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VACUUM CONTROLLING DEVICE FOR AN ENGINE CARBURETOR

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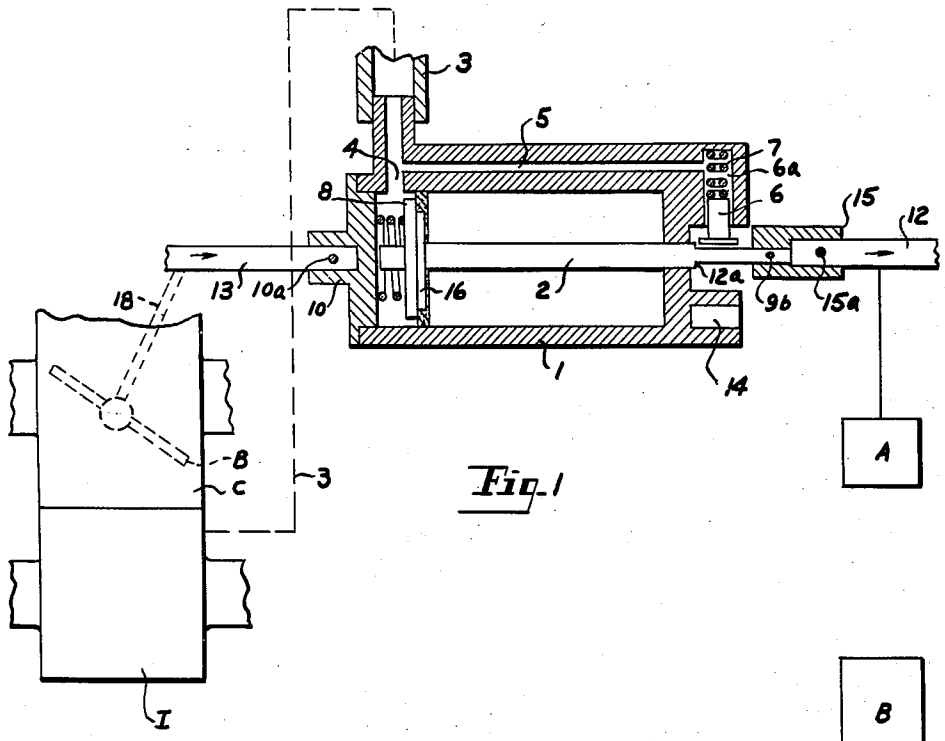


Fig. 1

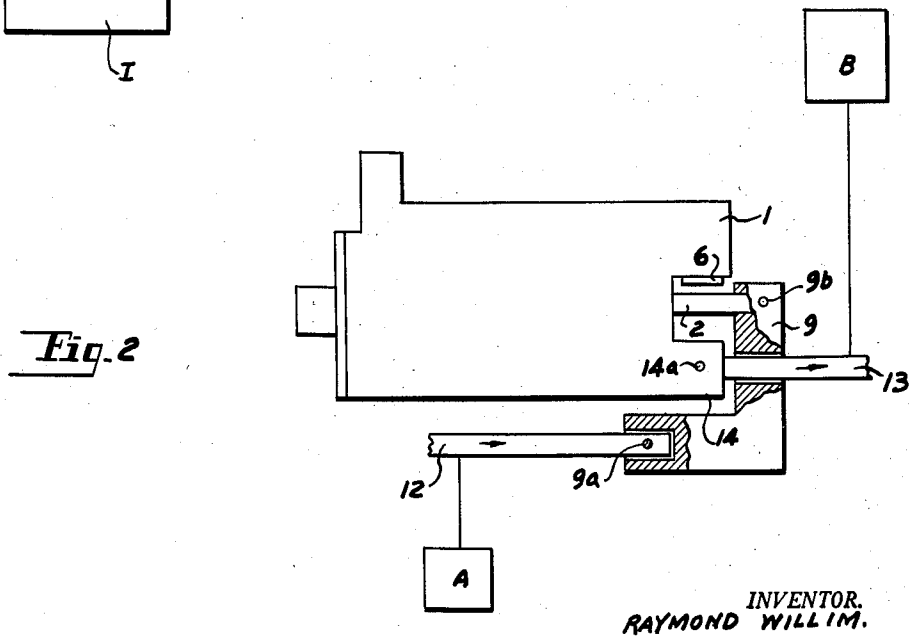


Fig. 2

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VACUUM CONTROLLING DEVICE FOR AN ENGINE CARBURETOR

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4 Claims. (Cl. 123—103)

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This invention relates to a vacuum controlling device for a vehicle carburetor and more particularly to a vacuum throttle control for internal combustion engines.

It is the object of this invention to provide an automatic adjusting device for regulating the throttle opening within a carburetor to maintain a predetermined minimum vacuum and to thereby automatically control and maintain the proper fuel mixture to insure the highest efficiency for the engine particularly during periods of acceleration.

Heretofore the accelerator has been directly connected to the butterfly valve within the carburetor so that application of said accelerator directly moves the butterfly valve to regulate the speed of the engine. While operating at a fixed speed the carburetor attains an efficient automatic adjustment, however when operating at slow speeds if there is an abrupt application of the accelerator pedal the butterfly valve in the carburetor is suddenly opened too wide. This causes a sudden falling off of the vacuum within the carburetor so that the proper mixture is not immediately made available to the engine often causing an erratic action of the engine.

It is the object of the present invention to provide a yielding connection between the accelerator arm and the carburetor valve control arm so that regardless of the erratic operation of the accelerator there will be assured the proper partial throttle opening within the carburetor to thereby smooth out engine operation particularly during periods of acceleration.

These and other objects will be seen from the following specification and claims in conjunction with the appended drawing in which—

Fig. 1 is an elevational section of the vacuum controlled yielding linkage between the accelerator arm and the carburetor throttle rod of an internal combustion engine; and

Fig. 2 is a side elevational view of a slight variation thereof with a portion thereof broken away and sectioned.

It will be understood that the above drawing illustrates merely a preferred embodiment of the invention and that other embodiments are contemplated within the scope of the claims hereafter set out.

Referring to the drawing, Fig. 1 there is diagrammatically indicated a manually operable accelerator A for a vehicle engine which is suitably joined to the accelerator arm 12 for effecting reciprocal longitudinal movements thereof. There is also illustrated, diagrammatically, a

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vehicle intake manifold I and connected therewith carburetor C and with the butterfly valve therein B.

Operating lever 18 is diagrammatically illustrated, being joined at one end to the butterfly valve B for rotating the same within carburetor C for effecting the desired fuel opening therethrough.

The longitudinally reciprocal operating rod 13 is joined at its outer end to the upper end of the operating lever 18 as diagrammatically illustrated.

There is provided a yielding vacuum controlled connection between the accelerator arm or rod 12 and the operating rod 13 joined to the carburetor butterfly valve B. This consists of a relatively movable cylinder 1 having a suitable reciprocal or relatively reciprocal piston 16 therein.

In the preferred embodiment shown in Fig. 1 the accelerator arm or rod 12 is connected by coupling 15 and the transverse pins 9B and 15A to the free end of the piston rod 2 upon the outside of cylinder 1. Furthermore the free end of the operating rod 13 extends within the central sleeve 10 at the end of the cylinder 1 and is secured thereto by the transverse pin 10A.

The relative movement between cylinder 1 and piston 16 is controlled by the vacuum conditions within the vehicle intake manifold I.

To attain this control there is provided an outlet passage 4 at one end of cylinder 1 and this passage is connected with the interior of the intake manifold by the flexible conduit 3, a portion of which is diagrammatically illustrated in the drawing.

There is also employed a light spring 8 within cylinder 1 interposed between the end of said cylinder corresponding to passage 4 and one side of the piston 16, normally urging said piston away from that end of said cylinder.

By this construction it is apparent that a varying vacuum condition will be established within passage 4 and within the cylinder between one end of the cylinder and the piston 16 so that a longitudinal movement to the right of the accelerator arm 12 will effect a proportional and varying movement of cylinder 1 and the operating rod 13 connected therewith.

For starting the vehicle engine and before any vacuum is created within the intake manifold it is desirable that there be a direct connection established between accelerator arm 12 and operating rod 13 so as to effect an initial opening of the butterfly valve B within the carburetor. This is accomplished by the provision of a plunger 6

reciprocally movable within a transverse passage 6a at one end of said cylinder with the outer end of said plunger adapted for positioning against the shoulder 12A of the rod 2 to thereby retainingly engage the same so that an initial longitudinal movement of accelerator arm 12 will effect a corresponding longitudinal movement of cylinder 1 and the operating rod 13 joined thereto. The coiled spring 7 is positioned within the transverse passage 6A and is adapted to normally urge the plunger 6 to the position shown in Fig. 1.

Longitudinal passage 5 is also formed within cylinder 1 and at at one end is connected with outlet passage 4 and at its other end with plunger passage 6A. By this construction as soon as the vehicle engine is operating and a predetermined vacuum is attained within the intake manifold, this vacuum will be communicated to plunger 6 lifting the same in passage 6A against the action of spring 7 thereby disengaging accelerator arm 12 from cylinder 1.

Thereafter there is a yielding vacuum controlled connection between accelerator arm 12 and the carburetor controlling operating rod 13.

This means that during periods of acceleration abrupt movements of the accelerator arm 12 will cause only a partial opening movement of the butterfly valve B to thereby maintain a predetermined minimum vacuum within the carburetor and thereby assure an efficient operation of the engine resulting in a smooth acceleration.

Thus while the operator has full control of the carburetor at starting, as soon as the engine is started there will be provided a flexible vacuum controlled connection between the accelerator arm and the butterfly valve of the carburetor.

Under certain conditions such as a sudden load increase to the vehicle engine and a corresponding falling off of the vacuum within the intake manifold, the spring 8 will function to maintain a spaced relation between piston 16 and the end of cylinder 1 so that said cylinder is temporarily motionless and so holds the operating rod 13 as to maintain a predetermined minimum vacuum within the carburetor. As the load lightens on the engine the vacuum increases in the passage 4 and the cylinder 1 now follows the piston 16 more closely substantially to the point selected by the operator by the manual control of the accelerator arm 12.

Fig. 2 illustrates a slight variation wherein the cylinder 1 is constructed in the manner shown in Fig. 1 however the piston rod 2 is connected with the operating or accelerator arm 12 so that a pushing action of said arm will cause a corresponding movement to the right of said piston rod. For this purpose there is provided a coupling 9 which has a transverse opening to loosely receive carburetor operating rod 13 and which is joined at 9A to accelerator arm 12 and at 9B to the piston rod 2. In all other respects the operation of the vacuum controlled connection is the same as above described with respect to Fig. 1.

The above construction additionally provides for a device which may be readily installed on any engine without any change in the engine assembly.

Furthermore this flexible connection will reduce the use of a carburetor choke both as to time and amount, and by assuring the correct fuel mixture during periods of acceleration, crank case oil dilution will be reduced. Furthermore gasoline consumption will be reduced and the engine will operate smoother particularly during periods of acceleration.

Fig. 2 shows operating rod 13 as secured by pin 14A to the opposite end of cylinder 1 as indicated at 14.

Having described my invention, reference should now be had to the claims which follow for determining the scope thereof.

I claim:

1. A vacuum control for an engine having an intake manifold and a carburetor with a valve for supplying a controlled fuel mixture thereinto, a longitudinally movable operating rod joined at one end to said valve, a cylinder joined to said rod at its other end, a piston movable within said cylinder, a longitudinally reciprocable accelerator arm joined to said piston, an outlet passage at one end of said cylinder, a conduit interconnecting said passage and said intake manifold, a spring loaded plunger slidable within said cylinder at right angles to said arm and retainingly engageable therewith for interconnecting said arm and said cylinder for movement in unison, and a second passage in said cylinder connected at one end with said outlet passage and at its other end with said plunger for effecting a withdrawing movement of said plunger after the engine is operating.

2. A vacuum control for an engine having an intake manifold and a carburetor with a valve for supplying a controlled fuel mixture thereinto, a longitudinally movable operating rod joined at one end to said valve, a longitudinally reciprocable accelerator rod, a relatively movable cylinder and piston, with the cylinder connected to one of said rods and its piston connection to the other of said rods, an outlet passage at one end of said cylinder, a conduit interconnecting said passage and said intake manifold, and a spring loaded plunger slidable within said cylinder at right angles to said other rod and retainingly engageable therewith for interconnecting said other rod and said cylinder for movement in unison, and a second passage in said cylinder connected at one end with said outlet passage and at its other end with said plunger for effecting a withdrawing movement of said plunger after the engine is operating.

3. A vacuum control for an engine having an intake manifold and a carburetor with a valve for supplying a controlled fuel mixture thereinto, a longitudinally movable operating rod joined at one end to said valve, a cylinder joined to said rod at its other end, a piston movable within said cylinder, a longitudinally reciprocable accelerator arm joined to said piston, an outlet passage at one end of said cylinder, a conduit interconnecting said passage and said intake manifold, a spring loaded plunger slidable within said cylinder at right angles to said arm and retainingly engageable therewith for interconnecting said arm and said cylinder for movement in unison, a second passage in said cylinder connected at one end with said outlet passage and at its other end with said plunger for effecting a withdrawing movement of said plunger after the engine is operating, and a coiled spring between said piston and the end of said cylinder corresponding to said outlet passage.

4. A vacuum control for an engine having an intake manifold and a carburetor with a valve for supplying a controlled fuel mixture thereinto, a longitudinally movable operating rod joined at one end to said valve, a longitudinally reciprocable accelerator rod, a relatively movable cylinder and piston, with the cylinder connected to

one of said rods and its piston connected to the other of said rods, an outlet passage at one end of said cylinder, a conduit interconnecting said passage and said intake manifold, vacuum responsive movable means on said cylinder retaining engageable with said other rod for interconnecting said rods for movement in unison, and a conduit connected at one end with said outlet passage and at its other end with said vacuum responsive means for disengaging said vacuum responsive means and said other rod after the engine is operating, so that there is a flexible vacuum control mechanism between said rods.

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