Aug. 18, 1925. 1,550,120

E. G. STAUDE

GAS ENGINE GOVERNOR

Filed Jan. 22, 1920

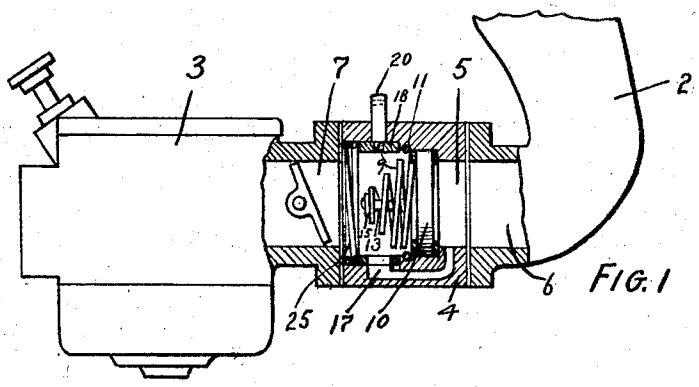


FIG. 1

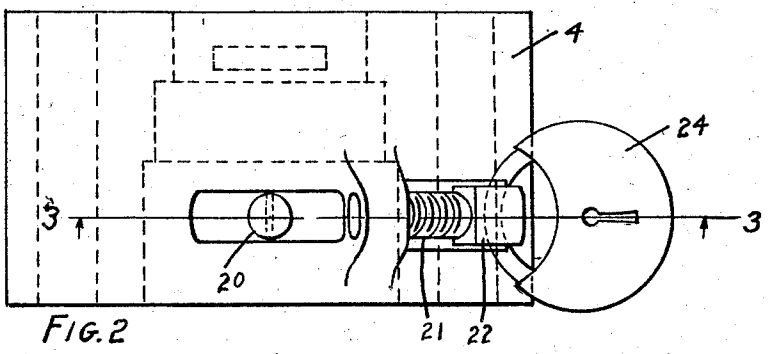


FIG. 2

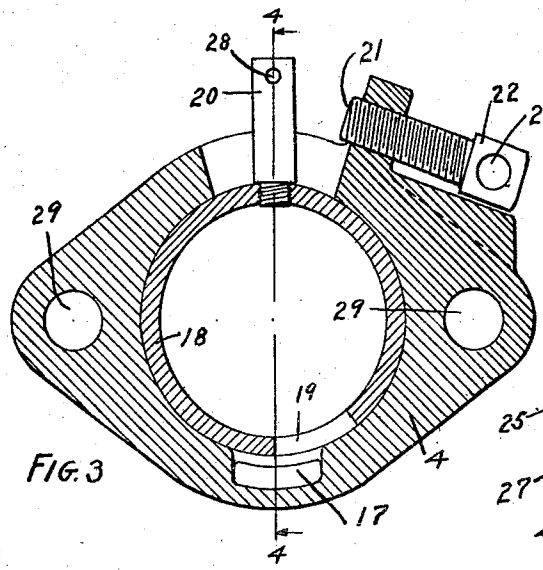


FIG. 3

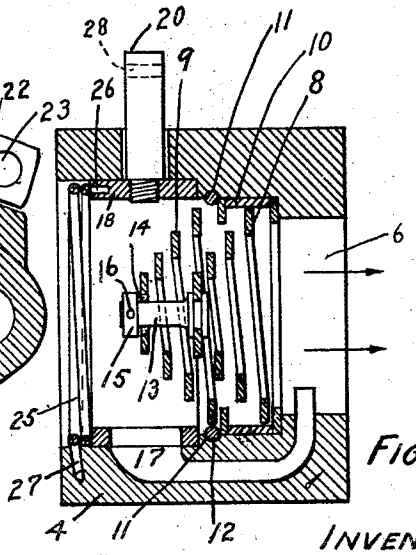


FIG. 4

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UNITED STATES PATENT OFFICE.

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GAS-ENGINE GOVERNOR.

Application filed January 22, 1920. Serial No. 353,232.

To all whom it may concern:

Be it known that I, EDWIN G. STAUDE, a citizen of the United States, resident of Minneapolis, county of Hennepin, State of Minnesota, have invented certain new and useful Improvements in Gas-Engine Governors, of which the following is a specification.

My invention relates in general to devices for automatically controlling the speed of internal combustion engines, particularly of the automative high speed type, and the general object of the invention is to provide a simple, inexpensive and effective speed governor for this type of engines. A more particular object is to provide a simple automatic speed controlling device or governor that may be readily attached to any existing engine for the purpose of preventing racing of the engine with an open or partially open throttle when starting the engine or when the load is suddenly thrown off and to automatically control the speed of the engine under varying loads.

A further object is to provide simple and convenient means for adjusting the governor to control and keep the engine running at any desired speed, regardless of the load on the engine.

My invention consists in certain constructions and combinations, as hereinafter described and particularly pointed out in the claims, taken in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of an engine manifold having my invention attached thereto,

Figure 2 is a top view of the governor, showing the method of attaching the padlock to lock the governor at any predetermined maximum speed,

Figure 3 is a cross section on the line 3—3 of Figure 2, looking in the direction of the arrow,

Figure 4 is a cross section on the line 4—4 of Figure 3, looking in the direction of the arrow.

In the drawing, 2 represents the manifold of an ordinary gasoline engine. 3 shows an ordinary type of carburetor between which and the manifold my governor indicated by the reference figure 4 is secured. The governor in the governor block 4 has a central opening 5 which is in line with the opening 6 of the manifold and the outlet opening 7 of the carburetor. Within this opening 6 I provide a pair of helical springs connected to meet at their apices. These springs I indicate by the reference figures 8 and 9. The size of these springs is such that the spring 8 is first inserted in the opening and next I insert an annular bar 10 which serves to hold the helical spring 8 in position and acts as a spacer for the helical spring 9 which I insert, holding the two springs in position by a split ring 11 adapted to drop into a groove 12 within the opening through the block 4.

In the apex of the spring 8 I provide a stud 13 which is securely fastened to the spring 8 and adapted to slide freely through an opening 14 in the spring 9 and a collar 15 secured by a pin 16 which serves to connect the spring 8 with the spring 9 through the stud 13 when the spring 8 is under compression.

In practical operation I have used a single spring 8 in a similar position as shown and found that the increased vacuum caused by excessive motor speed serves to draw the coils of this spring together and close the opening sufficiently to so reduce the supply of fuel that the motor speed must decrease sufficiently to reduce the vacuum and the compression of the spring 8 causes it to open to allow the mixture to flow through the coils and supply additional fuel.

I have found that when one spring is set to cut off the supply of gas when a speed of 25 miles has been reached, it will not begin to open up until the speed has been reduced to 22 miles. This is for the reason that as soon as the opening 6 is closed the vacuum so increases that a considerable reduction in speed is necessary before the spring is again free to open. In order, therefore, to reduce the variation in speed to the smallest possible amount I have provided this governor with two helical springs connected together as described. The mixture rushing through the two springs will with the same effort act on both springs and compress them, shutting off the supply of gas.

I have found that while the spring 9 should be somewhat lighter than the spring 8 I can make them almost identical and when the spring 8 is compressed to shut off the supply of fuel, it will no longer permit the vacuum to act on the spring 9 and this spring will immediately be released and under its compression assist the spring 8

to open up, thereby counter-balancing the increased vacuum that takes place when the spring 8 is entirely closed. I find in this way that I am able to operate the governor with a variation much smaller than where one spring is used.

I do not, of course, wish to confine myself to the two springs, since it is the object of this invention to depend upon the velocity of the fuel for compressing the spring and closing off the opening proportional with the speed of the motor.

In order to have some means for varying the speed I provide a bypass 17 controlled by a valve 18 and a port 19 and a control 20 adapted to bear against an adjustable screw 21 having a head 22 and an opening 23 through which a padlock 24 shown in Figure 2 may be secured which will prevent the turning of the screw 21 on account of the lack of space between the head 22 and the raised portion 24 on the block 4. In Figures 2 and 3 this control 20 is shown moved out of contact with the adjustable screw 21.

In order to hold the control 20 against the adjusting screw 21 I provide a tension spring 25 secured in the valve 18 at the point 26 and the block 4 at the point 27.

I have found in practice that the bypass 17 need only be a small opening to permit of a large amount of speed variation. With its maximum adjustment the port 19 will be full open and when in this position it will maintain the maximum speed the governor is capable of permitting.

Directly the screw 21 is adjusted so that the controller 20 is in the position shown in Figure 3, the speed will have reduced about 50% and it will depend entirely on the position of the screw 21 just what the maximum speed will be.

It will be noted that after the adjustment has been made the padlock will prevent any tampering so that with this governor in position the speed cannot be increased without the padlock being first removed.

Provision is, however, made through the small hole 28 in the controller 20 to permit of a connection with the controller 20 and the gas controlling arm at the lower portion of the steering post so that other positions may be obtained independently of the one which is locked, but in no case can the controller be moved to provide a greater opening than that of the lock position.

As will be seen from the drawings, the object of this bypass is to provide an opening for a sufficient amount of fuel to pass through this controller to regulate the minimum speed when the springs 8 and 9 are fully compressed.

It will be apparent that the larger this opening is the more fuel will pass through the opening 6 before a sufficient vacuum can be formed to compress the springs 8 and 9 and thereby shut off the flow of fuel directly through the opening.

I have found from experience that this method of controlling the speed is positive and may always be depended upon and that the springs 8 and 9 may have different tensions due to difference in tempering and the variations in the resistance of these springs to compression must be compensated for in a measure by the adjustment of the valve 18.

As shown in Figure 1, the governor is preferably inserted between the manifold 2 and the carburetor 3, using the bolt centers 29, as shown in Figure 3. To use this governor, therefore, it is only necessary to provide bolts of suitable length to fit it to any motor built on standard bolt center specifications.

I claim as my invention:

1. An internal combustion engine having a gas passage therein, helical springs mounted in said passage and normally having open coils for allowing the flow of gas through said passage, a stud mounted in one of said springs and slidably connected with the other spring, and said springs being mounted to close their coils and cut down the flow of gas when the suction in the engine exceeds a predetermined degree.

2. In an internal combustion engine a gas passage therein, a pair of helical springs mounted in said passage, one within the other, and having normally open coils for the flow of the mixture therethrough, means connecting the corresponding ends of said coils, the suction in said passage operating on the inner spring to draw the convolutions thereof together and cut off the flow of gas and the outer spring being put under compression during the closing of the inner spring to open the convolutions of said inner spring proportionately with the decrease of the vacuum in said passage.

3. In an internal combustion engine a gas passage therein, helical springs mounted in said passage and normally having open coils for allowing the flow of gas through said passage, said springs having their convolutions adapted to close when a vacuum is created in said passage through the suction of the engine and reduce automatically the feed of the mixture, and one spring being mounted to exert a separating action on the convolutions of the other spring and automatically resist the effect of the vacuum on said other spring.

In witness whereof, I have hereunto set my hand this 17th day of January 1920.

EDWIN G. STAUDE.