May 7, 1929. A. P. PLAUT 1,712,166

GOVERNOR

Filed Oct. 22, 1921 4 Sheets-Sheet 1

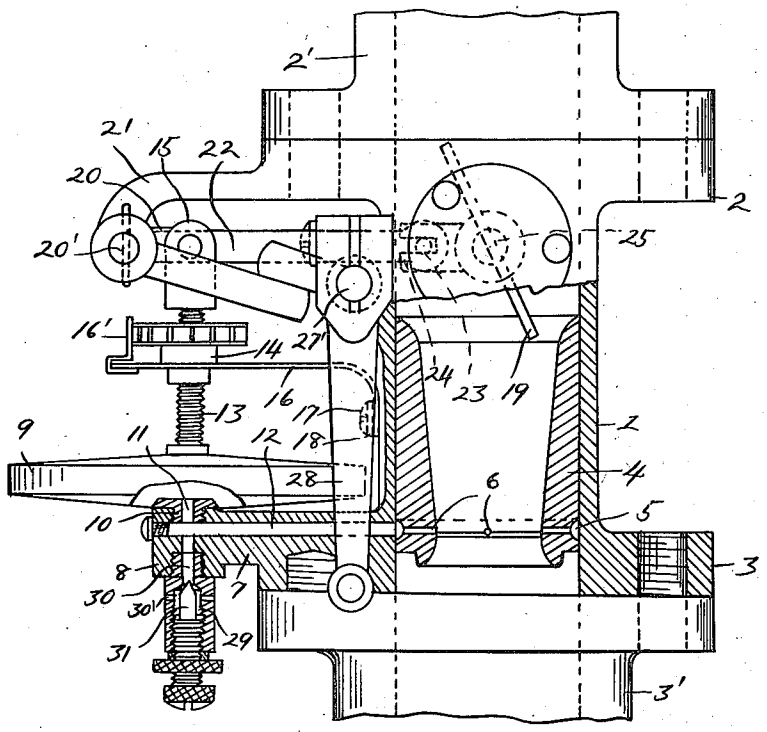


Fig. 1.

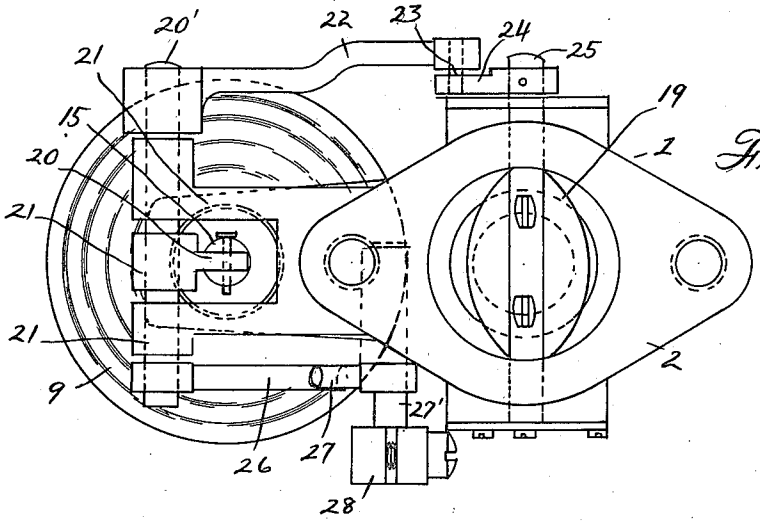


Fig. 2.

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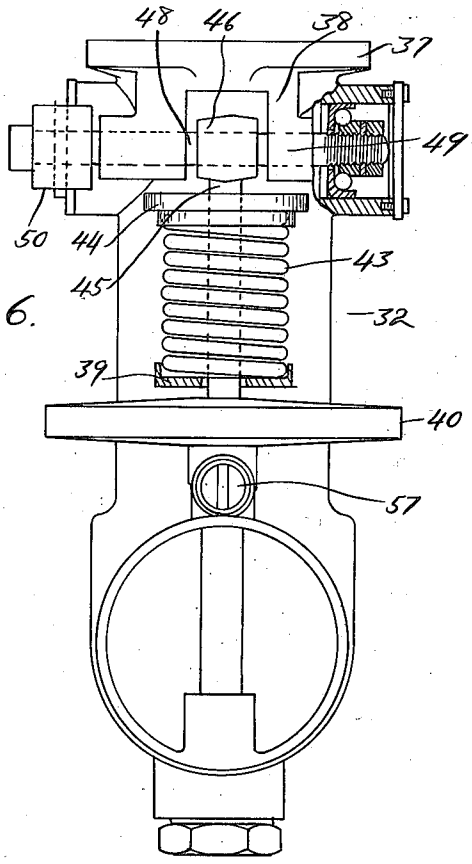
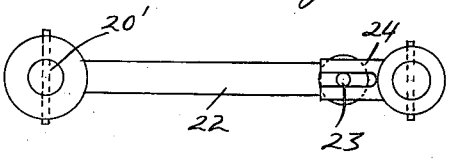


Fig. 6.

Fig. 2a



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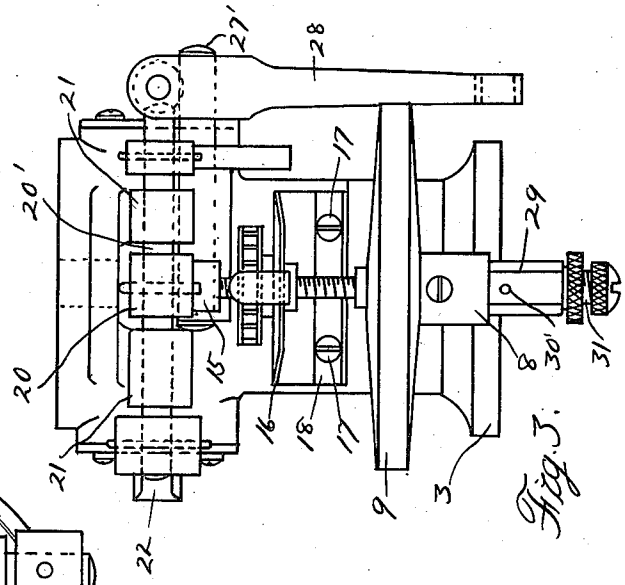


Fig. 3.

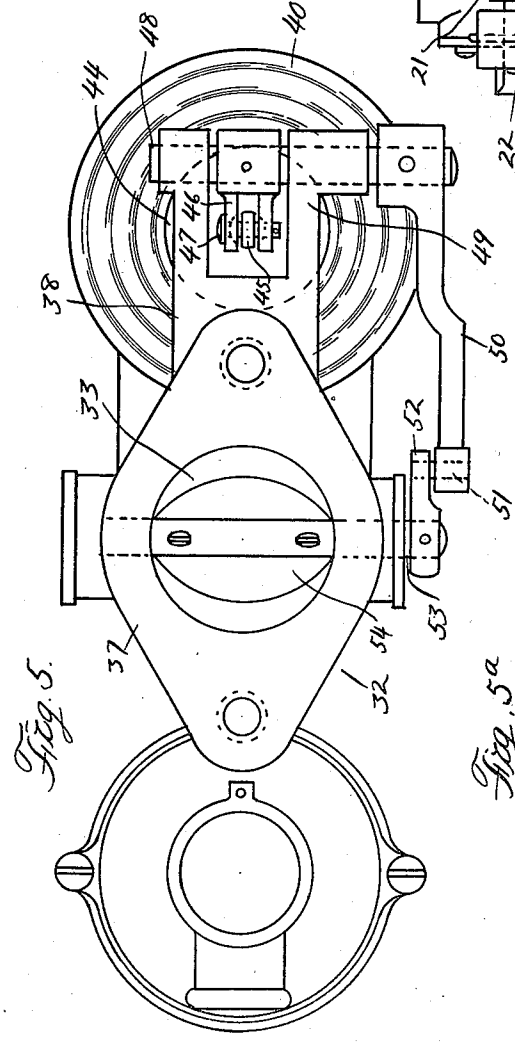


Fig. 5.



Fig. 5a.

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GOVERNOR

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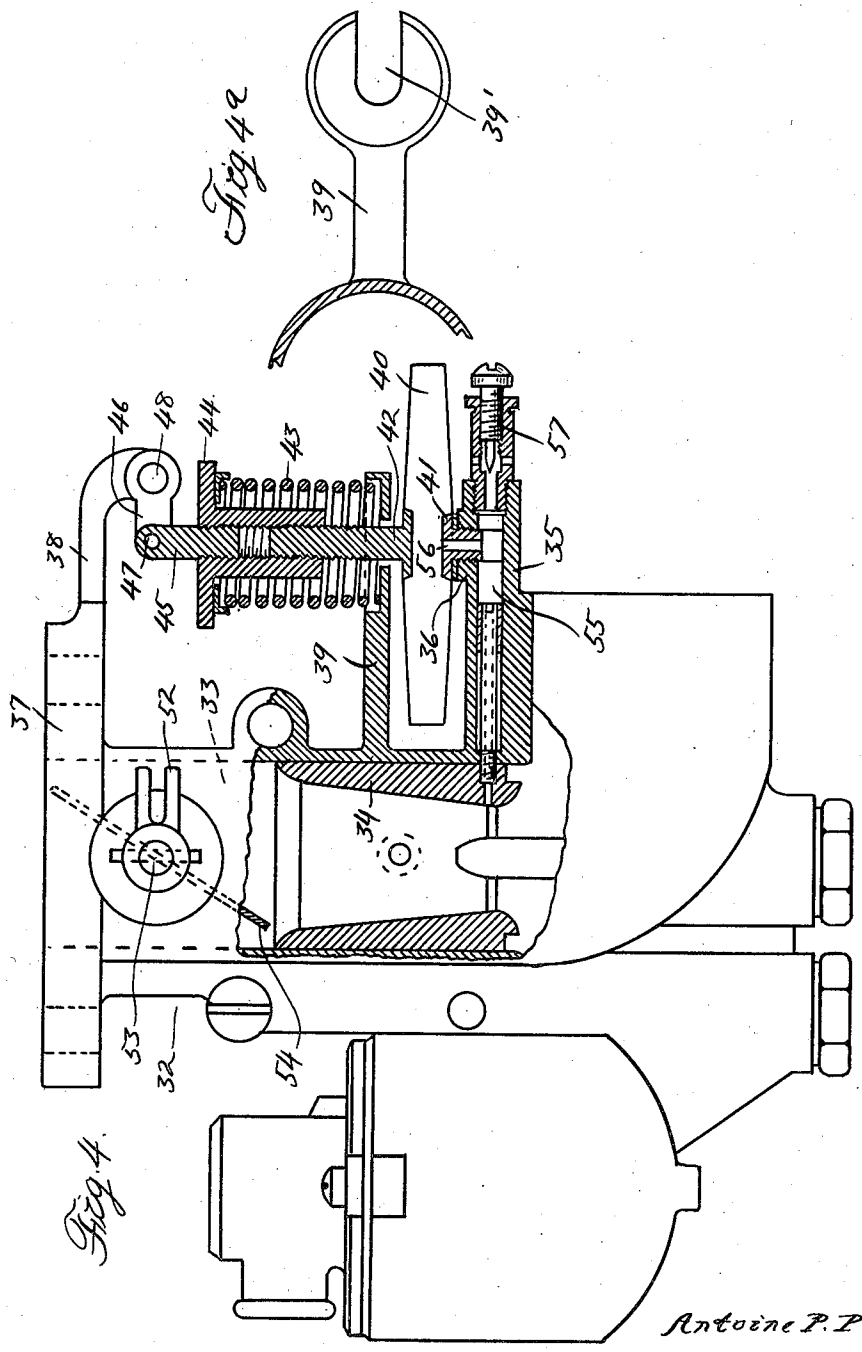


Fig. 4.

Fig. 4a

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Patented May 7, 1929. 1,712,166

UNITED STATES PATENT OFFICE.

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GOVERNOR.

Application filed October 22, 1921. Serial No. 509,757.

The invention relates to governors for automatically controlling the speed of internal combustion engines. One object of the invention is to make a governor in its simplest form using well-known principles whereby the dimensions of the parts of the governor for a certain size motor are amenable to calculations with reasonable accuracy. Another object is the provision of means in the induction passageway of the engine for increasing the degree of vacuum obtained by the passage of the explosive mixture through the induction passageway. Further objects of the invention reside in the novel features of construction and combinations and arrangements of parts as more fully hereinafter set forth.

In the drawings:

Figure 1 is a sectional elevation of a governor attachment embodying my invention;

Figure 2 is a top plan thereof;

Figure 2A is a side elevation of the lever construction for directly operating the throttle valve;

Figure 3 is an end elevation of Figure 1;

Figure 4 is a sectional side elevation of a combined carburetor and governor embodying my invention;

Figure 4A is a top plan view of the bracket supporting the coil spring;

Figure 5 is a top plan view of Figure 4;

Figure 5A is a side elevation of the lever construction for directly operating the throttle valve;

Figure 6 is an end view partly in section of Figure 4.

As shown in Figures 1 to 3 inclusive, my governor may be designed as an attachment adapted for insertion between the carburetor and the intake manifold of an internal combustion engine. With this arrangement, the usual throttle valve in the induction passageway of the carburetor may be dispensed with. In detail, 1 is a tubular body having an internal diameter of required size and 2 and 3 are flanges at the ends of this body serving for attachment respectively to the intake manifold 2′ and the carburetor 3′. 4 is a calibrated choke tube or venturi fitting tightly in the passageway of the body 1 and fixedly secured thereto, this choke tube having in its periphery a vacuum chamber 5 in communication with its throat through a series of transverse openings 6. The lower flange 3 has an extension 7 provided at its end with the boss 8. On the upper part of this boss there is a collapsible diaphragm 9 having a corrugated base and top, the base being secured to the boss by means of the stud 10. For placing the interior of the diaphragm in communication with the vacuum chamber 5, the stud has an axial passageway 11 which connects into the passageway 12 extending longitudinally within the extension 7 and connecting into the vacuum chamber.

For yieldably maintaining the top of the collapsible diaphragm in a predetermined position, there is the stud 13 secured centrally to the top and threaded to receive the nut 14 and the block 15. 16 is a flat spring which slidably engages the reduced lower end of the nut 14 and is rigidly secured to the tubular body 1 by means of the plate 18 and the screws 17 passing through the plate and through the transverse flange of the spring into the tubular body. Rotation of the nut 14 will move the spring 16 longitudinally of the stud 13 and thereby vary the tension of the spring. Unintentional rotation of the nut is prevented by means of the resilient clip 16′ fixedly secured to the end of the spring 16 and adapted to engage in notches in the periphery of the nut.

To operate the throttle valve 19 which is located in the passageway of the tubular body 1 between the choke tube and the engine, the block 15 is pivotally connected to the lever 20 fixedly secured upon the shaft 20′ which is journalled in the bifurcations 21 extending laterally from the flange 2 of the tubular body. 22 is a second lever secured to the shaft 20′ at one end thereof, the free end of the arm having the pin 23 which slidably engages in the lever 24 which is longitudinally slotted to receive the pin and is fixedly secured to the shaft 25 of the throttle valve. With this arrangement any motion of the collapsible diaphragm 9 produces a corresponding motion of the throttle valve 19, the ratio of the two motions being the same as that of the system of levers.

If it is desired to manually close the throttle valve 19 beyond the point to which the governor automatically moves the throttle valve, as for instance, when it is desired to have the engine running at idle speed,

there is the lever 26 fixedly secured to the shaft 20′ at the end opposite to the lever 22 and having its free end extending to a position to be engageable by the lever 27 fixedly secured upon the rock shaft 27′ journalled in the tubular body 1 and adapted to be rotated from the closing lever 28 which latter is fixedly clamped thereon. With this arrangement, the throttle valve can be closed independently of the diaphragm but it is seen that opening of the throttle valve cannot be secured by manual manipulation of the closing lever.

The velocity of the explosive mixture passing through the throat of the choke tube having been calculated according to the speed of the engine, the drop in pressure created by the velocity of air will be known. The working surface of the collapsible diaphragm also being known, the resistance of the spring and proper selection of these various quantities to establish a certain closing of the throttle valve under given conditions can be readily secured.

Another important feature also resides in providing an air adjustment which will control the operation of the governor independent of the spring adjustment. In detail, the under part of the boss 8 has secured thereto the body 29 provided with the axial passageway 30 communicating with the passageway 12 in the extension 7 and also provided with the transverse passageways 30′ for placing the passageway 30 in communication with the air. 31 is a valve such as a needle valve adapted to close the axial passageway 30 and having its stem adjustably threadedly engaging the body 29 to thereby adjustably vary the amount of air drawn through the transverse passageways 30′ and entering the axial passageway 30. With this arrangement, it is seen that the degree of vacuum may be varied within the passageway 12 and consequently the operation of the collapsible diaphragm 9 may be varied independently of the mechanism including the tensioning spring for adjusting the throttle valve.

As shown in Figures 4 to 6 inclusive, the governor is combined in a single device with a carburetor. In detail, 32 is the carburetor body having the induction passageway 33 therethrough and 34 is the choke tube tightly fitting within the induction passageway and fixedly secured thereto. 35 is an extension upon the carburetor body having on its upper part the boss 36. At the upper end of the carburetor body there is the flange 37 for securing the carburetor body to the lower end of the engine intake manifold. Extending laterally from this flange is a bifurcated bracket 38. Intermediate the extension 35 and bracket 38 is another bracket 39 extending laterally away from the body 1. 40 is a collapsible diaphragm located between the extension 35 and intermediate bracket 39 and mounted upon the boss 36, the base of this collapsible diaphragm being secured to the extension by means of the stud 41. 42 is another stud which is secured to the top of the collapsible diaphragm and extends upwardly through the intermediate bracket 39, the latter having the slot 39′ extending from its outer edge for the passage of this last-mentioned stud. 43 is a coil spring supported upon the intermediate bracket 39 and surrounding the stud 42, the upper end of this coil spring engaging the abutment 44 which is internally threaded to engage the stud 42. With this arrangement, rotation of the abutment 44 relative to the stud 42 varies the tension upon the coil spring 43.

45 is a stud in alignment with the stud 42 and threadedly engaging the abutment 44, the upper end of the stud 45 being shaped to fit between the bifurcations and the upper end of the stud pass the pivot 47. The lever 46 is fixedly secured to the rock shaft 48 which is journalled in the bifurcations 49 of the bracket 38. 50 is a lever fixedly secured to one end of the rock shaft 48 and having at its opposite end the pin 51 slidably engaging between the bifurcations of the lever 52 fixedly secured to the shaft 53 to which the throttle valve 54 is rigidly secured.

For placing the interior of the collapsible diaphragm 40 in communication with the interior of the choke tube 34 so that the velocity of the gaseous mixture passing through the choke tube will produce an increased suction effect upon the diaphragm, there is the passageway 55 through the extension 35 and in communication at one end with the throat or choke tube and at the other end with the passageway 56 extending axially through the stud 41.

Also in this construction, a suitable valve 57 may be provided for controlling the amount of air passing into the passageway 55 to thereby vary the pressure within the collapsible diaphragm.

As shown in Figure 5A, the levers 58 and 59 which are respectively fixedly secured to the shaft of the throttle valve and to the rock shaft journalled in the bracket bifurcations and actuated by the collapsible diaphragm, have cooperating toothed segmental ends for actuating the one from the other.

The levers and other governor controlling mechanism in both constructions, is suitably protected from injury and tampering as by means of a housing for enclosing the parts.

From the above description, it is seen that both modifications are very similar with the exception that in the first case, the governor is an attachment, while in the second case the governor and carburetor are embodied in one device. Also the two constructions

differ in their specific means for placing tension upon the diaphragm.

What I claim as my invention is:

A governor for controlling the speed of an internal combustion engine, comprising an induction passageway, a choke tube in said passageway, a throttle valve in said passageway between said choke tube and the engine, a collapsible diaphragm, a coil spring for normally maintaining said diaphragm in a predetermined position, a stationary abutment for one end of said coil spring, a stud secured to said diaphragm and passing through said stationary abutment, an adjustable abutment for the opposite end of said coil spring and threadedly engaging said stud, a second stud in alignment with said first-mentioned stud and threadedly engaging said adjustable abutment, a lever pivotally connected to said second stud, connections between said lever and throttle valve, and a passageway connecting into the throat of said choke tube and into said diaphragm.

In testimony whereof I affix my signature.

ANTOINE P. PLAUT.