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COMPENSATING DEVICE FOR CARBURETORS OF INTERNAL COMBUSTION MOTORS.

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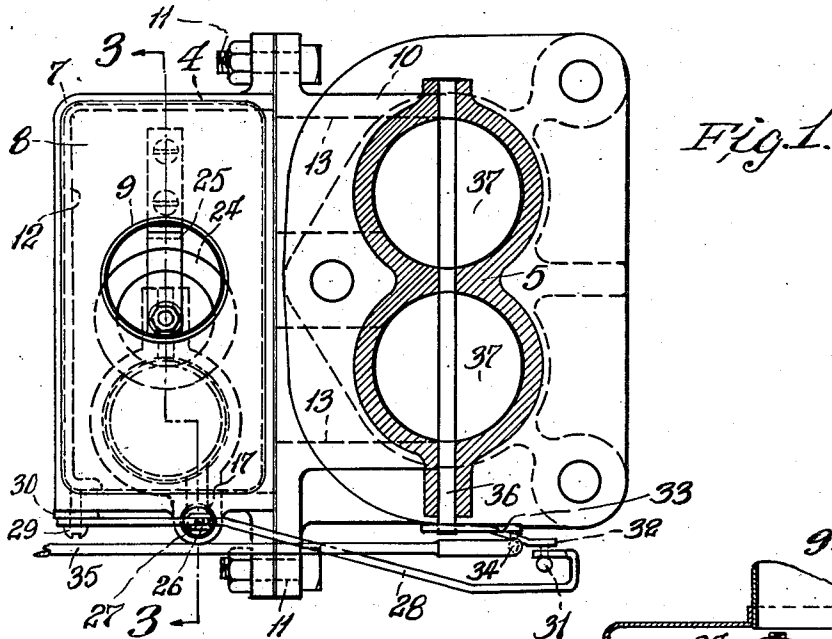


Fig. 1.

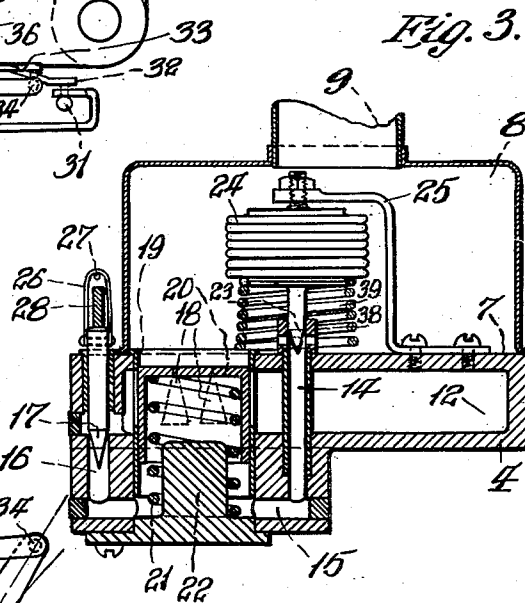


Fig. 3.

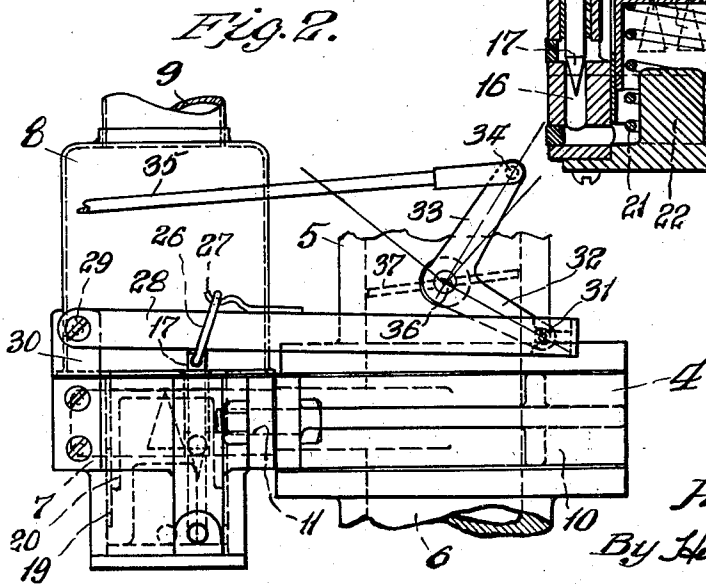


Fig. 2.

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COMPENSATING DEVICE FOR CARBURETORS OF INTERNAL COMBUSTION MOTORS

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10 Claims. (Cl. 123—124)

This invention relates to a compensating device for carburetors of internal combustion motors, which is presently adapted to be located between the carburetor and the intake manifold of a motor so as to be effective on the carburetted mixture as it is entrained from the carburetor to the intake manifold, and is a furthering of the invention disclosed in my U. S. Letters Patent No. 2,212,101, dated August 20, 1940.

The invention of the instant application has for one of its objects to provide a device having a valve controlled auxiliary chamber actuated by vacuum controlling means governed by the accelerator means of an internal combustion motor.

Another object is to provide a device having a vacuum actuated auxiliary air valve which is under the control of another valve operated by the accelerator rod of the carburetor of an internal combustion motor.

A further object is to provide a device in the form of a housing having therein a chamber which communicates with both the carburetor and the intake manifold of an internal combustion motor, and the housing having a free air venting passage communicating to the chamber having a resisting valve at respective ends and a vacuum actuated plunger cooperable with the outlet end of the passage and being effected by air entrainment through said passage.

A still further object is to provide a device for cooperation with both the intake manifold and the carburetor of an internal combustion motor, for admitting varying proportions of free air, comprising an attachable unit having an inlet passage leading to the manifold, and the passage having cooperable resisting valves, one of which is mechanically actuated and the other being thermostatically actuated, and a spring return plunger cooperable with the passageway.

Other objects and advantages will appear as this description progresses and by reference to the drawing, in which:

Figure 1 is a sectional plan elevation showing an adaptation of the invention in a cooperable position with the carburetor for an internal combustion motor.

Figure 2 is a side elevation of Fig. 1.

Figure 3 is a vertical sectional elevation taken approximately on the line 3—3 of Fig. 1.

Referring to the drawing, 4 designates a housing which is secured between the carburetor 5 and the intake manifold 6 of an internal combustion motor, and mounted on top of the part 7

of the two-part housing 4 is an air chamber 8 having a communicating inlet branch 9 which may lead from an air cleaner or the like.

The part 10 of the housing 4 is secured between the carburetor 5 and manifold 6, and the parts 7 and 10 of the housing being secured together by bolts 11, and when thus secured, the chamber 12 formed in the part 7 communicates with a pair of passages 13 in the part 10 which communicate with the carburetor 5 and the manifold 6.

Extending through the chamber 12 is a vertical tube 14 having its upper end disposed above the housing, the lower end of said tube communicating with a horizontal passageway 15, and said passageway having the vertical run 16 with which a pin valve 17 is cooperable, and the vertical run 16 of the passageway 15 communicating with the chamber 12 adjacent the ports 18 formed in a vertically disposed cylindrical sleeve 19.

Both the upper end of the sleeve 19 and the tube 14 communicate with the air chamber 8, and the sleeve 19 extends downwardly to the passageway 15, and reciprocal in said sleeve is a piston or plunger 20 which is normally positioned in the sleeve with respect to the ports 18 thereof, by a coil spring 21 which is centered over a lug 22 which extends upwardly from the bottom of the passageway 15. Cooperable with the inlet end of the tube 14 is a pin valve 23 which is carried by a Sylphon element 24, said element being adjustably secured to the bracket 25 and is disposed within the air chamber 8.

The upper extending end of the pin valve 17 is provided with a loop 26 attached to a hook 27 carried by a lever 28 which is pivoted at 29 to a bracket 30 secured to the housing 4, the swinging end of said lever being connected at 31 to the arm 32 of a bell crank lever 33, and connected at 34 to the other end of said bell crank lever is an accelerator rod 35.

The bell crank lever 33 is securely fixed to a shaft 36 which is supported in the carburetor 5, and fixed to said shaft are the twin throttle valves 37 of the carburetor.

As shown, the valve 17 being slightly larger in capacity than the valve 23, has the greatest variation over the throttle range of motor operation as the valve 17 varies from point .005 to .015 of a square inch, the latter size however, being at wide open throttle, whereas the valve 23 varies from .006 of a square inch at 6,000 feet sea level and at 120 degrees temperature to .012 of a

square inch at sea level atmospheric pressure or at zero.

When a motor equipped with this improved compensating device is at idling operation, the parts described are in the approximate positions shown, in which the valve 17 will be in its most closed position, whereas the valve 23 which may be in its most open position with respect to the tube 14, will allow more air to enter the passageway 15 than is evacuated by any possible vacuum formed in the housing chamber 12 or manifold 6. When the accelerator rod 35 is actuated to operate the throttle valves 37 to wide open throttle positions, the valve 17 will be in its most open position, and the entrained free air through the tube 14 and passageway 15 will create a pulling force under the piston 20 to approximately approach the vacuum created in the chamber 12 of the housing 4 for the reason that the constant leak or venting of air past the valve 23 and through the passageway 15, will not equal the volume taken by the manifold, past the valve 17.

At points in between positions of idling and full open throttle, the varying vacuum pressures in the chamber 12 will be extended so as to become effective in the passageway 15 and under the piston 20, and thereby moving the piston downwardly to varying extents created by the vacuum, to open the ports 18 in the cylindrical sleeve 19 against the tension of the coil spring 21. Obviously, the volume of entrained air through the ports 18 is that amount determined by the vacuum pull created in the chamber 12.

Under cold temperatures and sea level pressures, the Sylphon element 24 will remain contracted and the resistance of the valve 23 thereof at the inlet end of the tube 14 will be a minimum; therefore, the pressure under the piston 20 will likewise be a minimum over the entire throttle action range of the motor. With increase of temperature or altitude, the Sylphon element 24 will expand and move the valve 23 thereof into a closer position with the inlet end of the tube 14, thereby causing a greater resistance to the flow of air through the passageway 15, and consequently, the vacuum of the chamber 12 will become more effective on the under side of the piston 20 to move the piston a greater degree downwardly in uncovering or opening the ports 18, even though the throttle action and the vacuum in chamber 12 remain the same as when the Sylphon element 24 was in its contracted position.

Specifically, the upper extending end of the tube 14 is provided with an apertured sleeve 38 in which the valve 23 is engaged, said sleeve serving as a guiding element to said valve, and to counteract the spring effect of the Sylphon element 24, a coil spring 39 is engaged at its upper end against the under side of the element and having its lower end seated on the housing 4, said spring making the Sylphon element more effective with regard to changing its length due to temperature and pressure variations.

The lower end of the coil spring 39 is disposed to overlap the sleeve 19 to serve as a stop to prevent the plunger 20 being forced outwardly from the sleeve by its spring 21, and in operation the striking of the plunger 20 against the spring, will vibrate the Sylphon element sufficiently to free any frictional sticking of the valve 23 with the sleeve 38.

The ports 18 are preferably graduated in width for increasing or decreasing the inlet areas of the chamber 12, as determined by the opened positions of the plunger 20 as may be required to

admit a correct volume of auxiliary air to the chamber to mingle with the carburetted fuel charge as delivered by various carburetors having varying mixture characteristics to be compensated.

Obviously, temperature and atmospheric pressure conditions attendant with climatic changes govern the expanding and contracting action of the Sylphon element 24, and consequently, greater or lesser air charges will be entrained through the passageway 15 as determined by the position of the valve 23, in co-relation however, with the position of the valve 17 in respect to the outlet end of said passageway 15.

While I have described one embodiment of my invention with some particularity, obviously many other embodiments thereof will occur to those skilled in the art to which it appertains. I, therefore, do not limit myself to the precise details described, but claim as my invention all variations and modifications coming within the scope of the subjoined claims.

What I claim is:

1. A compensating device for an internal combustion motor comprising a housing having a chamber therein, an intake manifold with which said chamber communicates, a passageway leading to said chamber from the outside of the housing, a manually controlled valve and a thermostatically controlled valve cooperable with said passageway, and a plunger for governing the admittance of auxiliary air to said chamber and being under the control of suction in said passageway.

2. A compensating device to be inserted between the intake manifold and the carburetor of an internal combustion motor comprising a housing having a chamber in communication with the manifold and the carburetor, a passageway leading to said chamber from the outside of the housing, a manually controlled valve and a thermostatically controlled valve cooperable with said passageway, a ported cylinder intercepting said chamber and said passageway, and a plunger in said cylinder effected by and being under the control of suction in said passageway.

3. A compensating device for an internal combustion motor comprising a housing having a chamber, an intake manifold with which said chamber communicates, a passageway leading to said chamber from the outside of the housing, a ported cylinder having one end in communication with said passageway and its other end communicating with the outside of said housing and the ports of said cylinder adapted to communicate with said chamber, a plunger in said cylinder cooperable with the ports thereof, a manually controlled valve cooperable with said passageway on one side of said plunger, and a thermostatically controlled valve cooperable with said passageway on the other side of said plunger.

4. A compensating device for an internal combustion motor comprising a housing having a chamber therein, an intake manifold with which said chamber communicates, a passageway leading to said chamber from the outside of the housing, a ported cylinder having one end in communication with an intermediate portion of said passageway and being in communication at its other end with the outside of said housing, a plunger in said cylinder cooperable with the ports thereof, and a pair of controlled valves having co-operable relation with said passageway.

5. A compensating device for an internal combustion motor comprising a housing having a

chamber, an intake manifold with which said chamber communicates, a passageway leading to said chamber from the outside of the housing, a thermostatically controlled valve cooperable with said passageway, a ported cylinder having one end in communication with said passageway and its other end in communication with the outside of the housing, the ports of said cylinder being in communication with said chamber, and a plunger in said cylinder.

6. A device for cooperable connection with an intake manifold of an internal combustion engine for admitting auxiliary air thereto, comprising a housing having a chamber in communication with the manifold, a passageway leading to said chamber from the outside of the housing and having a thermostatically controlled valve cooperable with said passageway, a ported plunger cylinder communicating at one end with said passageway and at its other end with the outside of the housing and the ports of said cylinder being in communication with said chamber, and a plunger mounted in said cylinder and cooperable with said ports.

7. A device for cooperable connection with the intake manifold and the throttle valved carburetor of an internal combustion engine for admitting auxiliary air thereto, comprising a housing having a chamber in communication with the manifold, a passageway leading to the chamber from the outside of the housing, a ported cylinder communicating at one end with said passageway and at its other end with the outside of the housing and the ports of said cylinder being in communication with said chamber, a plunger mounted in said cylinder and cooperable with said ports, and a valve cooperable with said passageway and having synchronizing connection with the throttle valve of the carburetor.

8. A device for cooperable connection with the intake manifold and the throttle valved carburetor of an internal combustion engine for ad-

mitting auxiliary air thereto, comprising a housing having a chamber in communication with the manifold, a passageway leading to the chamber from the outside of the housing, a ported cylinder communicating at one end with said passageway and at its other end with the outside of the housing and the ports of said cylinder being in communication with said chamber, a plunger mounted in said cylinder and cooperable with said ports, a valve cooperable with said passageway and having synchronizing connection with the throttle valve of the carburetor, and a thermostatically controlled valve having cooperable relation with said passageway.

9. A compensating device for an internal combustion motor comprising a housing having a chamber therein, an intake manifold with which said chamber communicates, a passageway leading to said chamber from the outside of the housing, a manually controlled valve and a thermostatically controlled valve cooperable with said passageway, a port at the outlet end of said passageway in communication with said chamber and adapted to supply air thereto, and a plunger cooperable with said port and said passageway and adapted to be actuated by varying pressures existing in said passageway.

10. A compensating device for an internal combustion motor comprising a housing having a chamber therein, an intake manifold with which said chamber communicates, a passageway leading to said chamber from the outside of the housing, a manually controlled valve and a thermostatically controlled valve cooperable with said passageway, a port at the outlet end of said passageway in communication with said chamber and adapted to supply air thereto, and a spring returned plunger cooperable with said port and said passageway and adapted to be actuated by varying pressures existing in said passageway.

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