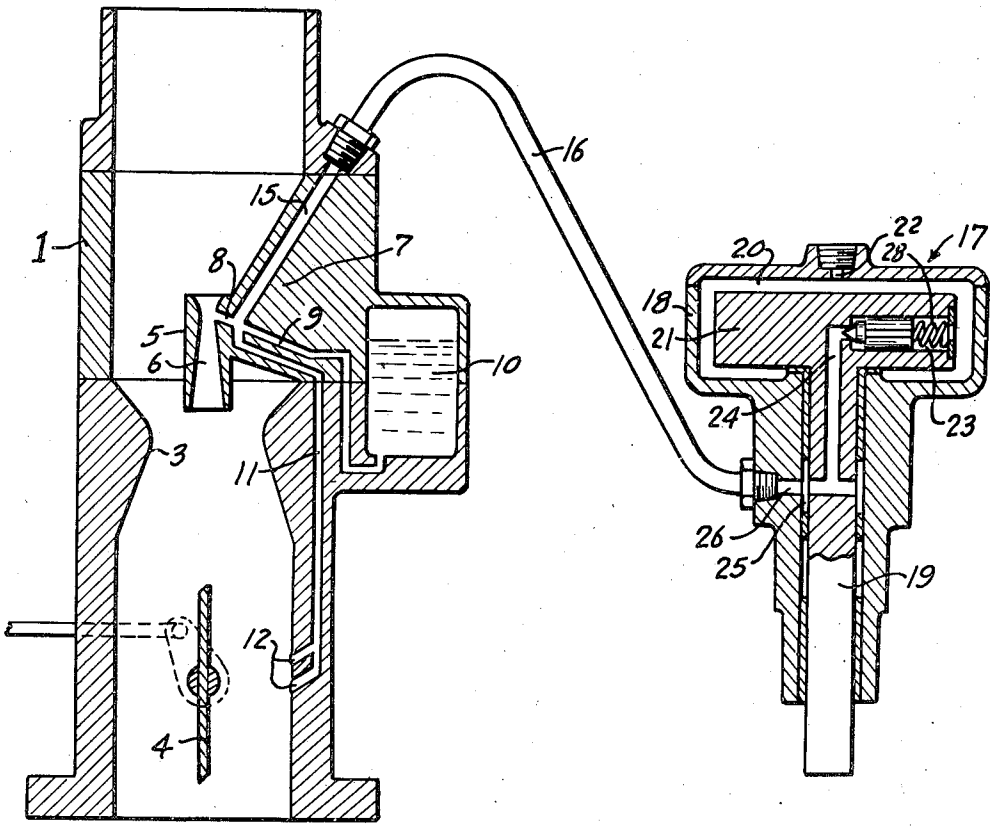
June 21, 1949. M. MALLORY 2,473,761

SPEED CONTROL FOR INTERNAL-COMBUSTION ENGINES

Filed Sept. 25, 1947 2 Sheets-Sheet 1

FIG. 1.



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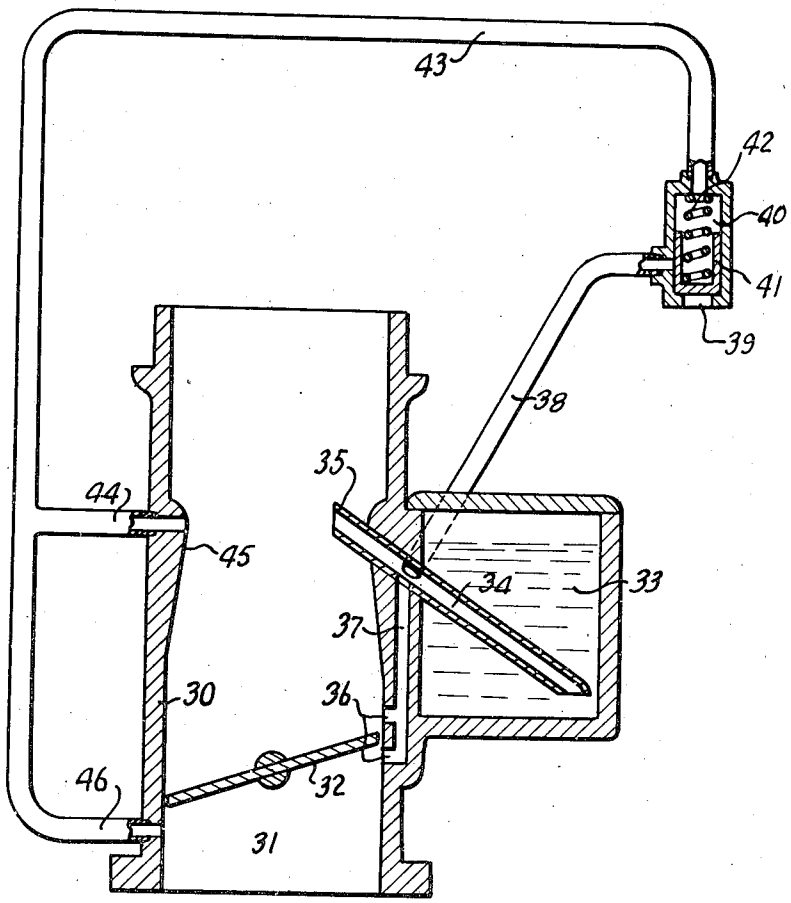
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2 Sheets-Sheet 2

FIG. 2.



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SPEED CONTROL FOR INTERNAL-COMBUSTION ENGINES

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11 Claims. (Cl. 123—106)

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This invention relates to means for stopping the running of an internal combustion engine when a predetermined speed has been attained.

It has heretofore been the practice to control the speed of internal combustion engines by speed governors which actuate the carburetor throttle or a supplemental throttle to reduce the fuel supply to the engine when a predetermined speed has been reached. This form of control is objected to by automobile fleet owners for the reason that the horsepower of the engine is reduced before the speed limit is reached, whereas it is desired to maintain the full horsepower right up to the point where the maximum engine speed for which the device is set is reached.

The object of the present invention is to obviate this objection to the use of speed control governors for internal combustion engines by the provision of means in connection with the carburetor that is automatically actuated to stop the flow of fuel to the carburetor throat or fuel supply passageway to the engine when, and not until, a predetermined engine speed has been reached so that full engine horsepower is maintained right up to the engine speed limit desired.

The invention is fully described in the following specification and two embodiments thereof illustrated in the accompanying drawings in which—

Fig. 1 is a central longitudinal section of an apparatus embodying the invention with parts in full and with the air relief valve of the centrifugal control means closed; and Fig. 2 is a similar section of a form of the invention in which the centrifugal means is eliminated.

Referring to the drawings, 1 designates a carburetor casing forming a fuel feed throat or passageway 2 to an associated engine (not shown) and having the customary Venturi restriction 3 therein. Inward from this restriction is the customary throttle valve 4. A fuel feed nozzle 5 is disposed centrally in the throat 2 adjacent to the inlet end of the restriction 3 and, in the present instance, is provided lengthwise of the throat passageway with an elongated passage 6 open at both ends of the passage 2. The outer end of the passage 6 is shown as abruptly flared, while its inner end portion or that adjacent to the engine is more gradually flared so as to form the nozzle with a Venturi-like passage.

The nozzle 5, in the present instance, is provided on a wall enlargement 7 of the casing 1, and extending into such enlargement from the restricted portion of the nozzle passage 6 is a fuel feed supply orifice 8. This orifice has communication through a channel 9 with the bottom of the fuel bowl 10 of the carburetor so that suction created in the orifice by the rush of air through the passage 6 will cause fuel to be drawn thereto from the bowl 10, as well understood in the art. A channel 11 also extends from the orifice 8 or from the outer end portion of the channel 9 to two idling jets 12, one being at the outer side and the other at the inner side of the throttle valve 4 when in closed or nearly closed position. It is apparent that suction through the jets 12 and channel 11 will draw fuel from the bowl 10 through said channel 9. This particular form of carburetor or fuel supply for the fuel feed passage 2 is old and is shown merely to illustrate one manner of supplying fuel to the passage.

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For the purpose of the automatic control embodying the present invention, there is provided an air bleed channel 15 extending laterally from the feed channel 9, preferably adjacent to the communicating end of the channel 11, and continuing through a tube 16 to a centrifugal governor 17. This governor comprises, in the present instance, a casing 18 forming a bearing for a shaft 19 suitably driven from the associated engine, and also forming a chamber 20 in which a cylinder head 21 on the shaft 19 rotates, and this chamber has a vent 22 to the atmosphere. The head 21 has a radially disposed relief chamber 23 therein opening at its outer end into the chamber 20 and communicating at its other end with the channel 24 in the head and shaft. This channel has branched connection with an annular sealed-off space 25 in the shaft bearing portion of the casing 18 and thence with the tube 16 through a casing channel 26. A weighted valve has movement in the chamber 23 radially of the head and is normally held in closing engagement with the adjacent end of the channel 24 by a spring 28. It is apparent that the spring 28 is set to permit the valve to move outwards by centrifugal force and open the channel 24 to permit its venting through the chamber 23 into the casing chamber 20 and then through the opening 22 to the atmosphere when the engine has reached a predetermined speed.

The venting of the channel 24 relieves the fuel feeding suction in the orifice 8, thus stopping the flow of fuel thereto from the supply bowl 10, or other suitable source, and consequently stopping the engine, or at least slowing it down to keep its speed within the set limit. As the engine speed is reduced, the tension of the spring 28 overcomes the centrifugal force on the valve

27 and moves the valve inward to close the bleed passage so that the rush of air through the nozzle 5 again acts to draw fuel from the carburetor instead of having such drawing or suction action overcome and relieved by the bleeding which takes place through the channel 15, tube 16 and governor channels when the valve is open.

If the desired speed limit of the engine is 3,000 R. P. M., a spring 28 of suitable tension for the purpose is provided so the valve will move outward to open the vent passage at approximately 3,000 R. P. M., thus relieving the suction in the fuel feed channel 9 so that stoppage of fuel flow takes place and continues until the speed has been reduced sufficiently for the valve to close, which may occur at 2,800 or 2,900 R. P. M. When this occurs, the suction will again be restored in the fuel feed chamber 9 and the feeding of fuel to the passageway 2 in the regular manner will then take place. The opening of the relief valve 27 would also stop the flow of fuel to the idling jets 12 so that a complete stoppage of fuel supply to the engine feed passageway 2 is effected. Should stoppage of the engine occur during the interrupted fuel feed interval, a renewed starting will be necessary. Such stoppage would soon teach the operator that he could not drive over a set speed and he would therefore watch his speedometer more carefully.

It is apparent that with this control, full horsepower operation of the engine is brought right up to the point where the engine speed is checked, which is a feature highly desirable to most automobile fleet owners.

Another means for bleeding or relieving the fuel feeding suction in the carburetor nozzle channel when a predetermined engine speed is reached, is shown in Fig. 2. In this form, 30 designates the casing forming a passageway 31 for feeding fuel to the engine cylinders; 32 the throttle valve therein; 33 the carburetor fuel bowl; and 34 the feed channel from the bowl to the nozzle 35 that projects into the passageway 31 so that fuel is drawn to and from the nozzle by suction action, as well understood in the art.

The nozzle orifice 34 has communication with idler jets 36 through a channel 37, such jets being located adjacent to and one at each side of the throttle valve 32 when in closed position.

The novel feature consists in extending a relief passage 38 from the nozzle channel 34 to a vent 39 to the atmosphere, which vent is controlled by a normally closed valve 40. This valve operates in a chamber 41 and is yieldingly held by a spring 42 in position to close the communication between the passage 38 and vent 39 and is moved by suction action in the inner end portion of the chamber to open such communication. A channel 43 extends from the inner or suction end of the chamber 41 to the interior of the passageway 31, and in the present instance, has a branch 44 opening into the passageway at the inlet side of the throttle valve, preferably through the most restricted portion of its venturi 45, and a branch 46 opening into the passageway at the outlet or engine side of the throttle valve. The rush of air or gaseous fuel through the passageway 31 when the engine is operating at high speeds is sufficient to draw the valve 40 inward against the tension of the spring 42 and open the vent 39 to the passage 38, the speed at which such opening occurs depending on the tension of the spring. The nozzle passage 34 is thus relieved of suction action and the flow of fuel thereto, as well as to the idling jets 36, is stopped when the engine reaches a predetermined speed.

By locating the passageway ends of the branches 44 and 46 above and below the throttle valve, as shown, the intake suction therethrough will be on a gradual slope which increases in direct relation with engine speed. In other words, the suction power in the line 43 will increase similar to a centrifugal governor as the speed increases. While the use of both orifices 44 and 46 is preferable, the device will work fairly well with the orifice 44 omitted, but the vacuum would be much higher and would require a stronger suction device, spring arrangement, etc., to handle the system.

It is apparent that in each illustrated form of the invention the fuel flow from the carburetor bowl to the discharge nozzle is stopped when the engine reaches a predetermined speed, the stoppage being occasioned by relieving the suction action in the carburetor nozzle when the speed limit is reached. It is also apparent that in both of these forms of the invention, the suction action in the fuel supply passage to the engine is utilized to actuate a valve to effect the stoppage of the fuel flow to the carburetor nozzle when the engine reaches the predetermined speed. In each case, the engine is operating at full horsepower until the speed limit is reached, which is an important advantage.

Upon a stoppage of the fuel flow to and from the main and idler feed orifices, the fuel that had gone into the engine would all be burned and there would be no fuel in the muffler to cause backfire or explosions. The engine would simply quit or slow down every time the operator tried to overspeed, the same as if he ran out of gasoline, but there would be no effect whatever on the power below the limit speed.

The device is simple and could be easily and quickly attached to any carburetor by merely adding, in the case of Fig. 1, the bleed line 15 into the carburetor and attaching the speed governor fittings thereto, or, in the case of Fig. 2, adding the bleed line 38 with the control valve 40 and the suction lines 43, 44, 46 to control the opening of such valve by suction from within the engine fuel feed passageway 31. It would not be necessary to connect any rods to the throttle, or supply other parts, as is the case with other speed control governors of which I am aware.

I wish it understood that my invention is not limited to any specific construction, arrangement or form of the parts, as it is capable of numerous modifications and changes without departing from the spirit of the claims.

Having thus described my invention, what I claim as new and desire to secure by United States Letters Patent is:

1. The combination with an internal combustion engine comprising a fuel feed passageway to the engine cylinders and a carburetor having a fuel supply source, a main discharge nozzle disposed in said passageway, a channel through which fuel is drawn from the source to the nozzle by suction action therein occasioned by the rush of gases through said passageway, and a throttle in said passageway, of a vent channel leading to said nozzle channel from the atmosphere, and means normally closing said vent channel and operable to open it and vent the nozzle channel to stop the fuel flow therethrough when the engine reaches a predetermined open throttle speed.

2. The combination as called for in claim 1 wherein said means comprises a valve normally

closing said vent channel to the atmosphere and movable by suction action to open such channel when the engine speed reaches a predetermined point.

3. The combination as called for in claim 1 wherein said means comprises a valve normally closing said vent channel to the atmosphere and movable to open the channel, and means forming a channel opening communication between said valve and said fuel feed passageway, whereby the rush of gases through said passageway creates a suction in said last channel to move the valve to an open position when a predetermined open throttle speed is reached by the engine.

4. The combination as called for in claim 1 wherein said means comprises a rotatable member driven by the engine and forming a part of said vent channel, and a valve carried by said member and operable by centrifugal action to open said channel to the atmosphere when the engine reaches a predetermined speed.

5. The combination with an internal combustion engine having a fuel feed passageway to its cylinders and a carburetor having a main fuel feed channel for supplying fuel to the passageway by suction action therein, and having a throttle in the passageway at the engine side of said channel, of a vent channel leading to said feed channel from the atmosphere, and means normally closing said vent channel and operable to open it and vent said feed channel to stop the fuel flow therethrough when the throttle is open and a predetermined engine speed is reached.

6. The combination as called for in claim 5 wherein said means comprises a valve normally closing said vent channel to the atmosphere and movable by suction action to open such channel when a predetermined speed is reached by the engine.

7. The combination as called for in claim 5, wherein said means comprises a valve normally closing said vent channel to the atmosphere and movable to open said channel, and means forming a channel opening communication between said valve and said fuel feed passageway whereby the rush of gases through said passageway when the throttle is open creates a suction in said last channel to move the valve to open position when a predetermined speed is reached by the engine.

8. The combination as called for in claim 7, wherein said fuel feed channel has supplemental communication with the interior of the passageway adjacent to and at both sides of the throttle valve.

9. The combination with an internal combustion engine having a fuel feed passageway to its cylinders and a carburetor having a main nozzle opening into said passageway with its channel in communication with the carburetor fuel supply whereby fuel is caused to flow through said channel and nozzle to the passageway by suction action in the latter, and a throttle in said passageway at the engine side of said nozzle, of means having a vent channel from said nozzle channel to the atmosphere, and means normally closing said vent channel to the atmosphere and automatically operable to open the vent channel and relieve the suction in said nozzle channel to stop the flow of fuel to the nozzle when the engine reaches a predetermined speed on open throttle.

10. The combination with an internal combustion engine having a fuel feed passageway to its cylinders, and a carburetor having main and idling nozzle jets opening into said passageway and fuel feed channels thereto, whereby suction in said jets causes fuel to flow thereto from a supply source, of a vent channel leading from said feed channels to the atmosphere to stop the flow of fuel therethrough when the vent channel is open, and means normally closing said vent channel and operable to open it and vent said feed channels to stop the fuel flow therethrough when a predetermined engine speed is reached.

11. The combination with an internal combustion engine having a fuel feed passageway to its cylinders and a carburetor having a main fuel feed channel for supplying fuel to the passageway by suction action therein and having a throttle in the passageway at the engine side of said channel, of a vent channel leading to said feed channel from the atmosphere, means normally closing said vent channel and operable to open it and vent said feed channel to stop the fuel flow therethrough when the throttle is open and a predetermined engine speed is reached, said means comprising a rotatable member driven by the engine and forming a part of said vent channel, and a valve carried by said member and operable by centrifugal action to open said channel to the atmosphere when the engine reaches a predetermined speed.

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