Oct. 11, 1927. 1,644,717

L. FERRETTE

AUTOMATIC FUEL REGULATOR

Filed Feb. 5, 1927

Fig. 1.

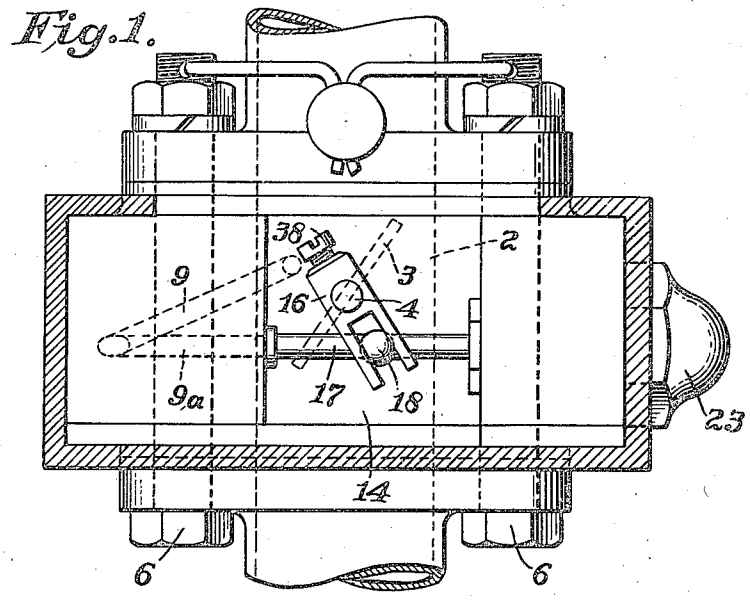


Fig. 2.

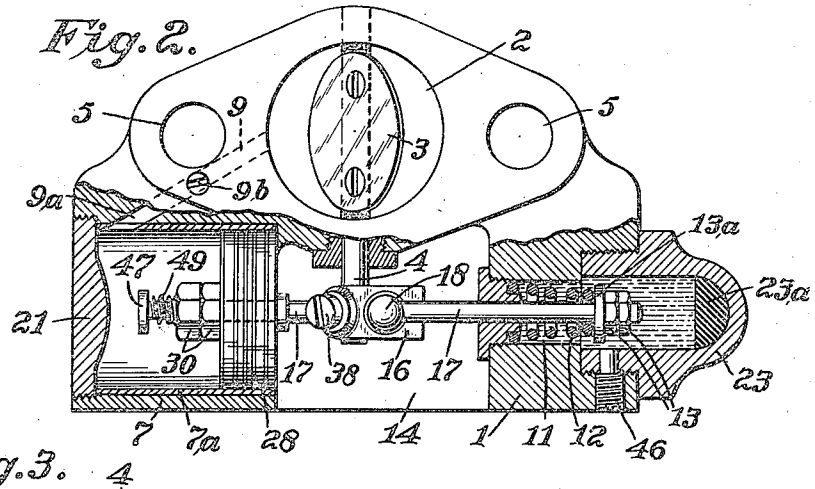


Fig. 3.

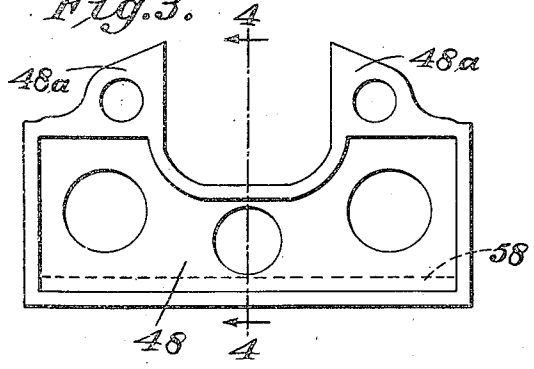
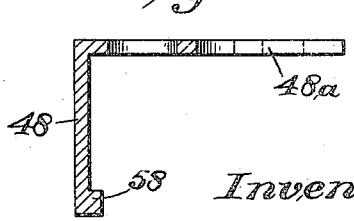


Fig. 4.



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UNITED STATES PATENT OFFICE.

LOUIS FERRETTE, OF PARIS, FRANCE.

AUTOMATIC FUEL REGULATOR.

Application filed February 5, 1927. Serial No. 166,122.

My invention relates to automatic fuel regulators for gas engines of the type in which the pressure built up in the intake pipe between the engine and the carburetor is utilized to control a regulating valve in said intake pipe, thereby automatically regulating the amount of fuel supplied to the engine.

Regulators are already known in the art in which a conduit is brought out from the supply pipe to a chamber in which a cylinder is formed containing a piston and a spring, the movement of the piston controlling some sort of a regulating mechanism, usually a throttle valve placed in the supply pipe.

One of the objects of the present invention is to provide a new means for utilizing the rectilinear movement of the piston to produce the necessary alternating rotary movement of the throttle valve. By providing a fixed lever on the shaft of the throttle valve one end of which is provided with prongs and straddles a spherical portion on the piston rod, I am able to dispense with the usual gears and pinions thereby eliminating any backlash and generally improving the flexibility of the regulator.

Another object of the invention is to provide a means for regulating the length of stroke of the piston and thereby movement of the throttle valve.

Still another object of the invention is to provide means to prevent tampering with the regulating screws once the device is set to respond to a given value.

I attain these objects by the mechanism illustrated in the accompanying drawing, in which—

Fig. 1 is an elevation of the device attached to the intake pipe with its cover removed,

Fig. 2 is a plan view with parts broken away to better illustrate the controlling mechanism,

Fig. 3 is a view in elevation of the cover; and

Fig. 4 is a section along the line 4—4 in Fig. 3 looking in the direction of the arrows.

Referring to the drawing in which similar parts are represented by similar characters, throughout, 1 represents the metallic frame of the device provided with a cylindrical opening 2. The latter is provided with a throttle valve 3, carried by the shaft 4 which is journalled in the main frame of the machine. Two holes 5 are provided for bolts 6 which secure the device in position in the supply pipe between the carbureter and the engine as clearly illustrated in Figure 1.

A cylinder 7 is provided in the main frame and is provided with a lining 7^b of hard non-oxidizable metal. The cylinder 7 is placed into communication with the chamber 2 by means of two channels 9, 9^a one of which communicates above the valve 3 and the other below. A set screw 9^b is provided for varying the effective cross-section of channels 9, 9^a.

A smaller cylinder 11 (Fig. 2) is provided in frame 1 along the axis of cylinder 7. This cylinder houses the opposing spring 12 the tension of which is regulated by nuts 13 carried by the extremity of the piston rod 17. In between spring 12 and nuts 13 is placed a piston 13^a the purpose of which is to retard the movement of piston rod 17 when moved by spring 12. To this end, a plug 23 is provided in cylinder 11 which is filled with some unctuous material such as a heavy oil. Within plug 23 is placed an elastic abutment 23^a against which piston rod 17 abuts at the end of its stroke. The plug 23 is held in place by a set screw 46 which is inaccessible when the cover is in place.

The shaft 4 of valve 3 projects into cavity 14 and is provided at its extremity with a crutch 16 having four prongs. The crutch is secured to the valve shaft by means of set-screw 38. Piston rod 17 is provided with a spherical portion 18 which the prongs of crutch 16 embrace. The arrangement is such that when piston rod 17 moves longitudinally rotary motion is transmitted to valve shaft 4.

Cylinder 7 opens in to cavity 14 at one end and like cylinder 11, is closed at the other end with a plug 21 which also serves the purpose of an abutment plate. Piston rod 17 carries at its extremity a regulating screw 47 which abuts against said plate.

A piston 28 is fastened to piston rod 17 by means of nuts 30. Between these nuts and screw 47 is placed a spring 49 to prevent loosening of the former. Leather piston rings are provided and piston 28 moves to the left when a vacuum is created in cylinder 7 due to its close fit.

The cover member 48 is provided with two ears 48^a which are drilled to receive fastening bolts 6. This member is also provided with a heel 58 (Fig. 4) which pre-

vents removal of the cover plate without withdrawing the bolts 6.

The operation of my device is as follows:

Normally the parts occupy the position shown in Fig. 2. With piston 28 in the right hand position, valve 3 is open, being biased to that position through the action of spring 12.

When the engine fed by the feed pipe is accelerated, the suction caused by the increased demand in fuel causes a suction to take place in channels 9, 9a. This suction causes a vacuum to be formed in cylinder 7 thereby causing piston 28 to move rapidly to the right, at the same time closing valve 3. The closing of valve 3 cuts down the fuel supply and hence slows down the motor. When the vacuum in cylinder 7 has reached a sufficiently low value piston 28 is moved back to its original position by spring 12, thereby reopening valve 3.

By adjusting the tension of spring 12 or by regulating the size of the opening in channels 9, 9a valve 3 may be made to open and close for any given value of fuel supplied to the engine. It will thus be seen that the running of the engine above unauthorized speeds is prevented.

I am aware that heretofore gas engine regulators have been proposed which operate on this principle. I therefore do not claim such a combination broadly; but

I claim:

1. In a device of the type described a piston rod and a spring for urging said rod in one direction, means for adjusting the tension of said spring, a plug for housing said adjusting means, a cover-plate adapted to be sealed to said device and means on said cover-plate to prevent the removal of said plug before the removal of said cover-plate.

2. An automatic fuel regulator for internal combustion engines comprising a block having a fuel passage therein, a valve rotatable therein for opening and closing said passage, actuating means for said valve contained in said block, adjusting means for determining the amount of movement of the actuating means, a cap attached to the block and covering the adjustment means, locking means for said cap, and a cover attached to said block and covering the cap locking means, whereby upon sealing the cover the cap locking means is rendered inaccessible, and hence tampering with the adjusting means is prevented.

3. A fuel regulator for internal combustion engines comprising a block having a fuel passage therein, a valve in said passage, actuating means for the valve within an aperture in the block, adjusting means for the actuating means, a cap covering the adjusting means, a lock for the cap, a cover closing the actuating means containing aperture and the cap lock and having ears overlying the block and straddling the fuel aperture, and means penetrating the ears to secure the cover to the block.

4. A fuel regulator for internal combustion engines comprising a block having a fuel passage therein, a valve in said passage, actuating means for the valve within an aperture in the block, adjusting means for the actuating means, a cap covering the adjusting means, a lock for the cap, a cover closing the actuating means containing aperture and the cap lock and having ears overlying the block and straddling the fuel aperture, and means penetrating the ears to secure the cover to the block, said cover having a heel underlying the block.

Signed at Paris, France, this 25 day of January A. D. 1927.

LOUIS FERRETTE.