

March 25, 1941.

C. A. MARTIN

2,235,838

SPEED REGULATOR

Filed Nov. 25, 1938

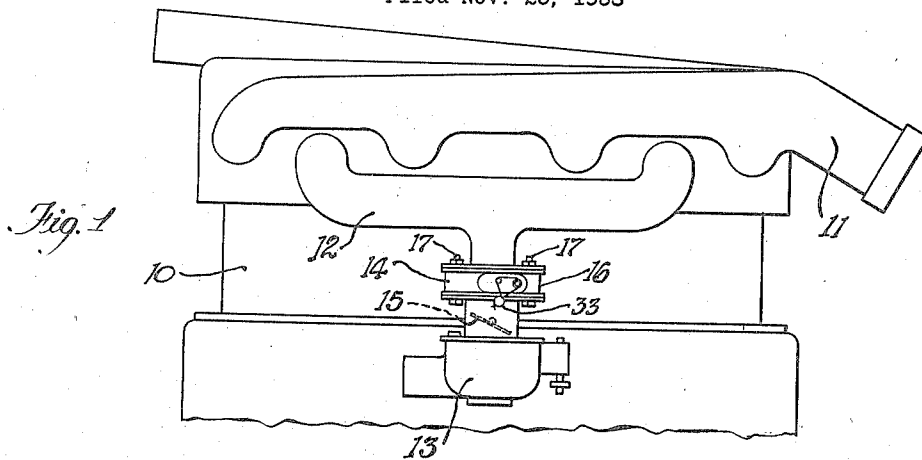
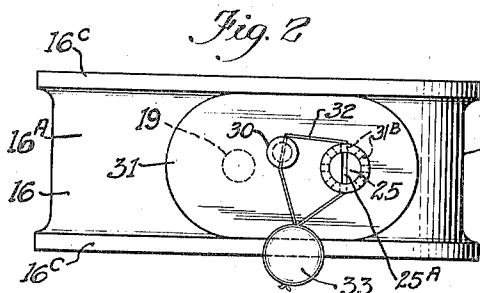
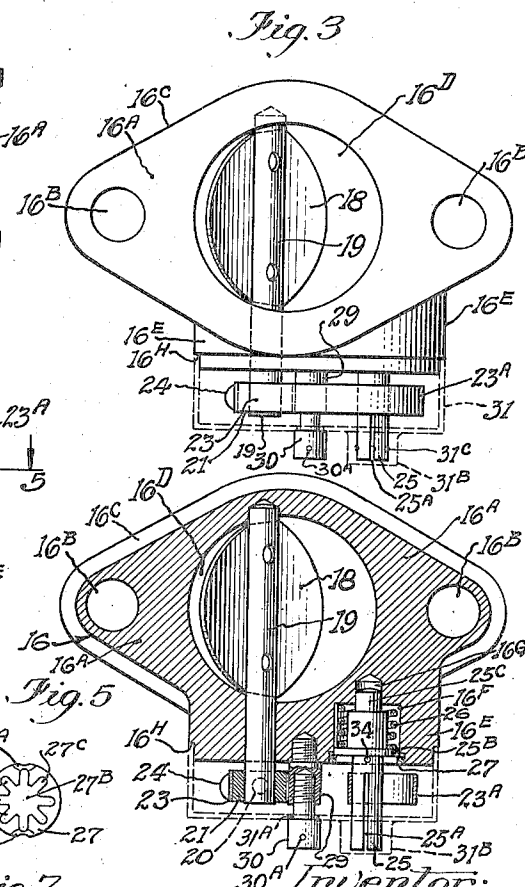
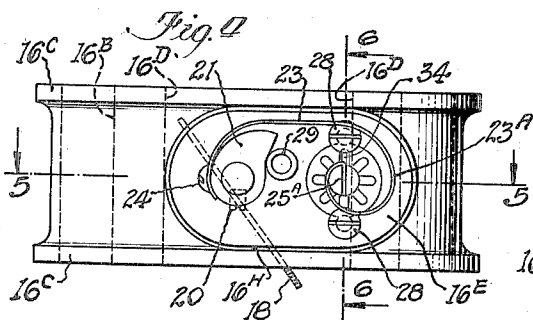
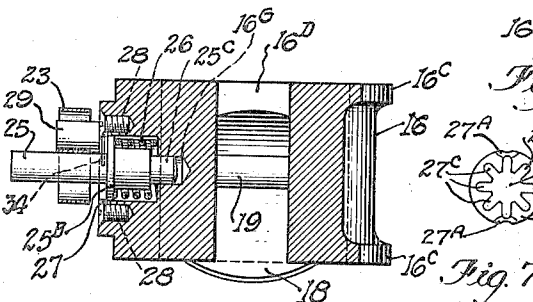


Fig. 7

Inventor:
Charles A. Martin.
By: Frank J. Schraeder, Jr.
Attorney.

UNITED STATES PATENT OFFICE

2,235,838

SPEED REGULATOR

Charles A. Martin, Berwyn, Ill.

Application November 25, 1938, Serial No. 242,253

5 Claims. (Cl. 123—103)

This invention relates to new and useful improvements in speed regulators and governors particularly adapted for use in connection with internal combustion engines for various vehicles.

5 The invention is especially adaptable for use as a regulator and governor for internal combustion engines for trucks, tractors and the like.

10 An important object of my invention is to provide a speed regulator and governor which shall not only be simple in construction and easy to install, but which shall be efficient in operation, adjustable, and automatically responsive to the flow of the fuel charge to the engine.

15 Another feature of my invention is found in the provision of sealing means preventing unauthorized tampering with or changing of the setting of the device after same is set for maximum speed control of the motor.

20 Another object of my invention resides in the provision of a speed regulator and governor which can be readily interposed between a carburetor and the intake manifold of the engine for automatically regulating and controlling the maximum speed of the engine and for so auto-

25 matically regulating the flow of the fuel charge that a more uniform operation of the engine will be attained when the vehicle travels on an undulating highway.

30 Still another object of my invention is found in the provision of a novel resiliently pressed cam operatively associated with the governor valve for imparting the desired balance between the moving fuel charge and the counterbalancing means of the governor at predetermined speeds

35 of the engine.

A further object of my invention resides in the provision of novel spring-pressed means for retaining the desired adjusted tension of the spring imparting the progressively applied pressure against the regulating and governing valve during its movement into closed position.

40 With the above and other objects in view, my invention consists in the novel combination, construction and arrangement of the parts and members shown in preferred embodiment in the attached drawing, described in the following specifications and particularly pointed out in the appended claims.

50 In the drawing:

Fig. 1 is a side elevation of a portion of an internal combustion engine provided with a speed regulator and governor embodying my invention;

55 Fig. 2 is an enlarged side elevation of my improved speed regulator;

Fig. 3 is a plan view of same with the cover for the operating parts shown by dotted lines;

Fig. 4 is a side elevation similar to Fig. 3 but with the cover for the adjustable operating parts removed;

Fig. 5 is a horizontal cross-section taken on line 5—5 of Fig. 4;

Fig. 6 is a vertical section taken on line 6—6 of Fig. 4, and

Fig. 7 is a front view of the locking washer 10 for the spring adjustment.

In the drawing, as shown in Fig. 1, I indicate a portion of a conventional type of internal combustion engine 10 provided with an exhaust manifold 11, an intake manifold 12 and my improved 15 automatic speed regulator and governor 14 interposed between the intake manifold 12 and the carburetor 13 which is provided with the usual throttle valve 15.

The speed regulator and governor consists of 20 a casing 16, preferably a metallic casting having enlarged ends 16^A provided with vertical holes 16^B for bolts 17 whereby said casing is secured to and between the flanged connections of the intake manifold 12 and the carburetor 13, and the 25 casing 16 is preferably provided with upper and lower flanges 16^C corresponding to the flanges of the intake manifold and the carburetor.

The casing 16 is also provided with a central cylindrical passage 16^D which communicates with 30 the intake opening of the intake manifold 12 and the outlet opening of the carburetor 13.

The regulating valve 18 which acts to regulate and govern the flow of the fuel through the passage 16^D and into the intake manifold 12 is suitably 35 secured to the shaft 19 which is pivotally mounted in the casing 16.

To the outer, or operative, end of the governor valve shaft 19 is secured, as by set screw 20, a 40 cam 21.

A spiral spring 23 of flat spring steel has one end connected to the cam 21 by screw 24 and its other end, which is disposed within the coiled portion 23^A, is slidably inserted within the slot 25^A of the adjustment member or pin 25. 45

The adjustment member or pin 25, in its outwardly extending portion, is of uniform diameter, but in its inner portion, which is disposed within the recess 16^F of the enlarged integral side portion 16^E, is provided with an integral enlarged 50 collar 25^B which is engaged by the outer end of the coil spring 26 disposed against displacement within the recess 16^F. The innermost end of the pin 25 is decreased in diameter, as at 25^C, for sliding movement within the cylindrical inner- 55

most recessed portion 16^G. The central portion of the pin 25 is guided in its sliding movement by the collar 25^B which is slidably fitted within the cylindrical recess 16^F.

5 The outer end of the recess 16^F is slightly enlarged to form an annular seat for the lock washer 27 which is suitably held against rotation by means of the countersunk heads of screws 28, the heads of screws 28 having overlapping engage-
10 ment within the small angular recesses 27^A in the marginal edge of the lock washer 27.

The lock washer 27 is provided with a central opening 27^B for the pin 25 and also with a plurality of radial slots 27^C communicating with the
15 central opening 27^B.

The adjustment member or pin 25 is provided with a small upstanding locking pin 34 which is so fixed in the member 25 that it normally extends into one of the radial slots 27^C of the lock
20 washer 27.

The locking pin 34 is normally maintained within the plane of the radial slots 27^C by the constant pressure of the coil spring 26 against the collar or flange 25^B so that the adjustment
25 member is always normally positioned as shown in the drawing with the lock pin 34 within one of the plurality of radial slots 27^C.

To adjust the device so that greater resistance is provided to the movement of the governor valve
30 18, its shaft 19 and cam 21, whereby the movement of the valve 18 to closed position will require greater force or a higher vacuum within the intake manifold 12, a screw driver, or other similar tool, may be inserted within the open end of the slot 25^A whereupon the pin 25 may be pushed inwardly, against the pressure of the coil spring 26, a slight distance to release the locking pin 34 from
35 alignment with its radial slot 27^C to permit clockwise rotation of the pin 25 to thereby wind up the spiral spring 23 and thus increase its tension, and then the pin 25 may be permitted to move forwardly, by the pressure of the coil spring 26 whereupon the locking pin 34 will become lodged
40 within one of the other locking slots 27^C to thereby retain the pin 25 against displacement from such adjusted position.

A reverse or anti-clockwise rotation of the pin 25 will loosen the spiral coil spring 23 and will permit the governor valve to close by comparatively less force of the vacuum in the intake manifold so that such governor valve 18 will then resist the supply of motive fuel to the engine to slow up the speed of the vehicle at a much lower
50 R. P. M. of the engine. An increased tension in the spiral spring 23 by tightening or winding up of the coiled portion 23^A by clockwise rotation of the adjusting pin member 25 will provide greater resistance to the rotation of the cam 21.

The tension of spiral spring 23 exerts a pressure
60 against the cam 21 tending to move it into stop position in engagement with the cam stop 29 which has threaded engagement within the oval enlarged integral extension 16^E and which cam stop 29 is also threaded inwardly of its outer end to receive therein the cover retaining screw 30
65 provided near its outer end with a transverse opening 30^A.

The oval-shaped enlarged integral extension 16^E, of the casing 16, is provided with a peripheral
70 recess 16^H adapted to receive therein the marginal edge of an oval cover 31 which is provided with an opening 31^A for insertion therethrough of the cover retaining screw 30 into threaded engagement within the cam stop 29. The cover 31 is
75 also provided with an integral outwardly disposed

tubular sleeve portion 31^B through which the end of the adjustment pin 25 extends and this sleeve portion 31^B is provided with a plurality of radially aligned openings 31^C corresponding to the radial arrangement of the radial slots 27^C of the lock
5 washer 27.

When the device is adjusted, the cover 31 is inserted into place on the recess 16^H, and the cover retaining screw 30 is screwed into the cam stop 29 to securely retain the cover against dis-
10 placement, whereupon a wire seal 32 is passed through the transverse opening 30^A of the cover retaining screw 30 and thence through a pair of the openings 31^C in the cover sleeve portion 31^B and through the slot 25^A aligned therewith and
15 the ends of such wire seal are then enclosed within the seal proper 33. Thus the cover retaining screw 30 and adjustment pin 25 are both sealed against unauthorized movement.

To prevent stalling or complete stopping of the
20 engine when the governor valve 18 is moved into full closed position, the plate forming the valve 18 may be so made that a slight clearance around its marginal edge is provided or a small recess 18^A may be cut into its marginal edge to provide for
25 a by-pass for a small amount of motive fuel therethrough, as indicated in Fig. 3.

This regulating and governing device is automatically operable by the pressure of the vacuum created in the engine manifold.

A motor vehicle equipped with this device traveling on a down-grade will be effectively checked in its speed to maintain its uniform maximum speed to which the governor is set, that is, an increase in the R. P. M. of the engine will cause
35 an increase in the force of the vacuum in the intake manifold to thereby cause a closing movement of the valve 18 whereupon the cam 21, as viewed in Fig. 4, will be rotated anti-clockwise tensioning the counterbalancing spiral spring 23
40 and thus the valve 18, automatically moving toward closed position, will check the supply of motive fuel to the intake manifold to decrease the speed of the engine, and if the vehicle then enters a steeper down-grade, the valve 18 will
45 then further respond to any additional increase in the force of the vacuum in the intake manifold until it reaches its closed position whereupon the engine will act as a retarder to maintain the speed of the vehicle at the maximum to which
50 the governor is set by the adjusting pin 25 which, as above pointed out, controls the tension of the spiral spring 23 and therefore the resistance of the valve to the variable torque reactions imposed upon it by the combined forces of the flow
55 of the motive fuel and the vacuum within the intake manifold.

In the movement of the vehicle onto an up-grade a slight decrease of speed will automatically cause an opening movement of the governor valve
60 18 permitting the engine to accelerate and maintain its power.

The cam 21 is designed and arranged for co-operation with the spiral spring 23 which is connected to such cam at a point disposed on a radius
65 which is shorter than the increasing radii of the operatively effective portions of the cam 21. This cam is so designed that its curve represents the characteristics of the reactive forces necessary to balance the governor valve 18 at its various
70 positions, that is, the spring 23 will have a progressively increasing length of contact with the cam during the movement of the valve 18 to closed position thereby exerting an increasing tension to maintain, in accordance with a pre-
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determined curve, the governor valve in a state of balance at a predetermined speed relative to the reactions imposed upon such valve by the operation of the engine.

I claim:

1. An automatically operable speed regulator and governor adapted for connection between an intake manifold for an internal combustion engine and the carburetor therefor, comprising a casing having a fuel passage and a flat face formed on one side of the wall thereof which defines said passage, which passage extends through said casing and between the fuel outlet of the carburetor and the fuel intake of the manifold, a normally open valve in said casing passage adapted to be progressively moved into closed position responsively to the velocity of the flow of the fuel through the manifold intake correspondingly to the varying speeds of the engine, and resilient pressure-exerting means cooperating with said valve and exerting a progressively increasing resistance to the closing movement of said valve correspondingly to the progressively increasing speeds of the engine, said means comprising a spiral spring mounted adjacent to said wall face and having its inner end supported on and connected to a pin member which is supported on said wall, an oscillatably mounted shaft extending through said wall and connected to said valve, and a single cam connected to one end of said shaft adjacent said wall face, the outer end of said spiral spring being connected directly to said cam and having a progressively increasing length of contact with said cam during the movement of said valve to closed position.

2. An automatically operable speed regulator and governor as embodied in claim 1 and wherein said pin member is rotatably mounted in said wall.

3. An automatically operable speed regulator and governor as embodied in claim 1 and including said pin member rotatably mounted in said wall to provide adjustment of said spiral spring for varying the resistance imparted thereby to the closing movement of said valve, and means for retaining said pin member in adjusted position.

4. An automatically operable speed regulator and governor as embodied in claim 1 and including said pin member rotatably mounted in said wall to provide adjustment of said spiral spring for varying the resistance imparted thereby to the closing movement of said valve, a cover for enclosing said resilient pressure-exerting means, a member for securing said cover in place on said wall face, and sealing means for preventing unauthorized changing of position of said spring-adjusting pin member comprising a wire connecting said cover-securing member and said pin member and a metallic seal connected to the ends of said wire.

5. An automatically operable speed regulator and governor as embodied in claim 1 and including a stationary lock washer having a plurality of radial slots, a lock element extending from said adjustment pin member within the plane of said radial slots and adapted to be selectively positioned within any one of said radial slots by rotation of said pin member to thereby lock said pin member in adjusted position, and resilient means urging said pin member into position wherein said lock element is positioned within the plane of said radial slots, said pin member being bodily slidable against the pressure of said resilient urging means to shift said lock element out of alignment with the plane of said radial slots to permit rotation of said pin member to vary the tension of said helical spring.

CHARLES A. MARTIN.