W. JAY.

SIGHT FEED AND DIRT SCREEN FOR VACUUM FEED DEVICES.

APPLICATION FILED SEPT. 16, 1916.

1,270,162. Patented June 18, 1918.

Fig. 1.

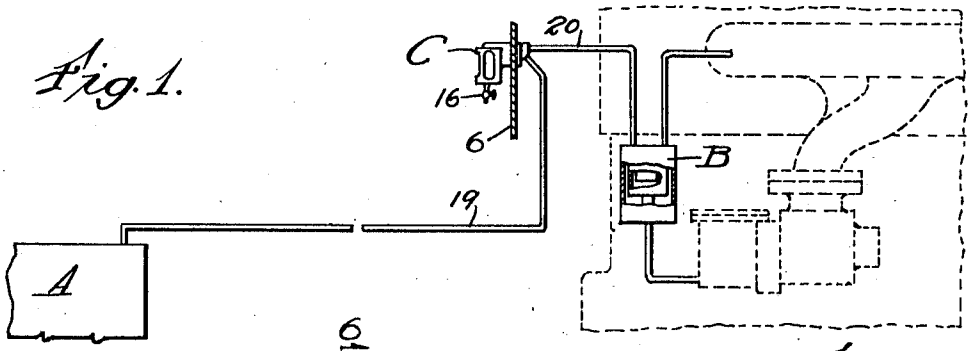


Fig. 2.

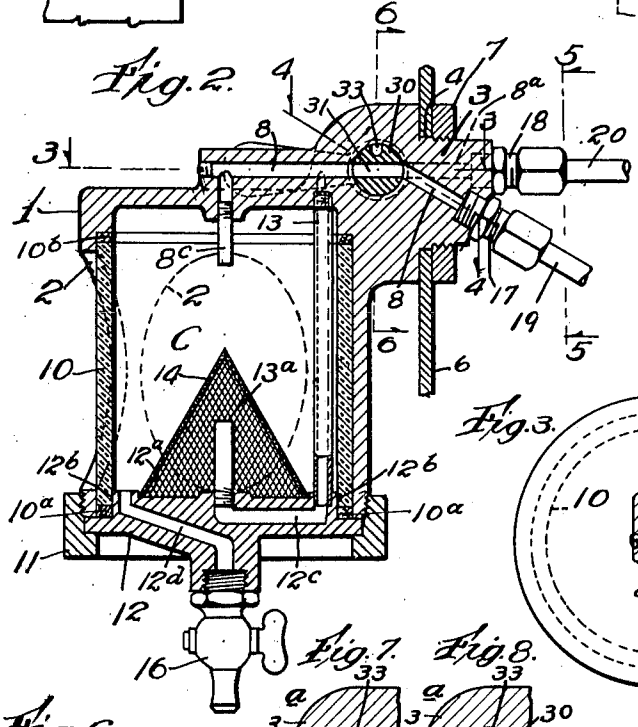


Fig. 5.

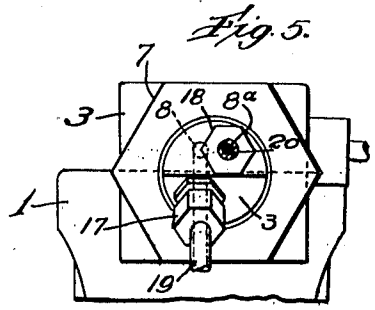


Fig. 3.

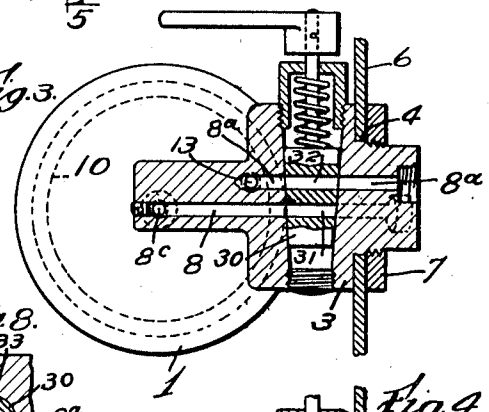


Fig. 7.

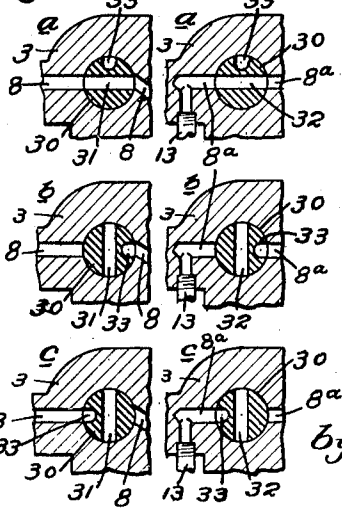


Fig. 8.

Fig. 6.

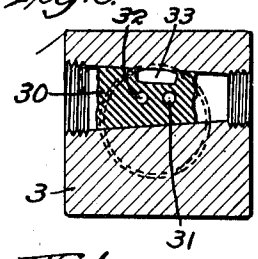
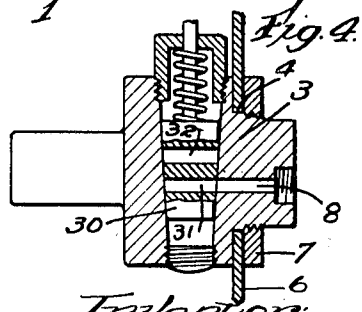


Fig. 4.



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UNITED STATES PATENT OFFICE.

WEBB JAY, OF CHICAGO, ILLINOIS.

SIGHT-FEED AND DIRT-SCREEN FOR VACUUM FEED DEVICES.

1,270,162. Specification of Letters Patent. Patented June 18, 1918.

Application filed September 16, 1916. Serial No. 120,571.

To all whom it may concern:

Be it known that I, WEBB JAY, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Sight-Feeds and Dirt-Screens for Vacuum Feed Devices, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved device adapted to the two purposes of permitting the observance of the fact and rate of feed of the liquid fuel to a vacuum feed device for internal combustion engines, and of screening the liquid fuel to separate therefrom on its way to the feed reservoir any dirt which it may contain; and incidentally also to separate observably any water which may be in the fuel. It consists in the elements and features of construction shown and described as indicated in the claims.

In the drawings:—

Figure 1 is a diagrammatic view showing in elevation a vacuum fuel feed system equipped with this invention.

Fig. 2 is a vertical axial section of a device embodying this invention.

Fig. 3 is a section at the line 3—3 on Fig. 1.

Fig. 4 is a section at the line 4—4 on Fig. 2.

Fig. 5 is a section at the line 5—5 on Fig. 2.

Fig. 6 is a section at the line 6—6 on Fig. 2.

Figs. 7 and 8 are sections at the lines 7—7 and 8—8, respectively, on Fig. 6, each of said figures showing three positions of the twin cock device, denoted respectively *a*, *b* and *c*, on said Figs. 7 and 8.

In the structure shown in the drawings, A is the main fuel supply tank of the fuel feed system; B is the elevated vacuum feed tank. C is the sight feed and screen device, comprising a metal body or casing, 1, having sight apertures, 2, and having fitting within it a tubular glass member, 10, which is clamped to a liquid-tight fit at both ends by means of a clamping ring, 11, screwed onto the lower end of the metal body, 1, and clamping the bottom, 12, against the lower end of the body, suitable gaskets, 10^a and 10^b, being interposed at the ends of the glass tube, 10. The body or casing, 1, is provided at the upper end with a boss, 3, protruding laterally, and radially with respect to the circular form of the body. This boss is exteriorly threaded and is designed to protrude through an aperture, 4, in the dash-board, 6, of the vehicle on which the engine which is served by the device is mounted. A nut, 7, serves to clamp the device rigidly to the dash-board on the inner or rear side thereof, the threaded boss, 3, projecting through and being exposed at the forward or outer side for the liquid connections hereinafter more particularly described. Extending through the boss are two ducts, 8 and 8^a, the former for connection with the fuel inlet and the latter for connection with the fuel outlet. Both these ducts open downwardly through the top of the casing or body, 1, the inlet at the center and the outlet near one side just inside the inner circumference of the glass lining tube, 10, a conical sieve or screen, 14, is fitted closely into a circular recess, 12^a, formed in the upper side of the bottom, 12, of the casing bounded by the vertical shoulder, 12^b. Into the downwardly-opening mouth of the inlet duct, 8, there is screwed a discharge nipple, 8^c, overhanging the apex of the conical screen or sieve, 14, for discharge of the liquid fuel onto said apex so that it will flow down over the screen and be discharged through it, leaving any dirt which it carries on the outside of the screen. Into the downwardly-open end of the outlet duct, 8^a, there is screwed fast a pipe, 13, whose lower end makes a tight fit in one of the upwardly-open ends of the outlet duct, 12^c, formed in the bottom, 12, the other upwardly-open end of said duct being positioned under the apex of the screen, 14, and having screwed into it at that end the discharge nipple, 13^a, which protrudes up within the screen or sieve, 14, at such distance above the bottom of the chamber as may be judged desirable to afford a trap or pocket for the accumulation of water in the bottom of the chamber. A drain cock, 16, is provided screwed into the bottom, 12, of the casing, leading from a drain duct, 12^d, which opens within the glass lining sleeve, 10, of the chamber outside the base of the conical sleeve or screen, for the purpose of drawing off the water. This drainage duct is preferably made to open as stated, outside the base of the screen, so that in a large measure the dirt which has been separated and stopped by the screen

may be drawn off at the same time as the water. To permit the ready removal of the screen for the purpose of cleansing it when necessary, and at the same time to remove any dirt which accumulates and is not washed out in drawing off the water through the cock, 16, the clamp ring, 11, is unscrewed and the entire bottom, 12, is withdrawn, carrying the screen, 14, the lower end of the pipe, 13, relieving from its seat in the upwardly-opening mouth of the duct, 12^c, and being readily remated with it in re-applying the bottom to the casing.

The boss, 4, has the outer ends of the ducts, 8 and 8^a, counterbored and threaded for receiving the couplings, 17 and 18, of familiar construction, for effecting a tight junction with the ducts, 8 and 8^a, of the inlet and outlet pipes, 19 and 20, which lead respectively from the main supply tank, A, at the lower level to the vacuum chamber of the tank, B, at the higher level.

In order to provide for the possibility of the breaking of the glass lining, 10, of the chamber, that is, to prevent such an accident from disabling the vacuum feed apparatus, there is provided a duplex three-position turn-cock device or valve, 30, seated in the boss, 3, at a position such that it crosses and controls both the inlet duct, 8, and the outlet duct, 8^a, and having a separate passage for each of said ducts, 8 and 8^a, which passages at one position of the cock lead directly through the latter for free communication of said ducts for inlet and outlet respectively; but at another position of the cock, 90 degrees around from the first said passages of the cock are out of registration with said ducts respectively, and a lateral recess or by-pass passage of the cock which extends longitudinally thereof a distance equal to the distance between the two transverse passages plus their two diameters stands in a position lapping at its ends on the two ducts, 8 and 8^a, at the outer side of the cock, so that said inlet and outlet ducts, 8 and 8^a, are put in communication through said lateral or by-pass passage of the cock, and are both cut off from communication with the chamber, C.

Referring to the drawings, particularly to Figs. 7 and 8, which illustrate the turn-cock referred to, the two transverse passages, 31 and 32, are those mentioned which at the normal or ordinary position of the turn-cock, that is, when the sight feed device is in service, are registered respectively with the inlet passage, 8, and outlet passage, 8^a. 33 is the lateral recess or by-pass passage referred to formed in the turn-cock, 30, extending longitudinally thereof far enough to lap the ports of the inlet and outlet passages, 8 and 8^a, respectively. The three positions of the turn-cock, 30, above referred to, are shown in Figs. 7 and 8; position *a* is the normal position occupied when the sight feed device is in service; position *b* is the position occupied for by-pass from the inlet to the outlet passage without communication through the sight feed chamber, and useful when the breakage of the glass makes it necessary to establish communication between the main tank, A, and the vacuum feed tank, B, without utilizing that chamber; position *c* is that occupied by the cock when it is employed for shutting off the flow entirely from the main supply tank to the vacuum feed tank.

The operation of the device, C, when connected as shown in the line of communication by which the fuel is intermittently supplied to the tank, B, as in the well known vacuum feed system shown, is that in the intervals during which a partial vacuum is produced in the vacuum chamber of said tank, B, such partial vacuum extends to the screen chamber of the device, C, and the liquid fuel is drawn up through the inlet duct, 12, and discharged downwardly through the open space of the screen chamber onto the apex of the screen and flows down over and through the latter; and said screen chamber being filled up to the intake mouth of the up-standing discharge nipple, 13^a, the liquid thus discharged and passing through the screen, flows out by way of the pipe, 13, and outlet duct, 8^a, or is drawn out by the suction and is conducted to and discharged in the vacuum chamber of the tank, B, as in the ordinary operation of such vacuum feed systems when not provided with a screen chamber. The efficiency of the device for the purpose of screening the liquid fuel and taking out any dirt which it may contain is in a large measure due to two facts,—first, that the liquid discharged, as stated, through an open space onto the screen, tends to wash off the dirt into the bottom of the chamber and keep the screen clean, which would not happen if the screen chamber were at all times full of liquid, the liquid merely moving through it in an unbroken mass or body, and being obliged to pass through the screen in so moving. And second, that in the alternate action of suction and atmospheric pressure operating in the vacuum chamber of the vacuum feed tank, B, when after a period of partial vacuum, which causes a partial vacuum also in the screen chamber, the atmospheric pressure becomes operative in said vacuum chamber, such atmospheric pressure acting back on the liquid which fills the outlet pipe from the screen chamber to said vacuum chamber against the partial vacuum which still for a brief interval continues to exist in the screen chamber, causes a somewhat violent regurgitation of the liquid standing above the end of the nipple, 13^a, the liquid being

dashed up under the screen and through the screen, with the effect of washing off any dirt which may have accumulated thereon.

Certain of the effects above described,—the visibility of the discharge of liquid onto the conical screen; the effect of such discharge as a jet delivered through open space in washing off the screen, and the regurgitation of the liquid upon the change from vacuum to atmospheric pressure,—it will be readily understood, are dependent upon the screen chamber not becoming filled with liquid. This condition is assured by either one of two features which characterize the construction as it is ordinarily mounted. First, the fact that the pipe leading from the main low level reservoir to the screen chamber is considerably longer than the pipe leading from the screen chamber to the vacuum feed tank so that the friction of the liquid moving in said pipes respectively is considerably greater in the first-mentioned than in the second, which has the effect of causing the partial vacuum of suction operating in the suction chamber of the vacuum feed tank to take the liquid out of the pipe connecting the screen chamber with that suction chamber more rapidly than it can come into the screen chamber through the longer pipe leading from the low level tank. Secondly, the diameter of the outlet duct from the screen chamber at its most restricted part, which is in the pipe member, 13, is greater than the diameter of the inlet passage at its most restricted part, which is the nipple, 8ᵉ; and this again has the effect of insuring that the outflow of the liquid from the screen chamber, occurring at the instant of change from atmospheric pressure to suction in the suction chamber of the vacuum feed tank, will be more rapid than the inflow occurring at the same instant from the low-level tank. Either of these causes, and especially both of them operating together, insure that the screening and sight feed chamber will never be flooded but will always have a free space through which the liquid will be discharged visibly and unobstructedly upon the conical screen.

I claim:—

1. A screening device for suction-lifted liquid fuel supply, comprising a screen chamber, a conical screen or sieve erected in said chamber; a liquid inlet pipe to said chamber arranged to discharge downward above the apex of the screen, and an outlet pipe opening under the screen.

2. A screening device for suction-lifted liquid fuel supply, comprising in combination, a screen chamber, a conical screen or sieve erected in said chamber; a liquid inlet duct discharging in said chamber above the apex of the screen therein, and an outlet duct opening under the screen, said chamber having an exteriorly-protruding boss through which both said ducts lead, said boss being adapted for mounting the device.

3. A screening device for suction-lifted liquid fuel supply, comprising in combination, a screen chamber having an exterior frame or casing provided with sight apertures, and an interior transparent lining; a conical screen or sieve erected within the lining of the chamber; an inlet duct opening for discharge downward from one end of the chamber above the apex of the screen, and an outlet duct extending for its intake upward from the other end of the chamber, and opening under the screen, said ducts leading in and out respectively through the same end of the chamber, the duct which opens from the opposite end comprising a pipe which extends from end to end of the chamber inside the glass lining thereof.

4. A screening device for suction-lifted liquid fuel supply, comprising in combination a screen chamber having a metal shell or casing with inlet and outlet ducts both leading in through one end and extending for intake and discharge opening respectively from opposite ends of the chamber, the duct which so extends from the end opposite that through which both ducts lead in, comprising a pipe which makes a thrust fit at its junction with one end of the chamber.

5. In a screening device for suction-lifted liquid fuel supply, in combination a skeletoned or apertured chambered body having a separable lining within the same, inlet and outlet passages extending in juxtaposition in said body at a location at which they may both be pierced without piercing said separable lining, and a turn-cock device having its seat traversing both said ducts at a juxtaposed extent for controlling both said ducts, and having a by-pass passage which connects the inlet and outlet ducts at a position of the turn-cock at which it cuts off communication of both said ducts with the chamber.

6. In a screening device for suction-lifted liquid fuel supply, in combination with a screen chamber comprising a casing having an inlet and an outlet, a screen positioned within the casing between the inlet and the outlet, said casing comprising a boss protruding at the upper part of the casing for mounting the device upon a support, said boss having both inlet and outlet passages leading through it, the casing having a removable bottom member, an outlet duct member carried by said bottom member, the outlet duct comprising a pipe portion located within the casing, and making a thrust fit at one end with the adjacent portion of the outlet duct which is contained in the corresponding end of the chamber, and means

for clamping the bottom member onto the body, adapted to apply the thrust necessary for effecting said thrust fit of said pipe.

7. In a screening device, in combination with a screen chamber comprising a casing having an inlet and an outlet, a screen positioned within the casing between the inlet and the outlet, said casing comprising a boss protruding at the upper part of the casing for mounting the device upon its support, the boss having both inlet and outlet passages leading through it, said passages leading also through the upper part of the casing, said casing having a removable bottom member, a portion of the outlet duct being formed in said bottom member, said outlet duct comprising a pipe portion located within the casing and making a thrust fit at one end with the portion of said duct which is contained in the corresponding end of the casing, the bottom member of the casing being adapted to be applied to the body of the casing by axial movement and pressure, and an interiorly-flanged and exteriorly threaded clamping ring adapted to be screwed onto the lower end of the body, and by its flange engaging the bottom or clamping it to the body.

8. A screening device for suction-lifted liquid fuel supply, comprising in combination with a screen chamber which has a metal shell or casing, and which has inlet and outlet ducts both leading in through the same end of the casing, said ducts having their terminal portions leading respectively to the intake and discharge openings, extending toward each other from opposite ends of the chamber, the duct which so extends from the end opposite that through which both ducts lead in as stated, having a portion which is in position for making a thrust fit at its junction with the next succeeding portion thereof formed in one end of the chamber.

9. A screening device for suction-lifted liquid fuel supply, comprising in combination with a screen chamber casing having an inlet discharging in the upper part of the chamber and an outlet having its receiving mouth at the lower part of the chamber, a screen positioned within the casing between the inlet and the outlet, the inlet passage being more restricted than the outlet passage.

In testimony whereof I have hereunto set my hand at Chicago, Illinois, this 9th day of Sept., 1916.

WEBB JAY.