United States Patent

[11] **3,618,582**

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[54] **THROTTLE CONTROL SYSTEM**
8 Claims, 5 Drawing Figs.

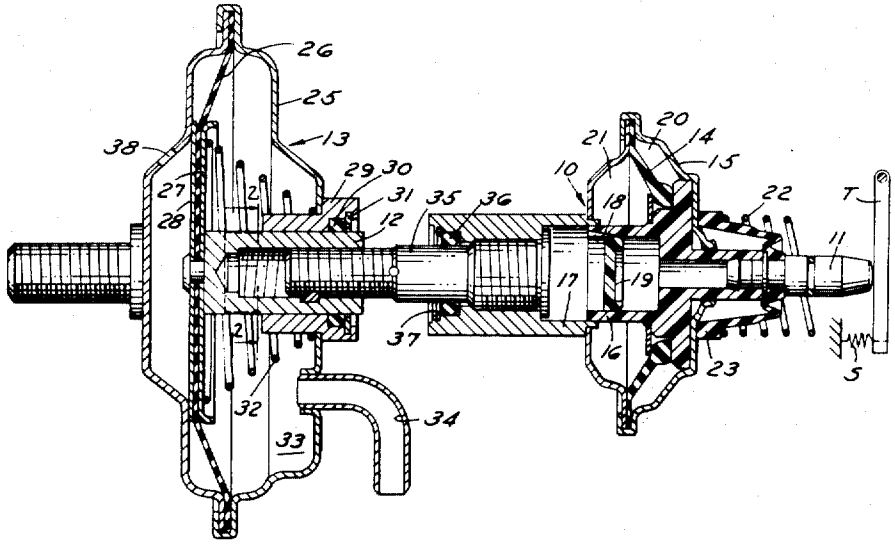
[52] **U.S. Cl.** ..... **123/198,** 123/DIG. 11, 123/103 E, 123/119, 137/480
[51] **Int. Cl.** **F02b 77/00,** F02d 11/08, F02m 19/12
[50] **Field of Search** ..... 137/479, 480, 481, 482; 123/119, 198 DC, 198 DB, 198 D, 103, 103 E, 97 B, DIG. 11

[56] **References Cited**
UNITED STATES PATENTS

2,575,384	11/1951	Horton	123/103 E
2,782,025	2/1957	Olson	123/103 E
2,985,196	5/1961	Brunner	123/103 E
3,287,007	11/1966	Schoeppach	123/103 X
3,491,737	1/1970	Burnia	123/119

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ABSTRACT: A throttle control system comprising a throttle member movable in response to movement of the throttle of the vehicle and a dashpot assembly mounted on an actuator of a vacuum-operated throttle control device. When the engine of the vehicle is operating, the system operates to prevent the throttle member from moving beyond a certain point toward a throttle-closing position and to prevent unduly rapid return of the throttle when the operator releases the throttle. Upon interruption of the operation of the engine of the vehicle, the system permits the throttle member to move beyond said point toward a throttle-closed position.



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SHEET 1 OF 2

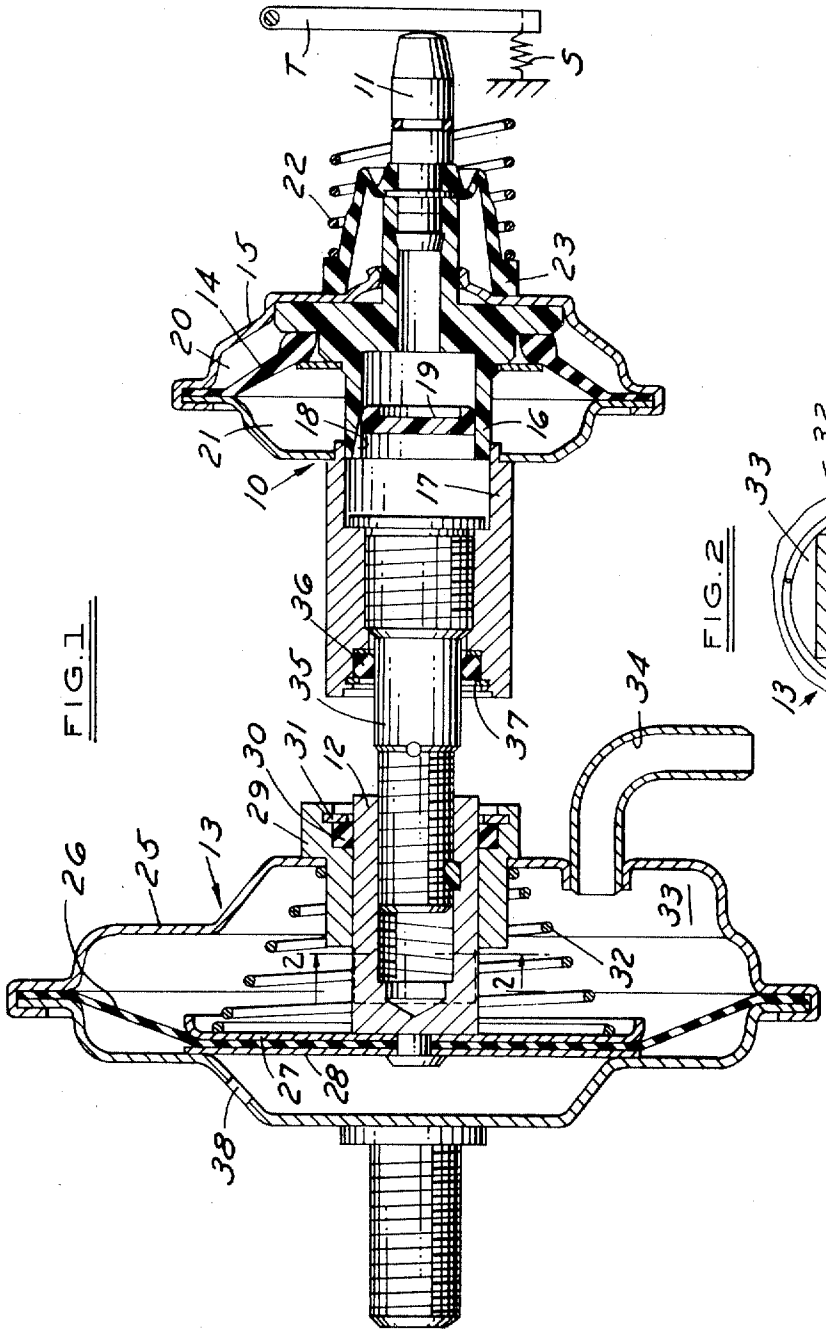


FIG. 1

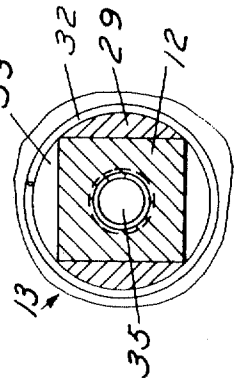


FIG. 2

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FIG. 3

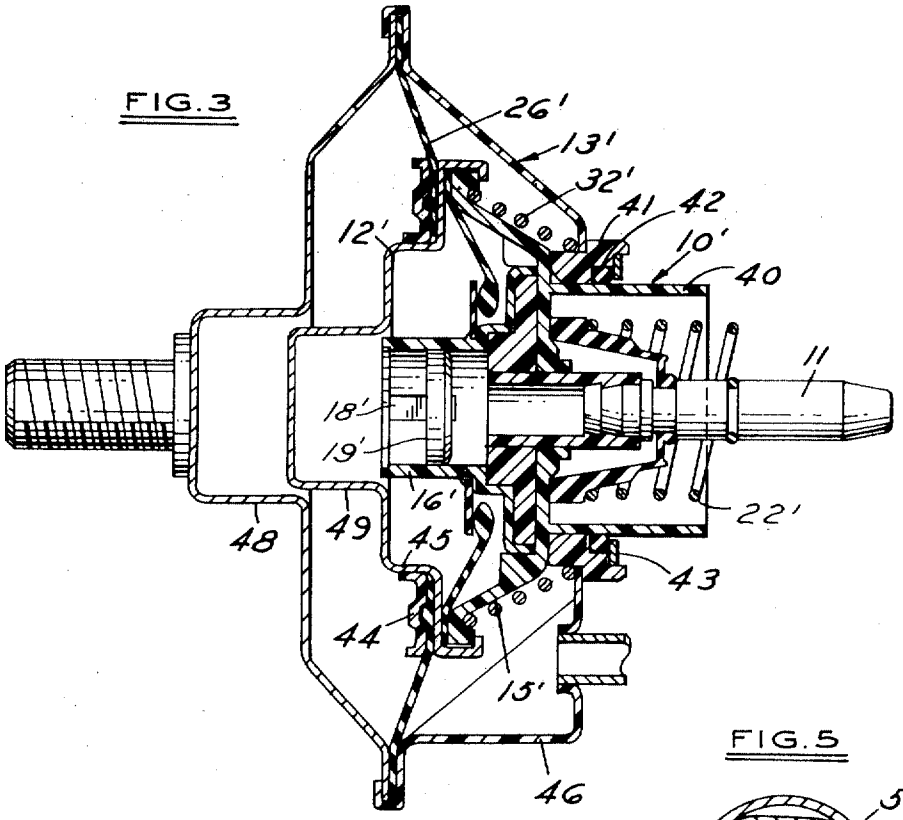


FIG. 5

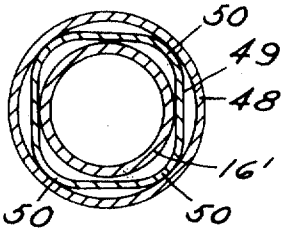
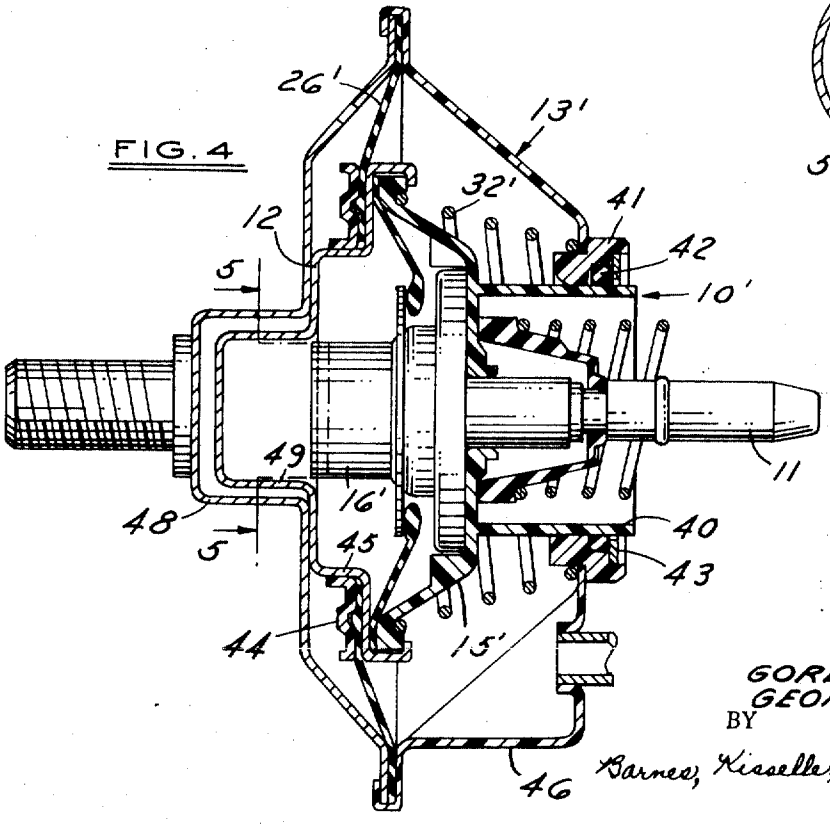


FIG. 4



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THROTTLE CONTROL SYSTEM

This invention relates to automotive vehicle throttle control systems and particularly to systems for controlling the operation of an internal combustion engine.

BACKGROUND OF THE INVENTION

In internal combustion engines, one of the major problems is contaminants and impurities due to exhaust. These contaminants and impurities exist particularly at idling speeds. Accordingly, one of the methods heretofore proposed for lessening the contaminants has been to increase the idling speed. However, as a result of the increase of the idling speed, there is tendency for the engine to continue to run even after the ignition is turned off. This is often referred to as a "dieseling" condition. Another problem is the tendency to stall and produce contaminants when the throttle is released suddenly during engine operation.

Among the objects of the invention are to provide a system whereby when the engine is operating and the ignition is on, the throttle is maintained at a high idle position and is prevented from too rapid a return when the throttle is released but when the engine is turned off, the throttle is permitted to move to a throttle-closed position and thereby minimize dieseling.

SUMMARY OF THE INVENTION

A throttle control system comprising a throttle member movable in response to movement of the throttle of the vehicle and a dashpot assembly mounted on the actuator of a vacuum-operated throttle control device that is operable when the engine of the vehicle is operating to prevent the throttle member from moving beyond a certain point toward a throttle-closing position and to prevent unduly rapid return of the throttle when the operator releases the throttle. Upon interruption of the operation of the engine of the vehicle, the system permits the throttle member to move beyond said point toward a throttle-closed position.

DESCRIPTION OF THE DRAWINGS

FIG. 1 is a longitudinal sectional view through a portion of the system embodying the invention.

FIG. 2 is a fragmentary sectional view taken along the line 2—2 in FIG. 1.

FIG. 3 is a longitudinal sectional view through a modified form of the invention.

FIG. 4 is a view similar to FIG. 3 showing the parts in a different operative position.

FIG. 5 is a sectional view taken along the line 5—5 in FIG. 4.

DESCRIPTION

Referring to FIG. 1, the system embodying the invention comprises a throttle member T that is movable with the throttle of the vehicle and is yieldingly urged by a spring S toward a throttle-closing position. In accordance with the invention, a dashpot assembly **10** is positioned during normal operation of the engine in such a manner that its plunger **11** is contacted by the throttle member T as it moves toward the throttle-closed position. The plunger **11** functions to retard the movement of throttle member T toward a throttle-closing position and thereby prevents stalling of the vehicle as well as controlling the combustion by preventing a sudden change in the fuel mixture that is supplied to the engine of the vehicle.

The dashpot assembly **10** is mounted on an actuator **12** of a vacuum-operated positioning assembly **13**. The actuator **12** is positioned when the engine of the vehicle is operated to hold the dashpot assembly **10** in position wherein the plunger **11** will be contacted by the throttle member. When the ignition to the vehicle is turned off, the vacuum is interrupted and the actuator **12** moved by a spring, as presently described, to a position wherein the dashpot assembly **10** is out of the path of the throttle member T permitting the throttle member to move to a full throttle-closed position and thereby eliminating dieseling.

The dashpot assembly **10** is substantially the same as that disclosed and claimed in the U.S. Pat. to Emerson et al. No. 2,894,740, issued July 14, 1959, and comprises a diaphragm **14** interposed between the flanges of two halves of a dashpot casing **15**. Plunger **11** is mounted on diaphragm **14** and includes a sleeve **16** that is guided within a portion **17** of the dashpot casing. A tapered metering groove **18** is provided on the interior of the sleeve **16** and a plug **19** is press fitted in the sleeve, the degree of penetration of the plug **19** determining the size of the resultant metering opening that is formed. The metering groove **18** restricts the flow of fluid from the chamber **20** to the chamber **21** when the plunger is moved to the left as viewed in FIG. **1**. The inner edge of the diaphragm **14** is adapted to seal on the plunger when the plunger is moved to the left but to permit flow of air between the chambers when the plunger is moved to the right. A spring **22** extends between the casing **15** and plunger **11** and yieldingly urges the plunger to the right. A flexible dust shield **23** is provided over the end of the plunger that projects beyond the housing.

The vacuum-operated positioning assembly **13** includes two halves of a housing **25** that support a diaphragm **26**. The actuator **12** is fixed on discs **27**, **28** on each side of the diaphragm **26** and is movable with the diaphragm **26**. The actuator **12** is guided by a stud **29** which is square in cross section (FIG. **2**) mounted on housing **13**. A flexible seal **30** held in by a retaining ring **31** provides the seal between the actuator and the stud. A spring **32** is interposed between the disc **27** and one-half of the housing **25** in chamber **33**. Vacuum from the manifold of the vehicle is supplied to the chamber **33** through a pipe **34**. The casing of the dashpot assembly **10** is mounted on the actuator **12** by a connector **35** threaded on opposite ends to provide for relative adjustment. An O-ring **36** retained by a retaining ring **37** provides a seal with a portion of the connecting member **35**. A bleed hole **38** vents the cavity on the left to the atmosphere to prevent a pressure differential from being created which would retard the motion of the diaphragm to the left (FIG. **1**).

In the form of the invention shown in FIGS. **3–5**, the dashpot assembly **10'** is mounted directly on the diaphragm **26'** of vacuum-operated positioning assembly **13'**, the member **12'** constituting the actuator of the vacuum-operated positioning assembly **13'**.

In this form, the dashpot assembly **10'** includes a tubular extension **40** on the housing **15'** which extends through a ring **41** on the housing. A resilient O-ring **42** held in position by a retaining ring **43** provides a seal between the periphery of the tubular extension **40** and the casing of the vacuum-operated positioning assembly **13'**. In all other respects, the dashpot assembly **10'** is identical to that described in connection with that described in FIGS. **1** and **2**. The actuator **12'** is maintained in position on diaphragm **26'** by a ring **44** that frictionally surrounds a portion **45** of the actuator **12'**. One half **46** of the housing and ring **44** are made of plastic material. Spring **32'** urges the dashpot and diaphragm to the left as viewed in FIG. **3**. As shown in FIG. **5**, housing **25'** includes a cylindrical projection **48** into which a generally square projection **49** on actuator **12'** with rounded corners **50** extends to be guided by the projection **48**. The sleeve **16'** of the dashpot assembly is adapted to extend into and be guided by the projection **49**. By this arrangement, proper guiding is achieved with minimum friction. By making the projection **48** cylindrical, inadvertent application of a wrench thereto is avoided.

In each form of the invention, during normal operation of the engine, vacuum causes the diaphragm **26**, **26'** to hold the dashpot assembly and, in turn, the plunger **11** in position to be contacted by a throttle member T (FIGS **1**, **3**). Any sudden release of the throttle member T causing the throttle member T to engage the plunger **11** and the plunger functions through the dashpot action to retard the movement of the throttle member T to the high idle position.

When the operation of the engine is interrupted as by turning the ignition off, the vacuum is dissipated and the spring 32, 32' urges the actuator 12, 12' to a position wherein the dashpot assembly 10, 10' and plunger 11 are moved away from the positions shown in FIGS. 1 and 3 so that the plunger 11 is not in the path of the throttle member T and the throttle member T can move to a full throttle-closed position.

I claim:

1. In a throttle control system, the combination comprising
a throttle member movable with the throttle and yieldingly urged toward a throttle-closing position,
a dashpot assembly,
said dashpot assembly comprising a casing,
piston means within the casing dividing the dashpot casing into two chambers,
a plunger mounted on the piston means and extending from the casing,
and a continuously open metered opening between said chambers,
a vacuum-operated positioning assembly including an actuator on which the casing of said dashpot assembly is mounted,
spring means yieldingly urging said actuator and in turn said dashpot assembly to a position wherein said plunger of said dashpot assembly is out of position for engaging the throttle member,
said vacuum-positioning mechanism being operable due to vacuum when the engine of the vehicle is operating to position the casing and in turn the plunger in position to contact the throttle member,
whereby when the plunger is moved into said last-mentioned position, said metered opening resists the movement of the plunger by the throttle member toward a throttle-closing position, and when the vacuum is removed from said vacuum-positioning assembly, said dashpot assembly and in turn said plunger is moved to said second-named position wherein the throttle member is permitted to move to the throttle-closing position.

2. The combination set forth in claim 1 wherein said vacuum-positioning mechanism comprises a housing,
a diaphragm dividing said housing into two chambers,
said actuator being fixed to said housing and extending through one wall thereof,
said spring means interposed between said diaphragm and said housing and urging said diaphragm and in turn said actuator to said second-named position,
and means for applying vacuum to the chamber in which said spring is positioned.

3. The combination set forth in claim 1 wherein said casing of said dashpot assembly is mounted on said actuator within said housing of said vacuum-positioning assembly.

4. The combination set forth in claim 3 including means for forming a seal between a portion of said casing and a portion of said housing.

5. In a throttle control system, the combination comprising
a throttle member movable with the throttle and yieldingly urged toward a throttle-closing position,
a dashpot assembly,
said dashpot assembly comprising a casing,
a plunger extending to the casing,
piston means within the casing dividing the dashpot casing into two chambers,
and a continuously open-metered opening between said chambers,
a vacuum-operated positioning assembly including a housing,
a diaphragm in said housing defining a closed chamber,
means for applying vacuum to said chamber,
an actuator on said diaphragm,
said casing of said dashpot assembly being mounted last-mentioned actuator and in said housing, a portion of said casing forming a seal with said housing,
spring means yieldingly urging said actuator and in turn said dashpot assembly to a position wherein said plunger of said dashpot assembly is out of position for engaging the throttle member,
said vacuum-positioning mechanism being operable due to vacuum applied to said chamber when the engine of the vehicle is operating to position the casing and in turn the plunger in position for contact with the throttle member,
whereby when the plunger is moved into said last-mentioned mentioned position, said metered opening resists the movement of the plunger by the throttle member toward a throttle-closing position, and when the vacuum is removed from said vacuum-positioning assembly, said dashpot assembly and in turn said plunger is moved to said second-named position wherein the throttle member is permitted to move to the throttle-closing position.

6. The combination comprising
a dashpot assembly,
said dashpot assembly comprising a casing,
a plunger extending to the casing,
piston means within the casing dividing the dashpot casing into two chambers,
and a continuously open-metered opening between said chambers,
a vacuum-operated positioning assembly including a housing,
a diaphragm in said housing defining a closed chamber,
means for applying vacuum to said chamber,
an actuator on said diaphragm,
said casing of said dashpot assembly being mounted on said actuator and in said housing, a portion of said casing forming a seal with said housing,
spring means yieldingly urging said actuator and in turn said dashpot assembly to a position wherein said plunger of said dashpot assembly is in a retracted position with respect to said housing,
said vacuum-positioning mechanism being operable due to vacuum applied to said chamber thereof to position the casing and in turn the plunger in an extended position relative to said housing,
whereby when the plunger is moved into said last-mentioned position, said metered opening resists inward movement of the plunger relative to the housing, and when the vacuum is removed from said vacuum-positioning assembly, said dashpot assembly and in turn said plunger is moved to said retracted position relative to the housing.

7. The combination set forth in claim 6 wherein said housing of said vacuum-operated positioning assembly includes a cylindrical projection,
said actuator having a noncircular projection adapted to extend into and be guided by said projection of said casing.

8. The combination set forth in claim 7 wherein said dashpot casing includes a projection adapted to extend into and be guided by said projection on said actuator.

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