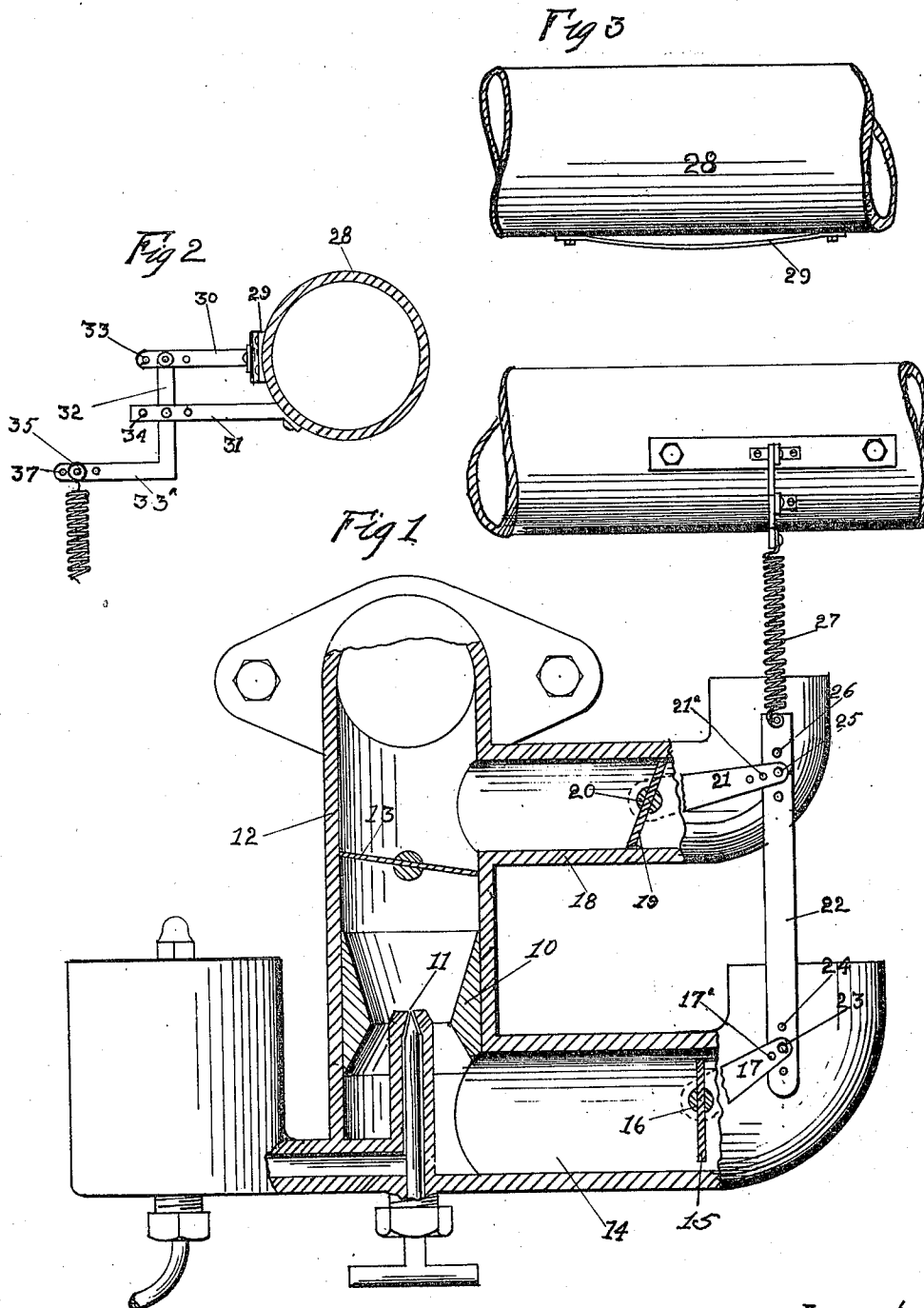


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CARBURETOR AIR CONTROL DEVICE.
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CARBURETOR AIR-CONTROL DEVICE.

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To all whom it may concern:

Be it known that I, EDWARD G. HODGES, a citizen of the United States, and resident of Marshalltown, in the county of Marshall and State of Iowa, have invented a certain new and useful Carburetor Air-Control Device, of which the following is a specification.

The object of my invention is to provide an automatic air control device of simple and inexpensive construction, designed to be used in connection with the carburetor of an internal combustion engine.

More particularly it is my object to provide in combination with the carburetor and fuel mixture passage, a pair of air passages communicating with the carburetor and with the fuel mixture passage above and below a throttle valve, and to provide valves in said air passages connected with each other for simultaneous operation, said valves being so mounted that a greater portion of the area of each valve is on one side of the stem than on the other side, so that said valves will tend to be actuated by the rush of air that passes the valves, and by the pressure of air due to the vacuum in the mixture passage.

Still a further object is to provide in addition to the means for connecting the valves in the air passages, a spring and a thermostat device operatively connected with said spring, said thermostat device being so mounted on the engine as to be subject to the heat thereof, the parts being so arranged that the spring tends to hold the valves closed when the engine is cold, and so that the thermostat device partially releases the tension on the spring when the engine becomes heated.

With these and other objects in view, my invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 shows a side elevation of my improved device, parts being shown in vertical cross-section.

Figure 2 shows a front elevation of a thermostat and the means for connecting the thermostat with the spring, and

Figure 3 shows a top or plan view of a

part of the engine, showing the thermostat thereon.

In the illustration of my invention shown in the accompanying drawings, I have used the reference numeral 10 to indicate generally a carburetor body having therein a fuel nozzle 11. Above the fuel nozzle 11 is a fuel mixture passage 12, in which is an ordinary throttle valve 13. It will be understood that the fuel mixture passage 12 is designed to communicate with the cylinders of the internal combustion engine through the ordinary manifold.

Communicating with the carburetor body below the throttle and below the discharge end of the nozzle 11, is an air pipe or passage 14, in which is a butterfly valve 15 having a stem 16 arranged off center with relation to the valve. The stem 16 is preferably horizontal, so that the greater area of the valve 15 is below the stem. On the stem 16 is an arm 17.

Communicating with the fuel mixture passage 12 above the throttle valve 13 is an air passage or a pipe 18, in which is a butterfly valve 19 having a stem 20 also preferably horizontally arranged and mounted off center on the valve 19, so that the greater area of the valve is below the stem.

Fixed to the stem 20, outside the passage 18, is an arm 21. The arms 20 and 21 are each pivoted to a link 22. The arm 17 is pivoted to the lower end of the link 22 by means of a pin 23 selectively received in one of a series of holes 24 in said link and one of a series of holes 17^a in the arm 17. The arm 21 is pivoted to the upper end of the link 22 by means of the pin 25 selectively received in one of another series of holes 26 in said link and one of a series of holes 21^a in the arm 21. Secured to the upper end of the link 22 is a coil spring 27.

Secured at its ends to a portion 28 of the exhaust passage is a thermostat bar 29, made of material which has a different coefficient of expansion than the engine, so that when the engine becomes heated the bar 29 will tend to buckle at its central portion.

Secured to the central portion of the thermostat bar 29 is an outwardly extending arm 30. Suitably mounted is a bracket 31. Pivoted between its ends on the bracket 31 is a lever arm 32, the upper end of which is pivoted to the arm 30. The arm 30 and the

bracket 31 each has a series of holes 33 and 34 to selectively receive pins, whereby the lever arm 32 is pivoted to said arm and bracket. At its lower end the arm 32 has a lateral extension 33^a, also provided with a series of holes 37.

It will be seen that the lever 32 and the extension 33 form a bell crank lever. Selectively received in one of the holes 34 is a pin 35, to which the upper end of the spring 27 is secured.

In the practical operation of my improved automatic air control device, it will be noted that the spring 27 normally holds the valves 15 and 19 in their closed position. The valve 19 seats snugly, but the valve 15 is so arranged as to allow the passage of some air at all times.

When the engine is started and the throttle valve 13 is opened, the tension of the spring 27 will tend to hold the valves 15 and 19 closed, although a partial vacuum will be created in the carburetor and the fuel mixture passage, and some air will be drawn past the valve 15 for supplying the carburetor. As the speed of the engine increases, both of the valves 15 and 19 are moved toward open position. The parts are so constructed and arranged that the valve 15 opens more rapidly than the valve 19. As soon as the engine begins to warm up, the thermostat bar 29 will force the arm 30 outwardly, with the result that the tension on the spring 27 will be partially released for allowing the freer opening movement of the valves, whereupon the vacuum above mentioned will result in a rush of air past the valves 15 and 19 and a further opening of said valves for allowing air to pass them according to the speed of the engine. On account of the fact that the stems 16 and 20 are mounted off center on the valves, the valves will be tilted toward open position, and the rush of air past said valves will also tend to open said valves and hold them open.

The pipes 14 and 18 are curved upward. On account of this structure the current of air will be more rapid on the out side of the curve of air travel, thus causing the more rapidly moving air to strike the lower parts of the valves 15 and 19 for increasing the effect of the rush of air in opening these valves.

When the engine is idling and the throttle valve is closed, it will be noted that the vacuum will exist only above the throttle valve, and hence the rush of air past the fuel nozzle 11 will be reduced for effecting a saving in fuel, while air will be supplied to the mixture in the mixture passage 12 through the pipe 18 for maintaining a proper volume in the engine cylinders. By maintaining the proper volume in the engine cylinders, proper compression is always had, and on account of having less vacuum above the pistons I

avoid the drawing of lubricating oils upwardly past the piston rings into the combustion chamber.

It will be seen that the operation of my air supply device is automatic, and that comparatively little air is supplied when the engine is being started, so that a mixture of maximum richness is had during the starting of the engine; whereas, after the engine has attained speed and has become heated, more air will be furnished.

When the throttle is nearly closed and the engine is idling, or is under a light load, more air and less fuel will be supplied to the cylinders; whereas, when the throttle valve is again further opened, as, for instance, when the engine is under heavier load, the rush of air through the passage 14 and around the nozzle 11 will result in the furnishing of a relatively richer mixture.

It will be noted that on account of the means for adjustably connecting the arms 17 and 21 with the link 22, the means for adjustably connecting the spring with the extension 33, and the means for adjustably connecting the lever arm 32 with the bracket 31 and the arm 30, a great variety of adjustments may be had, so that the tension on the spring may be varied as desired, for varying the action of the spring on the butterfly valves and determining just when in the operation of the device the butterfly valves shall be subject to the vacuum and the rush of air only.

Furthermore, the valve 15 may be adjusted to different normal positions, regulating the relative amounts of air to be supplied through the passages 14 and 18.

The adjustments provided also make it possible to apply an attachment of the kind herein mentioned, which may be made in standard sizes, to engines of different makes and kinds.

Some changes may be made in the construction and arrangements of the parts of my device without departing from the real intent of my invention, and it is my intention to cover by my claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim as my invention:

1. In a device of the class described, a plurality of fluid passages, valves in said passages for controlling the flow of fluid therethrough, means operatively connecting said valves, means normally urging said valves to a substantially closed position, said valves being so constructed and arranged that an unequal pressure on opposite sides thereof will tend to move the same toward open position against the action of said urging means.

2. In a device of the class described, a plurality of fluid passages, winged valves

pivotally mounted in said passages for controlling the flow of fluid therethrough, means operatively connecting said valves, and means normally urging said valves to a substantially closed position, the wings of said valves each having a greater area to one side of its pivot whereby the same will tend to move toward open position upon the pressure on opposite sides thereof becoming unequal.

3. In a device of the class described, a plurality of fluid passages, winged valves pivotally mounted in said passages for controlling the flow of fluid therethrough, means operatively connecting said valves, and means normally urging said valves to a substantially closed position, the wings of said valves each having a greater area to one side of its pivot, whereby the same will tend to move toward open position against the action of said urging means upon the pressure on opposite sides thereof becoming unequal, and one of said valves permitting a leakage thereby of a predetermined volume of fluid when the same is in fully closed position.

4. In a device of the class described, a

plurality of fluid passages, valves in said passages for controlling the flow of fluid therethrough, means operatively connecting said valves, means normally urging said valves to a substantially closed position, said valves being so constructed and arranged that an unequal pressure on opposite sides thereof will tend to move the same toward open position against the action of said urging means, and a thermostat device operatively connected with said urging means.

5. In a device of the class described, the combination of a carbureter, a fuel mixture passage, a fuel nozzle in said passage, a throttle valve in said fuel mixture passage, air supply passages communicating with the carbureter on both sides of the throttle valve, winged valves mounted in said passages and pivoted off center, means for operatively connecting said valves with each other, whereby said valves are subjected to the operation of the partial vacuum created in one or more of said air passages, and a thermostat device operatively connected with said air passage valves.

EDWARD G. HODGES.