

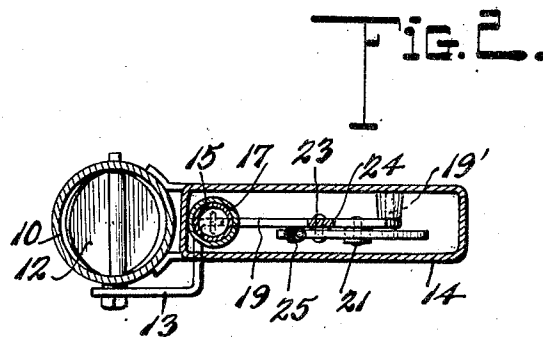
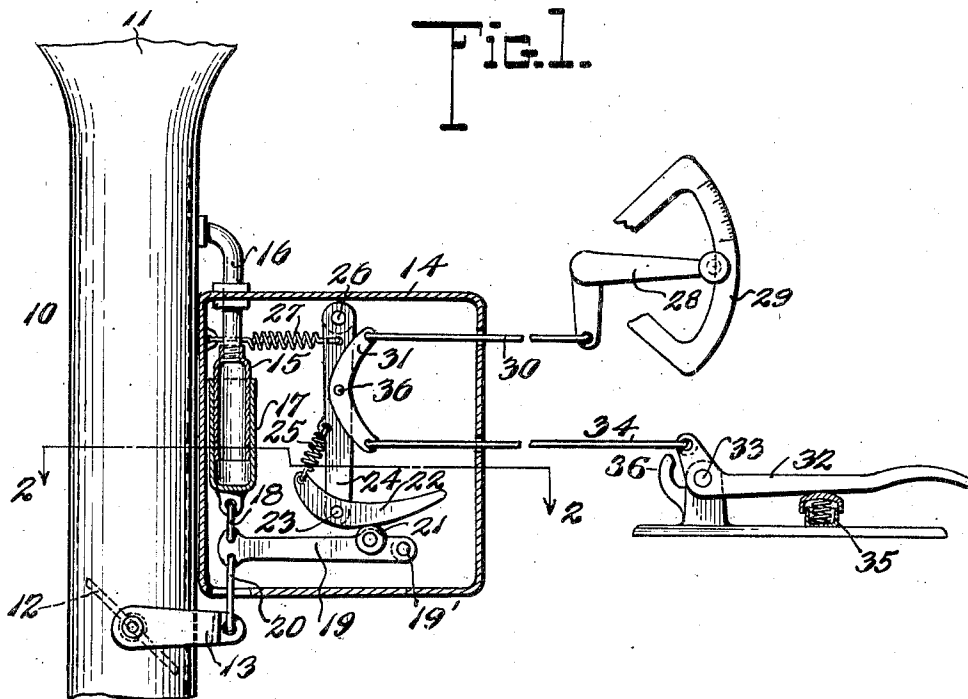
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AUTOMATIC THROTTLE CONTROL

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AUTOMATIC THROTTLE CONTROL.

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This invention relates to an automatic throttle control and particularly to a connection from the throttle valve by which it is controlled relative to the suction or vacuum at the intake manifold of an internal combustion engine.

In the prior art various means have been used to automatically shift the throttle valve to maintain a fixed speed when the engine is running, but the variation of such fixed speed has been difficult of accomplishment and required adjustment of the device to control an air port or the relation of the parts of the automatic means. This prevented the quick and easy variation of the fixed speed limit and the acceleration above said limit by separate manually operated devices disposed convenient to the operator of the automobile.

I have therefore designed an efficient and practical construction in which the vacuum at the intake manifold is resisted by a tensioned member and by varying the effective tension of said member the fixed speed may be altered, while a further variation or increase of such tension effects a temporary acceleration in speed, without affecting the normal set speed of operation. The engine is thus adapted to automatically control the throttle valve until the predetermined fixed speed is reached, and this speed may be exceeded by a manual operation.

The invention has for an object to provide a novel and improved construction including a cylinder connected to an intake manifold, a cooperating plunger, and a member connected to the plunger and throttle valve and variably tensioned to withdraw the plunger from the cylinder against the vacuum in said manifold to effect different fixed speeds of operation of the engine.

A further object of the invention is to present a new form of spring device for varying the action of the automatic control, with a manual connection for varying the effective force of said device, and a further manual connection for temporarily increasing the spring tension to supplement the fixed operating speed of the engine.

Another object of the invention is to provide an improved structure of control lever carrying a tensioned wiper arm engaging a member connected to the automatic device, with means for manually shifting said lever to vary the tension exerted by said arm.

Other and further objects and advantages of the invention will be hereinafter set forth and the novel features thereof defined by the appended claims.

In the drawing—

Figure 1 is a side elevation of the invention, with parts in section; and

Figure 2 is a section on line 2—2 of Figure 1.

Like numerals refer to like parts in the different figures of the drawing.

The invention is adapted for various applications and as showing one form thereof it is illustrated in connection with the intake pipe 10 which communicates at its upper end 11 with the intake manifold of an internal combustion engine by which a suction tension or vacuum is maintained in this pipe when the engine is in full operation. The intake pipe is provided with the usual throttle valve 12 from the pivot of which an operating lever 13 extends.

The control device is preferably disposed within a casing 14 mounted on the pipe 10 and comprises a cylinder member 15 communicating by pipe 16 with the pressure within the intake manifold beyond the throttle valve. The open end of the cylinder is enclosed by a plunger 17, having an air tight fit thereon, and connected by link 18 with the lever 19 pivoted at 19' upon the casing. From this lever a link 20 extends to the lever 13 which may be angularly bent for that purpose.

The connecting lever 19 carries a friction roller 21 which is engaged by a wiper arm 22 pivoted at 23 upon the lower end of the control lever 24 and tensioned toward the roller by a spring 25 connecting one end of the arm with the lever 24. This lever is pivoted at its upper end 26 and tensioned in one direction by the spring 27 extending therefrom to the casing. The control lever 24 thus swings toward and from the roller disposed adjacent the pivot of the connecting lever 19 and by shifting the fulcrum of the wiper arm relative thereto varies the effective tension of the spring which resists the vacuum of the intake manifold through the automatic device.

Various connections may be used for setting the fixed speed, such as the usual frictionally retained hand lever 28 cooperating with a sector 29 and having a connection to the equalizing lever 31 pivoted at 36 on the control lever 24. For the purpose of

temporarily accelerating or exceeding the fixed speed, a foot control 32 is pivoted at 33 and has a connector 34 extending to the equalizing lever 31. The pedal 32 is normally supported in inoperative position by a spring button 35 so that the foot of the operator rests comfortably against this button which is depressed when it is desired to actuate the accelerator.

In the operation of the invention when the engine is at rest, the spring upon the wiper arm forces the connecting lever downward and fully opens the throttle valve. As the engine speed increases the vacuum or suction in the intake manifold increases in direct proportion and acting upon the cylinder shifts the plunger against the spring tension which gradually closes the throttle valve. When the force of the spring and the vacuum balance each other a certain fixed engine speed is reached, and to increase this fixed speed more tension must be applied, while less tension will effect a reduction in the fixed speed. The action from starting to the fixed speed limit is purely automatic through the vacuum at the intake manifold, but if it be desired to change the fixed speed limit the hand lever is operated to shift the control lever and the arm carried thereby relative to the connecting lever secured to the movable member of the automatic device. This shifting of the fulcrum of the arm varies the effective tension of its spring upon the connecting lever and provides for a delicate and fine adjustment when the parts remain in fixed relation during normal operation.

It should be noted that the hand lever 28 is provided with the customary frictional device to retain it in either of its adjusted positions, and this friction is sufficient to resist any tendency for motion from the pedal 32 to be transferred to lever 28 through the medium of the rods 34 and 30 and the equalizing lever 31.

In the normal driving position, the operator's foot rests on pedal 32 and holds it approximately in the center of its travel, as shown on the drawing, with further downward movement resisted by the heavy spring 35. If the hand lever 28 is shifted it cannot cause the pedal to move upward because of the foot resting thereon, or downward because of the spring below it. The motion of hand lever 28 is therefore transferred to the control lever 24, which moves in such manner as to increase or decrease the engine speed to conform with the setting of lever 28, and this speed will thereafter be maintained constant by the automatic feature of the device. If it is desired to change this speed momentarily the pedal is moved either by lifting the foot therefrom to decrease the speed or by applying pressure thereto to overcome spring 35 and

increase the speed. As the hand lever 28 is frictionally held the motion of the pedal is transmitted to the control lever 24. The lever 28 is used only when it is desired to change the normal running speed, while pedal 32 is provided for momentary variations of such speed. The same result would occur if the foot were removed entirely from the pedal, allowing it to rise against its stop 36 under tension of spring 27, only in that event the hand lever 28 would be shifted further around its arc to compensate for the different position of the pedal. The invention thus supplements the automatic throttle control by means for varying the speed limit thereof, and further means for exceeding any speed limit thus established. The control lever with its wiper arm and tension devices form a single means for effectively varying the resistance to the engine vacuum, while the equalizing lever provides means for temporary acceleration by the foot control without affecting the set of the hand control for a fixed speed.

While the details of construction have been specifically shown and described the invention is not confined thereto as changes and alterations may be made therein without departing from the spirit of the invention as defined by the following claims.

What I claim is:—

1. An automatic throttle control comprising a fixed member adapted to communicate with an intake manifold, a movable member cooperating with the fixed member and having a connection for operating a throttle valve, an actuating member operable upon said connection, a shiftable controlling device bearing upon the actuating member in opposition to the suction of the intake manifold, and manually operable means for varying and maintaining the position of said device to establish a fixed speed of operation.
2. An automatic throttle control comprising a fixed member adapted to communicate with an intake manifold, a movable member cooperating with the fixed member and having a connection for operating a throttle valve, an actuating member operable upon said connection, a tension device for shifting the actuating member against the suction of the intake manifold, manually operable means connected to said devices for varying said tension to establish different fixed speeds of operation, and a separate manual connection from said device for temporarily accelerating such speed.
3. An automatic throttle control comprising a fixed member adapted to communicate with an intake manifold, a movable member cooperating with the fixed member and having a connection for operating a throttle valve, an actuating member operable upon said connection, a shiftable controlling device bearing under tension upon the actu-

ing member in opposition to the suction in said manifold, and a remote hand control for increasing or decreasing said tension relative to a desired speed limit of operation.

5 4. An automatic throttle control comprising a fixed member adapted to communicate with an intake manifold, a movable member cooperating with the fixed member and having a connection for operating a throttle valve, an actuating member operable upon said connection, a tension device operable upon the actuating member to resist the suction in said manifold, a remote hand control from said device for increasing or decreasing said tension relative to a desired speed limit, and a separate foot control operable upon said device to increase the tension to exceed said limit without affecting the subsequent operation thereof.

20 5. An automatic throttle control comprising a cylinder communicating with an engine intake manifold, a plunger cooperating with said cylinder and having a valve operating connection, an actuating member secured to said connection, a tensioned arm engaging said member, and means for varying the position of said arm relative to said member to change the tension thereon.

30 6. An automatic throttle control comprising a cylinder communicating with an engine intake manifold, a plunger cooperating with said cylinder and having a valve operating connection, an actuating member secured to said connection, a control lever, and a tensioned arm pivoted thereon and disposed to engage said member.

35 7. An automatic throttle control comprising a cylinder communicating with an engine intake manifold, a plunger cooperating with said cylinder and having a valve operating connection, an actuating lever secured to said connection, a control lever having means to tension its movement in one direction, a wiper arm pivoted upon the control lever and tensioned downwardly therefrom, and a manual connection for shifting the control lever in opposition to its tension means.

40 8. An automatic control device comprising a cylinder having an engine connection, a cooperating plunger having a valve connection, an actuating lever secured to said connection, a control lever carrying an arm disposed to engage the actuating lever, tension means for projecting the arm toward the actuating lever, and means for shifting the control lever to vary such tension.

50 9. An automatic control device comprising a cylinder having an engine connection, a cooperating plunger having a valve connection, an actuating lever secured to said connection, a control lever carrying at its free end a pivoted wiper arm disposed to engage the actuating lever, tension means for projecting the arm toward the actuating

lever, tension means for retracting the control lever and arm relative to the actuating lever, and a manual connection for operating the control lever in an opposite direction.

70 10. An automatic control device comprising a cylinder having an engine connection, a cooperating plunger having a valve connection, an actuating lever secured to said connection, a control lever carrying at its free end a pivoted wiper arm disposed to engage the actuating lever, a tension spring connecting said arm and the control lever, tension means for retracting the control lever and arm relative to the actuating lever, an equalizing lever connected to the control lever, and a plurality of manually operated means connected to the equalizing lever for shifting the control lever against its tension means.

80 11. In a control device, a casing, a cylinder therein having a vacuum pipe connection at one end, a plunger enclosing the open end of said cylinder, an actuating lever connected to said plunger and having a valve control therefrom, a control lever vertically disposed within the casing above the actuating lever, a laterally projected wiper arm pivoted to the lower end of the control lever, means for tensioning said arm toward the actuating lever, and means for shifting the control lever to vary the point of contact of said arm with the actuating lever.

90 12. In a control device, a casing, a cylinder therein having a vacuum pipe connection at one end, a plunger enclosing the open end of said cylinder, a horizontally disposed actuating lever connected to said plunger and having a valve control therefrom, a vertically disposed control lever above the actuating lever, an anti-friction contact face upon the actuating lever, a laterally projected wiper arm pivoted to the lower end of the control lever and tensioned toward said face, a tension spring connecting the control lever and casing, an equalizing lever pivoted upon the control lever, a hand control having a connection with one arm of the equalizing lever for varying the fixed speed, and a foot control connected to the equalizing lever for effecting an acceleration of the fixed speed.

100 13. The combination with the intake manifold of an internal combustion engine and a throttle valve controlling the same, of a cylinder connected to said intake, a plunger cooperating with the cylinder and connected to said valve, a control lever carrying means for applying different effective spring tensions to the plunger, a manual control for varying such tensions, a separate manual control for exceeding the tension of the first manual control, and equalizing means for connecting said manual controls to the control lever.

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14. The combination with the intake manifold of an internal combustion engine and a throttle valve controlling the same, of means for automatically positioning said valve for a fixed engine speed, a foot control pedal, a connection therefrom to the automatic means, and means for yieldingly supporting the pedal adapted to permit a normal partial depression of the pedal under fixed speed conditions, a reduction of such speed upon release of the pedal, and an increase of speed upon depression of the pedal beyond normal position for fixed speed.
15. The combination with the intake manifold of an internal combustion engine and a throttle valve controlling the same, of means for automatically positioning said valve for a fixed engine speed, a hand control for varying such speed, a foot control pedal connected to the automatic means, and a supporting spring for such pedal arranged to effect a reduction of speed when the pedal is raised, the normal fixed speed when the pedal is partially depressed, and an acceleration of such fixed speed when the pedal is fully depressed.

In testimony whereof I affix my signature.
WALTER J. SPIRO.