will be apparent to one skilled in the art that as the speed of the engine increases, by the opening of the throttle the suction is reduced and the flexible diaphragm 18 moves back to its normal position so as to increase the size of the annular opening in the diaphragm 17 around the needle valve B, whereby a greater quantity of lubricant will be drawn from the auxiliary reservoir 6, and delivered to the cylinders of the engine, and that by manipulating the cap 32, the operator can control to a nicety the quantity of the lubricant being delivered to the valves and the cylinders of the engine.

While in the drawing I have shown the device attached to the dash, it is, of course, understood that it can be placed at any desired point on the motor vehicle, as for example, on the manifold and when so attached, will dispense with the connecting pipe.

What I claim is:

1. In a lubricating system for an internal combustion engine, a housing having a pair of flexible diaphragms mounted therein, one of said diaphragms being provided with an aperture through which lubricant is adapted to be drawn by the suction of the engine, the other diaphragm being adapted to be flexed by the suction of the engine, a needle valve carried by the last mentioned diaphragm cooperating with the aperture of the first mentioned diaphragm for controlling the passage of lubricant through said aperture.

2. In a lubricating system for an internal combustion engine, a housing having a pair of flexible diaphragms mounted therein, one of said diaphragms being provided with an aperture through which lubricant is adapted to be drawn by the suction of the engine, the other diaphragm being adapted to be flexed by the suction of the engine, a needle valve carried by the last mentioned diaphragm cooperating with the aperture of the first mentioned diaphragm for controlling the passage of lubricant through said aperture, and means for adjusting the first mentioned diaphragm.

3. In a lubricating system for internal combustion engines, the combination with a source of supply, a conduit extending from said source of supply and adapted to communicate with the intake of the engine, a casing disposed in said conduit, a pair of movable walls disposed in said casing, one of said walls being adapted to be moved by the suction of the engine and the other of said walls being provided with an aperture through which lubricant is adapted to pass and means carried by the wall moved by the suction of the engine cooperating with the aperture of the other wall for controlling the passage of lubricant through said aperture to said engine.

4. In a lubricating system for internal combustion engines, the combination with a source of supply, a conduit extending from said source of supply and adapted to communicate with the intake of the engine, a casing disposed in said conduit, a pair of movable walls disposed in said

casing, one of said walls being adapted to be moved by the suction of the engine and the other of said walls being provided with an aperture through which lubricant is adapted to pass and means carried by the wall moved by the suction of the engine cooperating with the aperture of the other wall for controlling the passage of lubricant through said aperture to said engine, and means for adjusting the apertured walls.

5. In a lubricating system for internal combustion engines, a housing, a pair of flexed diaphragms mounted in said housing, one of said diaphragms being adapted to be flexed by the suction of the engine, the other diaphragm being provided with an aperture, manually operated means for flexing the last mentioned diaphragm, a needle valve adjustably mounted in the first mentioned diaphragm, said needle valve cooperating with the apertured diaphragm for controlling the passage of lubricant through said aperture to said engine.

6. In a lubricating system for internal combustion engines, a housing, a pair of flexible diaphragms disposed in said housing, one of said diaphragms being adapted to be flexed by the suction of the engine, the other of said diaphragms being provided with an aperture through which lubricant is adapted to pass in its passage to the engine, a manually operated member for flexing the apertured diaphragm, means for indicating the position of said member for determining the position of said apertured diaphragm, and a needle valve carried by the suction operated diaphragm cooperating with said aperture for controlling the passage of lubricant to the engine.

7. In a lubricating system for internal combustion engines, a housing having an inlet and an outlet, a pair of diaphragms disposed in said housing, one of said diaphragms being adapted to be flexed by the suction of the engine, and the other diaphragm being provided with an aperture, said apertured diaphragm being disposed between the inlet and outlet of said housing, a valve member carried by the suction operated diaphragm cooperating with the apertured diaphragm for controlling the passage of lubricant through the aperture in its passage into the engine, manually operated means for flexing the apertured diaphragm and means for indicating the position of said apertured diaphragm for determining the quantity of lubricant passing through said aperture to said engine.

8. In a lubricating system for internal combustion engines, the combination with a source of supply, of a conduit extending from said source of supply and adapted to communicate with the intake of said engine, a casing disposed in said conduit having a pair of movable walls, one of said walls being apertured to form an adjustable valve seat, the other wall being adapted to be moved by the suction of the engine, and provided with a valve cooperating with the adjustable valve seat of the other wall, and means for adjusting the apertured wall to adjust the valve seat in respect to the valve for regulating the quantity of lubricant passing to said engine.

9. In a lubricating system for internal combustion engines, the combination with a source of supply, of a conduit extending from said source of supply and adapted to communicate with the intake of said engine, a casing disposed in said conduit having a pair of movable walls, one of said walls being apertured to form an adjustable valve seat, the other wall being adapted to be moved by the suction of the engine, and provided with a valve cooperating with the adjustable valve seat of the other wall, and means for adjusting the apertured wall to adjust the valve seat in respect to the valve for regulating the quantity of lubricant passing to said engine, and means for indicating the position of said adjusted means.

10. In a lubricating system for an internal combustion engine, a sectional housing comprised of a body having annular seats, flexed diaphragms mounted on said seats, one of said diaphragms being provided with an aperture, and the other diaphragm with a needle valve cooperating therewith, cover members disposed over said diaphragm, the body being provided with an inlet, and one of the cover members being provided with an outlet, said inlet and outlet being adapted to be connected respectively to a source of lubricant supply and the intake of an internal combustion engine.

11. In a lubricating system of an internal combustion engine, a housing having an inlet and an outlet, a pair of flexible diaphragms arranged in said housing, one of said diaphragms being provided with an aperture through which lubricant is adapted to pass, the other diaphragm being adapted to be flexed by the suction of the engine, a plug secured in said last mentioned diaphragm, and a spring-pressed needle valve adjustably mounted in said plug cooperating with the aperture of said diaphragm for controlling the passage of lubricant to the engine.

12. In a lubricating system for internal combustion engines, a sectional housing comprising a central body carrying a pair of flexible diaphragms, cover members arranged over said diaphragms, one cover member being provided with an inlet and the body being provided with an outlet, one of said diaphragms being apertured and disposed between said inlet and outlet, an adjustable needle valve carried by the other diaphragm cooperating with the aperture of the other diaphragm, and a means for adjusting the apertured diaphragm in respect to said needle valve.

13. In a lubricating system for internal combustion engines, a housing having a pair of flexible diaphragms mounted therein, one of said diaphragms being provided with an aperture and the other with a needle valve cooperating therewith, and a member engaging said apertured diaphragm for adjusting the relative positions of said diaphragm to the normal position of said needle valve.

14. In a lubricating system for an internal combustion engine, a housing having an inlet and an outlet through which lubricant is adapted to pass in its passage to the cylinders of the engine, a pair of flexible diaphragms arranged in said housing, one of said diaphragms being apertured and arranged between the inlet and outlet of said housing and through which lubricant is adapted to pass, a needle valve carried by the other diaphragm cooperating with the aperture of said diaphragm for controlling the passage of lubricant therethrough, and a member mounted in said housing and surrounding said aperture and adapted to engage one face of said diaphragm for adjusting said diaphragm in respect to said needle valve for regulating the quantity of lubricant passing to the engine.

15. In a lubricating system for an internal combustion engine, a combination of a source of supply, of a conduit extending from said source

of supply and adapted to communicate with the intake of the engine, a casing disposed in said conduit having a pair of movable walls, one of which is adapted to be moved by the suction of the engine and the other wall being provided with an aperture through which the lubricant is adapted to pass in its passage to the engine, an adjustable needle valve carried by the first mentioned wall cooperating with the aperture of the apertured wall for controlling the passage of lubricant therethrough, a screw plug mounted in said housing having a serrated end adapted to engage the apertured wall for adjusting said wall in respect to said needle valve for regulating the quantity of lubricant passing to the engine.

BURT NEULON PIERCE.