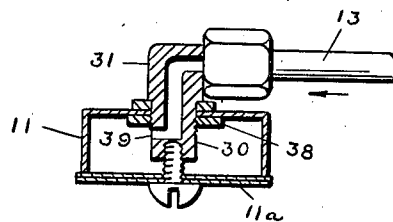
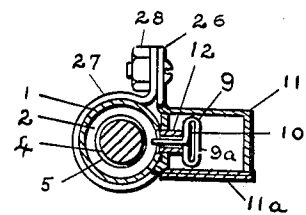
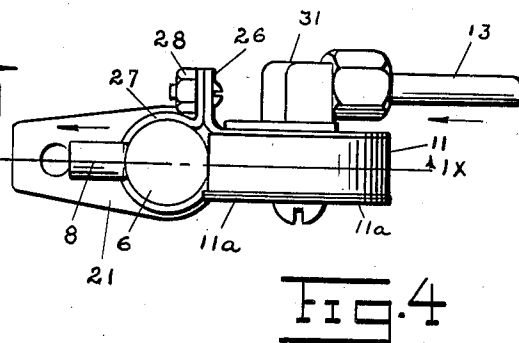
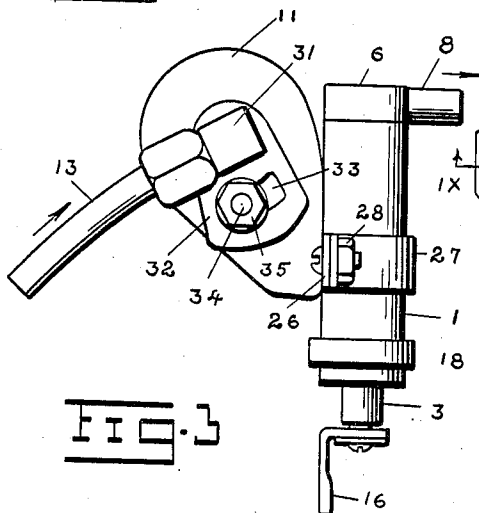
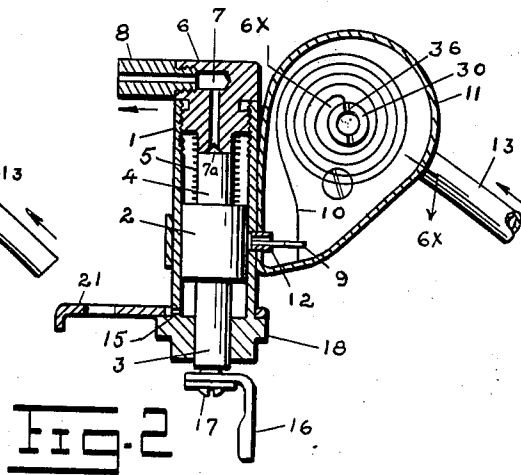
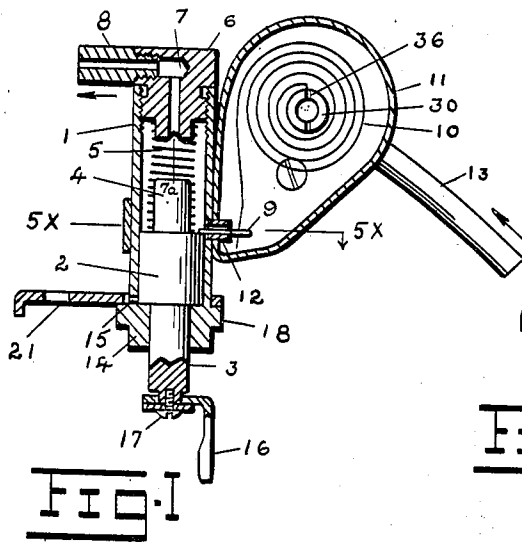


Feb. 8, 1944.

L. W. GILBERT
 DEVICE TO REGULATE THE DEPTH OF GASOLINE IN
 THE FLOAT CHAMBER OF THE CARBURETOR
 Filed June 13, 1942 2 SH

2,340,876

2 Sheets-Sheet 1



INVENTOR.

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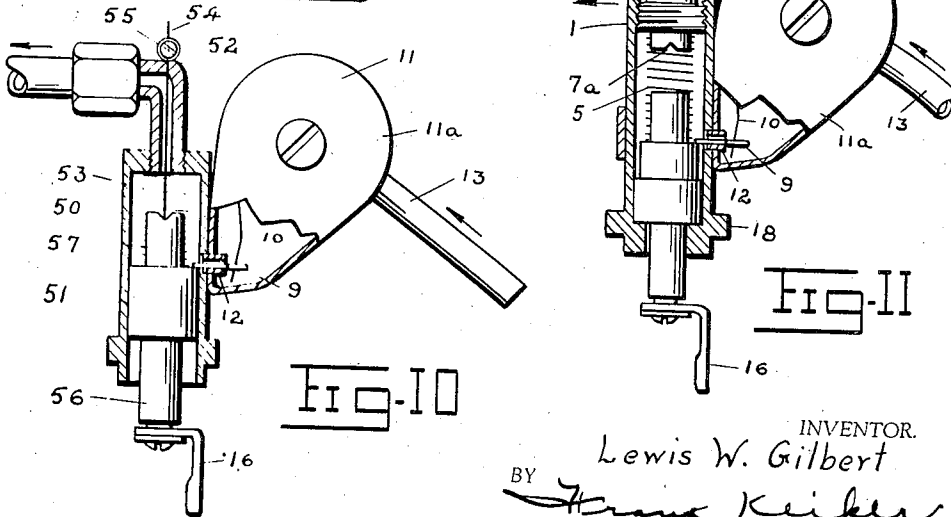
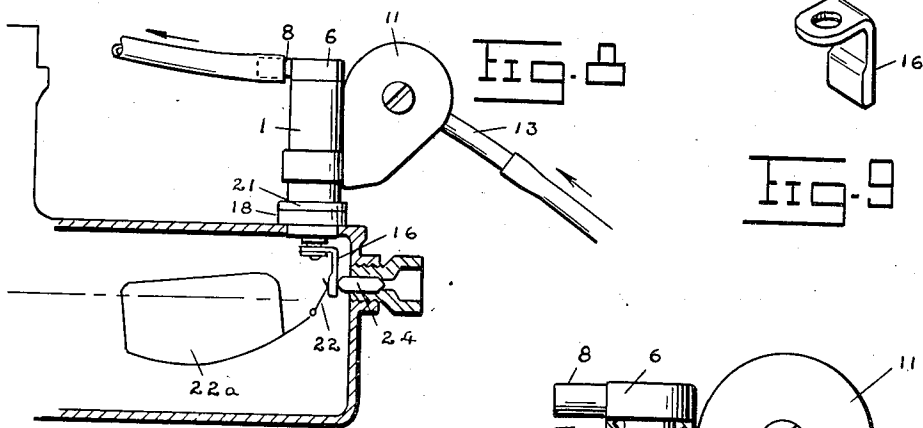
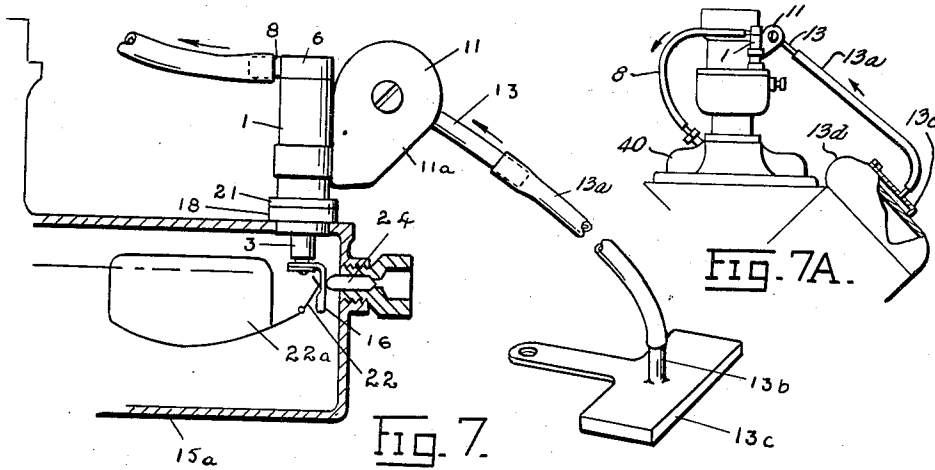
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2,340,876

2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,340,876

DEVICE TO REGULATE THE DEPTH OF GASOLINE IN THE FLOAT CHAMBERS OF CARBURETORS

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Application June 13, 1942, Serial No. 446,908

19 Claims. (Cl. 123—119)

The object of this invention is to produce a device that will regulate the depth of gasoline in the float chamber of the carburetor so as to save gasoline and get out of the gasoline more miles per gallon.

Another object of the invention is to provide a regulating device that will permit the car to get started with the normal level of gasoline in the carburetor which level will remain normal until the motor warms up and then the level will be automatically lowered to a predetermined level for a higher mileage per gallon of gasoline.

Another object of the invention is to provide means that will hold the gasoline at normal level in the float chamber of the carburetor until the engine heats up and thereafter lower the level of the gasoline in the float chamber to a predetermined level by a combined action of vacuum and thermostatic control and from then on while the engine runs the level of gasoline in the float chamber will be permitted to rise if the vacuum in the intake manifold falls.

In the drawings Figure 1 is a vertical section on the line 1x—1x of Figure 4 showing the piston in its lowest position.

Figure 2 is a vertical section on the line 1x—1x of Figure 4 showing the piston in its highest position.

Figure 3 is a side elevation of the device viewed from the rear of Figure 1.

Figure 4 is a top plan view of the whole device shown in Figure 1.

Figure 5 is a horizontal section on the line 5x—5x of Figure 1.

Figure 6 is a horizontal section on the line 6x—6x of Figure 2, the spring being omitted from the thermostatic chamber.

Figure 7 is a vertical section through the float chamber of the carburetor showing the regulating device superimposed thereon, the gasoline being shown at its normal level.

Figure 7a is a detail view showing the housing 13c attached to the outside of the motor.

Figure 8 shows a vertical section through the float chamber of the carburetor with the regulating device superimposed thereon, the gasoline being shown at the lower level, which level is secured by a change in position of the regulating parts.

Figure 9 is a perspective view of the wedge 16.

Figure 10 is a sectional view of a modified form of cylinder and piston in which the cylinder is shown open at the bottom, the downward movement of the piston being limited by a wire extending upwardly therefrom.

Figure 11 is a sectional view of a modified form of the cylinder and piston in which a trunk piston is shown having three diameters.

In the drawings, like numerals indicate like parts.

In the drawings reference 1 indicates a cylinder having a piston 2 therein to which piston is attached the stem 3 at the bottom thereof and a stem 4 at the top thereof. This piston is capable of movement up and down in the cylinder being moved up in response to a vacuum developed in the cylinder above the piston and being normally held down by a spring 5 which is contained in the cylinder. The top of the cylinder is closed by a screw plug 6 in which is provided an opening 7 which extends up to near the top of the plug and then opens laterally. The plug 6 acts as a stop for the piston. A so-called straight elbow may be used for this purpose. A tube 8 is threaded into this opening to provide a simple and easy manner of connecting the tube to the intake manifold so that the vacuum produced therein while the engine is running will raise the piston and compress the spring.

When the engine is cold or until the engine heats up the piston 2 is mechanically held against being raised by a lockpin 9, the position of which is controlled by a thermostat spring 10 carried in the chamber or housing.

The thermostat housing or the chamber 11 is connected to the inside of the cylinder 1 by a tube 12 in which the lockpin 9 loosely fits. When the engine starts a vacuum is produced in the intake manifold and this in turn produces a vacuum in the cylinder 1 and draws air through the tube 12 past the pin 9. The air flows from the housing of the thermostat chamber 11. The pin 9 is shown in Figure 5 formed with a loop 9a in which the thermostat spring 10 engages. This loop 9a engages with the tube 12 and prevents the pin from being pushed into the cylinder too far by the thermostat spring. Extending from this chamber or housing 11 is a tube 13 that extends to some hot spot on the motor or on the exhaust manifold. Until the engine or the exhaust manifold heats up, cold air will be drawn through this tube 13 and through the tube 12 into the intake manifold and as long as this condition exists the lockpin 9 will engage the top of the piston 2 and prevent it from rising in response to the vacuum. Except for the tubular openings the thermostat chamber is sealed up being closed on one side by the cover plate 11a having a layer of leather interposed

between the housing 11 and the plate 11a so as to make a joint that is substantially air tight. But as soon as the hot spot on the motor or the exhaust manifold heats up, the warm air drawn in through the tube 13 will gradually cause the thermostat spring 10 to flex and will draw the lockpin 9 to the right as shown in Figure 2, thus releasing the piston 2 which can then rise in response to the urge of the vacuum. The movement of the thermostat spring 10 to the right in Figure 2 is limited by the shape of the housing.

The opening 7 is larger and will pass more air than will the clearance in the tube 12 around the pin 9. Consequently the vacuum in the cylinder 1 will be greater than the vacuum in the thermostat chamber 11 and will be great enough to raise the piston and compress the spring 5. When the piston 2 rises it will partly or wholly close the opening in the tube 12, thus causing the vacuum in the cylinder 1 to act with extra force in raising the piston 2.

To permit air to enter the cylinder below the piston the stem 3 can be made with a loose fit, in the cylinder head 14 with which it makes engagement or an opening 15 can be provided through the side of the cylinder 1 at or near the bottom of the cylinder.

In this way the piston 2 can be made to raise and compress the spring 5 whenever there is a sufficient vacuum developed in the intake manifold.

To regulate the level of the gasoline in the float chamber 15a, I provide wedge 16 connected to the stem 3 below the piston. The wedge is in the form of an angle-shaped bracket which is loosely fastened to the bottom on the stem 3 by the screw 17 and it is held loosely thereon so that it can rock back and forth with a floating motion as it adjusts itself between the head of the needle valve 24 and the end of the arm 22 on the float 22a.

The cylinder shown in Figure 1 is provided at the lower end with a flange 18 and a reduced end 14. An opening is provided in the top of the float chamber of the carburetor in which this reduced end makes a snug fit. A strap or plate 21 is provided having an opening therein that fits around the cylinder 1 and this strap 21 is fastened to the top of the float chamber 15a of the carburetor by a screw not shown or in any other suitable manner. The strap is shown in full lines in Figure 1 at the left of the device, it being understood that its normal position would ordinarily be back of the cylinder and concealed thereby as shown in Figure 7. The stem 3 with the wedge 16 extends down into the float chamber, the wedge being interposed between the end of the float arm 22, and the needle valve 24. When the motor is cold the parts will be held in the position shown in Figure 7 by the lock pin 9 in which the thin part of the wedge 16 is interposed between the end of the float arm 22 and the end of the float needle valve 24.

While the parts are in this position the float takes the position shown in Figure 7, this being the normal level of gasoline in the carburetor as recommended by the carburetor manufacturers.

When the engine starts this level will be maintained until the hot spot has become heated up and until the thermostat spring 10 has pulled the lockpin 9 to the right as in Figure 2. Then the vacuum of the intake manifold can raise the piston 2 and in so doing it will raise the wedge

16 which will close the float needle valve 24 until the level of the gasoline in the float chamber has dropped permitting the float to drop, thereby releasing the float needle valve so the gasoline can again flow into the float chamber. So that the air drawn from the hot spot will not fluctuate much in temperature I use a rubber tube 13a connected to a tube 13b soldered in a housing 13c shown in Figure 7 and Figure 7a. In Figure 7a the housing 13c is attached to the outside of the motor 13b and the tube 8 is shown connected to the intake manifold 40 of the engine. This housing is closed on all sides but and is fastened to the engine or manifold so as to cover the hot spot. It helps the heating of the air.

It will be understood that the exhaust manifold heats up quicker than the motor generally and its cooling water heats up. It is desirable to delay the operation of the thermostat until the motor generally has warmed up rather than have the thermostat operate as soon as the exhaust manifold has warmed up. Therefore the housing is preferably attached to the motor either on top of the cylinder head or just below the cylinder head and the whole device with the exception of the stem 3 and the wedge 16 is placed outside of the carburetor and not inside of it. When so placed it will operate in response to the rise in temperature of the outside of the engine and the temperature of the cooling water and not in response to the rise in temperature of the manifold or in response to the seasonal variation in the temperature of the air or in response to variations in temperature in the float chamber of the carburetor which includes variations in the temperature of the gasoline. It will also be understood that when the engine starts to run its temperature goes up much faster and much higher than does the temperature of the float chamber of the carburetor which is kept rather cool by the vaporization of the gasoline and goes up much slower than does the temperature of the exhaust manifold.

When the car is going up hill and the vacuum drops due to a hard pull on the engine, the spring 5 can push the piston down until the thin part of the wedge has been exposed between the needle valve 24 and the arm 22 of the float. This will permit the needle valve to move to the left to permit more gas to flow into the float chamber until the float rises to close the needle valve at the normal gasoline level. This cycle will also occur when the driver steps on the accelerator pedal for quick acceleration on the motor and when the vacuum of the intake manifold rises again, then the wedge 16 will rise and close the needle valve until the level of the gasoline in the float chamber has been lowered.

The thermostat housing 11 is fastened to the cylinder in the manner that will now be described.

Fastened to one side of the thermostat chamber is a short strap 26 and fastened to the other side of the chamber is a long strap 27. The end of the long strap 27 is bent to overlap the end of the short strap 26 and the two parts are fastened together by a bolt and nut 28, clamping the long strap around the cylinder 1.

Pivotaly mounted in the side of the thermostat housing is the end 30 of an elbow 31. Outside of the housing fastened to this elbow is a plate 32 having an arcuate slot 33 therein into which extends a stud 34 having a nut 35 on the

outer end thereof. This elbow with the plate 32 can be turned to any position as shown in Figure 3 and clamped in that position by the nut 35. The inner end of the elbow is slotted with a transverse slot 36 as shown in Figure 1. Fastened in this slot is the inner end of the helical thermostat spring 10, the outer end of which is connected to the lockpin 9. By turning the elbow to any desired position as shown in Figure 3 any desired tension can be thrown on this spring 10 that will hold the lockpin 9 in the position shown in Figure 1 as long as the engine is cold or until the hot spot has heated up.

On the inside of the thermostat housing 11 is placed a washer 38 which is threaded on the inner end of the elbow 31 thereby holding the elbow in place so that it can turn in the thermostat housing to secure the proper adjustment of the spring 10 as above described. This elbow is provided with an opening 39 which extends through it as shown in Figure 6, so that hot air can be drawn through the elbow into the thermostat housing 11.

In Figure 10 I have shown a modified form of the cylinder in which 50 indicates the cylinder and 51 indicates the piston, it being understood that the bottom of the cylinder is open. An elbow 52 is provided on top of the cylinder by which it is connected to the intake manifold. The piston is normally held down by the spring 53 and the limit of its downward movement is fixed by a rod or wire 54 having an enlarged end 55 at the top, which passes up through the elbow. The upward movement of the piston is controlled by a lockpin similar to the pin 9 shown in Figure 1 and the lower end of the piston has a stem 56 thereon on which is carried the wedge 16 as is shown in Figure 1 and operates to control the gas supply as shown in Figures 7 and 8. A stem 57 is also provided on top of the piston 51 to which the rod or wire 54 is attached and on which the spring 53 is centered.

It will also be understood that this device can be made as an integral part of the carburetor as well as made and sold as an accessory thereto.

In Figure 11 I have shown a trunk piston in the cylinder. The piston has three diameters. The intermediate diameter is provided so that an air passage will always be open between the thermostat housing 11 and the cylinder 1 through the tube 12, so that the air will circulate from the hot spot on the motor through the opening 7 in the plug 6, when the piston is in its raised position, as well as when the piston is in its slowest position tube 12 and the opening 7 in the plug 6. The smallest diameter is to make room for the spring 5.

As shown in Figures 1 and 2 the bottom of plug 6 is grooved as indicated at 7a to provide an air passage when the piston is in contact with the plug.

In Figure 10 the corresponding groove is on top of the piston.

It will also be understood that the terms of normal level and high level and low level of gasoline in the float chamber of the carburetor include the actual levels of gasoline as the level fluctuates slightly when it permits the float to move down to open the valve and causes it to move up to close the valve at or about either of these levels.

I claim:

1. In a device to regulate the depth of gasoline in the float chamber of a carburetor, means for maintaining the gasoline at a standard level

while the engine is warming up, said means operating to shut off the inflow of gasoline in the float chamber after the engine is warmed up until the level of gasoline in the float chamber has been substantially reduced, said means then holding the gasoline at the reduced level while the engine runs, said means including a thermostat control device located outside the carburetor and warmed by an air current heated by contact with the outside of the engine.

2. In a device to regulate the depth of gasoline in the float chamber of a carburetor means for maintaining the gasoline at a standard level while the engine is warming up, said means operating to shut off the inflow of gasoline in the float chamber after the engine is warmed up until the level of gasoline in the float chamber has been substantially reduced, said means then holding the gasoline at the reduced level while the engine runs, said means including a vacuum control connected to the intake manifold and a thermostat controlled by warm air taken from a hot part of the engine and the parts being so connected that the warm air passes through the vacuum control and into the intake manifold.

3. In a device to regulate the depth of gasoline in the float chamber of a carburetor, a float and a valve for maintaining the gasoline at a standard level, a regulating device that will depress the float and hold the valve closed until the level of gasoline in the float chamber is sensibly reduced, said regulating comprising a connection between the intake manifold of the engine and a hot spot that will draw a current of air through the regulating device while the engine is running without depressing the float and will cause the float to be depressed and the valve to be closed after the air passing through the regulating device has become sufficiently warmed up.

4. In a device to regulate the depth of gasoline in the float chamber of a carburetor, a float and a valve for maintaining the gasoline at a standard level, a regulating device that will depress the float and hold the valve closed until the level of gasoline in the float chamber is sensibly reduced, said regulating device comprising a connection between the intake manifold of the engine and a hot spot that will draw a current of air through the regulating device while the engine is running without depressing the float, and will cause the float to be depressed after the air passing through the regulating device has become sufficiently warmed up, a thermostat affected by said warm air, a piston held against movement by said thermostat until the air becomes warm enough to cause it to release the piston, the vacuum of the intake manifold then causing the piston to move and depress the float and hold it in depressed position with the valve closed.

5. A carburetor having a needle valve, a float chamber and a float and a float arm, said float and float arm being adapted to hold the needle valve closed, when the gasoline reaches a standard level in the float chamber, a wedge, regulating means for interposing said wedge between the float arm and the needle valve and holding it closed until the gasoline had dropped to a lower level in the float chamber, said means operating to lower the level of the gasoline in the float chamber only after the engine is operating and warmed up, said means comprising a tubular connection between the intake manifold of the engine and a hot spot that will draw a current of warm air through the regulating means, a thermostat in said regulating means, a piston held

against movement by the thermostat, said thermostat being moved by the warm air to release the piston, a vacuum for causing the piston to move the wedge between the float arm and the needle valve and hold it there while the engine runs.

6. In a device to regulate the depth of gasoline in the float chamber of the carburetor, means for maintaining the level of the gasoline at a high level when the engine is idle and during the warming up period of the running of the engine, a regulating device operating to lower the level of the gasoline in the float chamber after the engine is warmed up and hold it at the lower level, said regulating device comprising a connection between the intake manifold of the engine and a hot spot that will draw a current of warm air through the regulating device and at a partial vacuum through a part of the regulating device while the engine is running after it has warmed up and will maintain a partial vacuum in a part of the regulating device while the engine is running.

7. In a device to regulate the depth of gasoline in the float chamber of a carburetor means for maintaining the gasoline at a standard level while the engine is warming up, said means operating to shut off the inflow of gasoline in the float chamber after the engine is warmed up until the level of gasoline in the float chamber has been substantially reduced, said means then holding the valve closed while the gasoline is above the reduced level while the engine runs, said means comprising a float, a float arm and a needle valve, a wedge having a thick part and a thin part, the thin part being normally interposed between the float arm and the needle valve when the engine is cold, means for moving the wedge so as to draw the thick part of the wedge between the float arm and the needle valve after the engine warms up thereby causing the float to close the needle valve when the gasoline in the float chamber is at a lower level.

8. In a device for regulating the depth of gasoline in the float chamber of a carburetor, the combination of a float chamber, a float and a float arm and a needle valve closed thereby when the gasoline in the float chamber is at a standard level, a wedge and means for interposing the wedge between the float arm and the needle valve and holding it closed until the gasoline has dropped to a lower level said wedge and float then permitting the valve to open and to permit gasoline to flow into the float chamber to maintain the low level.

9. In a device for regulating the depth of gasoline in the float chamber of a carburetor, the combination of a float chamber, a float, a float arm and a needle valve closed thereby when the gasoline is at a high level, a regulating device that causes the float and its arm to close the needle valve until the gasoline is at a low level in the float chamber, said device comprising a wedge interposed between the needle valve and the float arm, and a piston for moving the wedge, said piston and wedge being held against movement by a thermostat, said piston being released from said thermostat by a current of warm air, a vacuum for drawing the current of warm air and moving the piston and wedge after the piston has been released from the thermostat.

10. In a device to regulate the depth of gasoline in the float chamber of the carburetor, means for maintaining the level of the gasoline at a high level when the engine is idle, and during the

warming up period of the running of the engine, a regulating device operating to lower the level of the gasoline in the float chamber after the engine is warmed up and hold it at the lower level, said regulating device comprising a connection between the intake manifold of the engine and a hot spot that will draw a current of warm air through the regulating device and at a partial vacuum through a part of the regulating device while the engine is running after it has warmed up and will maintain a partial vacuum in a part of the regulating device while the engine is running.

11. In a device to regulate the depth of gasoline in the float chamber of a carburetor, means for maintaining the gasoline at a standard level while the engine is warming up, said means operating to shut off the inflow of gasoline in the float chamber after the engine is warmed up until the level of gasoline in the float chamber has been substantially reduced, said means then holding the gasoline at the reduced level while the engine runs, said means comprising a float, a float arm and a needle valve, a wedge interposed between the float arm and the needle valve, said wedge having a thick part and a thin part, the thin part being normally interposed between the float arm and the needle valve when the engine is cold, means for moving the wedge so as to draw the thick part of the wedge between the float arm and the needle valve after the engine warms up, the thick part of the wedge and the float operating to hold the needle valve closed when the gasoline in the float chamber is at low level the thin part of the wedge and the float operating to hold the needle valve closed when the gasoline is at a high level in the float chamber.

12. In a device to regulate the depth of gasoline in the float chamber of a carburetor means for maintaining the gasoline at a standard level while the engine is warming up, said means operating to shut off the inflow of gasoline in the float chamber after the engine is warmed up until the level of gasoline in the float chamber has been substantially reduced, said means then holding the gasoline at the reduced level while the engine runs, said means comprising a float, a float arm and a needle valve, a wedge interposed between the float arm and the needle valve, said wedge having a thick part and a thin part, the thin part being normally interposed between the float arm and the needle valve when the engine is cold or idle, a cylinder and a piston, said cylinder being connected to the intake manifold so that the piston will be moved by the vacuum created therein, a thermostat spring normally holding the piston against movement when the engine is cold, a housing in which said thermostat spring is enclosed, said housing being connected on one side to a hot spot on the engine or exhaust manifold, and being connected on the other side to the cylinder and intake manifold; so that on the operation of the engine air is drawn through the housing and cylinder into the intake manifold, the air when it becomes warm enough causing the thermostat spring to bend and release the piston, so that it can move in response to the vacuum of the intake manifold, and move the wedge so as to close the needle valve until the gasoline in the float chamber has moved to a lower level.

13. In a device for regulating the depth of gasoline in the float chamber of a carburetor,

the combination of a float chamber, a float, a float arm and a needle valve closed thereby when the gasoline is at a high level, a regulating device that causes the float and its arm to close the needle valve when the gasoline is at a low level in the float chamber, said device comprising a wedge interposed between the needle valve and the float arm and a piston for moving the wedge, said piston and wedge being held against movement by a thermostat, said piston being released from said thermostat by a current of warm air, a vacuum for drawing the current of warm air and moving the piston and wedge after the piston has been released from the thermostat, a spring for returning the piston and wedge to normal position on the failure of the vacuum.

14. A carburetor for internal combustion engines comprising, in combination, a fuel chamber for the carburetor; and means including a thermostatic element for controlling the admission of fuel to said chamber, said thermostatic element being located outside of the carburetor and being warmed by air heated by the engine.

15. A carburetor for internal combustion engines comprising, in combination, a fuel chamber having a fuel admission port, a valve for controlling the port; and means including a thermostatic element for controlling the valve, said thermostatic element being located outside of the carburetor and being warmed by air heated by the engine.

16. A carburetor for internal combustion engines comprising, in combination, a fuel chamber having a fuel admission port; a valve for controlling said port; a float in said fuel chamber; and means including a thermostatic element operatively connecting the valve with the float for controlling the valve, said thermostatic

element being located outside of the carburetor and being warmed by air heated by the engine.

17. An internal combustion engine comprising, in combination, a carburetor, having a passageway in communication with the engine; a fuel chamber for the carburetor adapted to contain a quantity of fuel; a fuel nozzle extending below the level of fuel in the chamber and leading to said passageway in communication with the engine; and means including a thermostatic element for varying the level of fuel in the fuel chamber, said thermostatic element being located outside of the carburetor and being warmed by air heated by the engine.

18. In a device to regulate the depth of gasoline in the float chamber of a carburetor means for maintaining the gasoline at a standard level while the engine is warming up, said means operating to shut off the inflow of gasoline in the float chamber after the engine is warmed up until the level of gasoline in the float chamber has been substantially reduced, said means then holding the gasoline at the reduced level while the engine runs, said means including a vacuum control connected to the intake manifold.

19. In a device for regulating the depth of gasoline in the float chamber of a carburetor, the combination of a float chamber, a float and a float arm and a needle valve closed thereby when the gasoline in the float chamber is at a standard level, means operated by the vacuum of the intake manifold for reducing the level of the gasoline in the float chamber to a level lower than the standard level after the engine is in operation, said means being controlled by a thermostat located outside the carburetor and heated by the engine.

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