Sept. 23, 1941. A. C. HOOF 2,256,467

GOVERNOR

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Fig. 1.

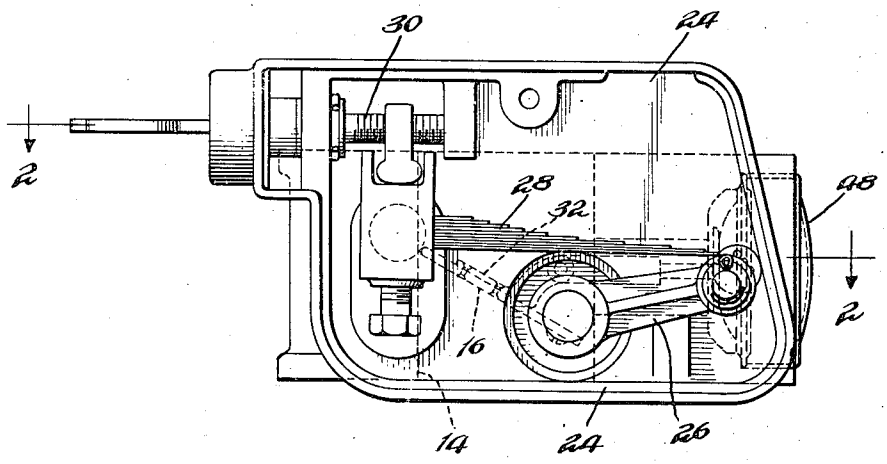
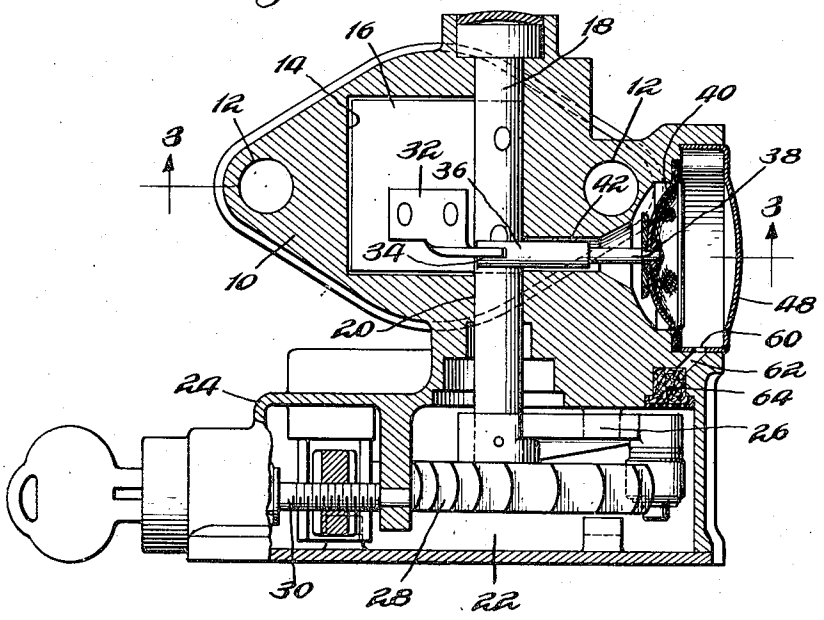


Fig. 2.



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Fig. 3.

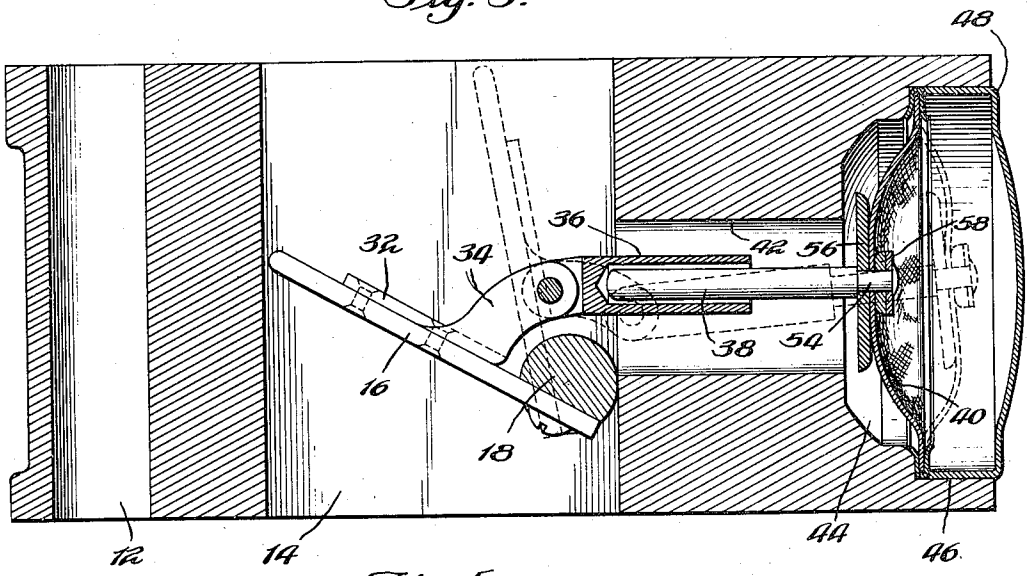
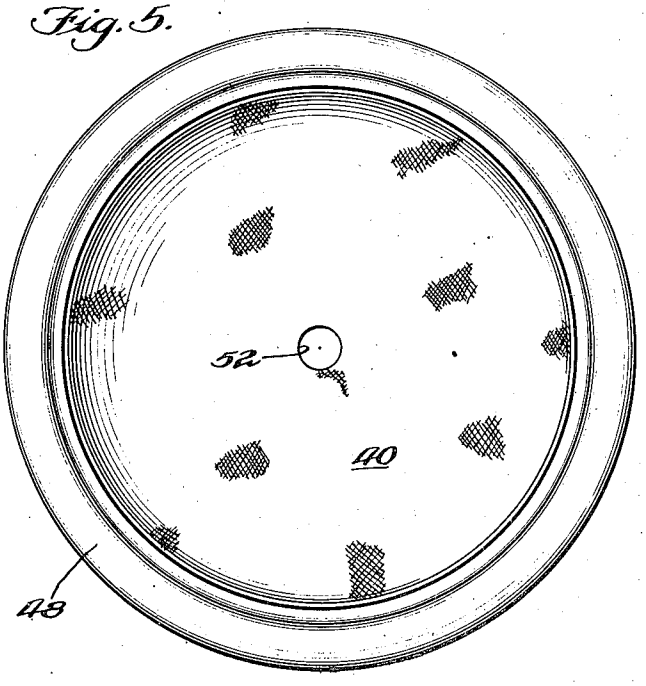


Fig. 5.



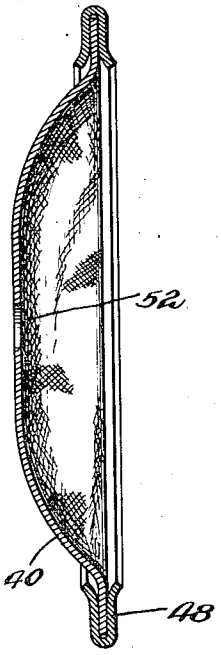


Fig. 4.

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Fig. 6.

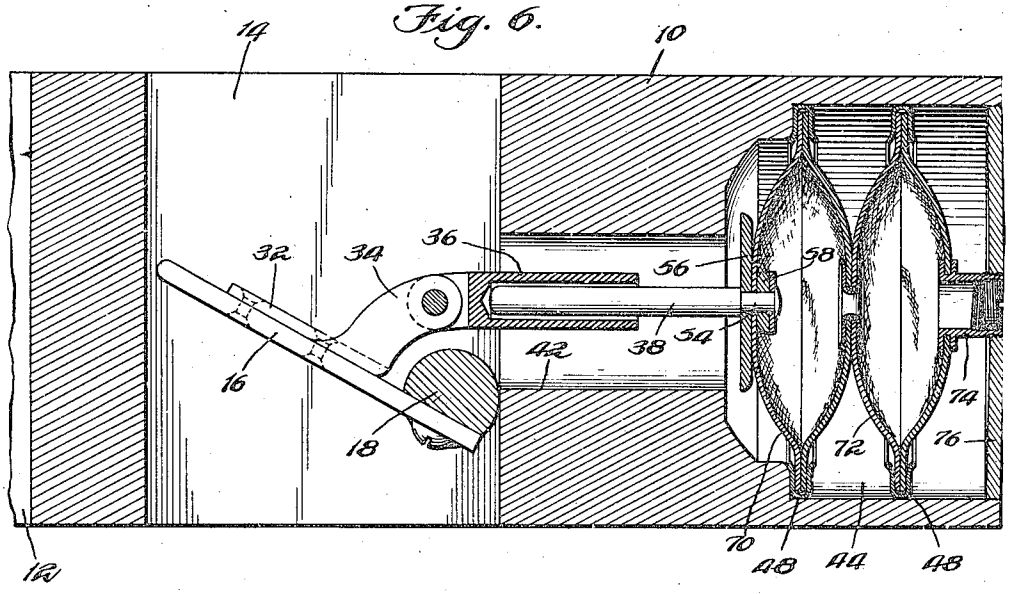
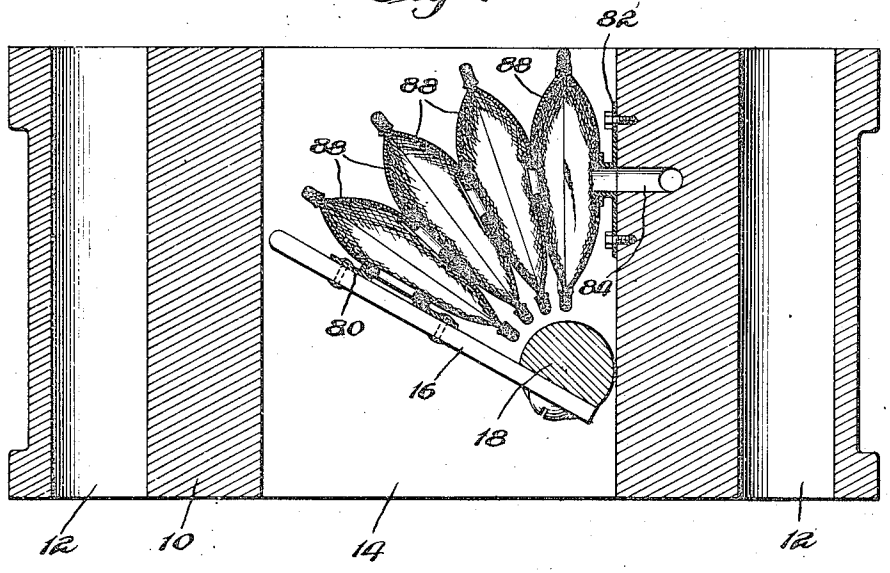


Fig. 7.



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UNITED STATES PATENT OFFICE

2,256,467

GOVERNOR

Addison C. Hoof, Hinsdale, Ill.

Application January 11, 1937, Serial No. 120,099

1 Claim. (Cl. 137—153)

My invention relates to improvements in governors and similar devices.

My invention relates more particularly to devices of the character described which are adapted to be actuated by the suction in the intake manifold of internal combustion engines.

One of the principal objections to many of the suction actuated governors on the market today is the fact that "cheating" may be accomplished by an operator that has learned how to "cheat." As is well known in the art, when the governor is in control of the flow of gases to the internal combustion engine, the vacuum or suction is transferred from a point adjacent the carburetor valve to a point between the governor valve and the manifold. It is a well known fact that the carburetor valve on an ordinary engine without a governor under part throttle operation, is at a point from which a vacuum is created, and where a governor is used in connection with the same under the same conditions, governors of the velocity type or the vacuum type are considerably affected by this part throttle operation in the manipulation of the governor throttle to an exact point where the valve of the carburetor is approximately at a postion where the opening is equivalent to the governed speed of the vehicle. Under part load the vacuum created by this manipulation creates a condition in the intake manifold, where the vacuum below the governor valve is partially transferred above the governor valve, creating less torque on the governor valve spring assembly and spring means, permitting the valve to open at greater than the governed speed, resulting in what is termed "cheating," or in other words, overspeeding the set speed of the governor.

As a matter of illustration, if a pre-determined speed of 40 M. P. H. is the setting of the governor, and the opening of the valve is approximately ⅛" with ⅛ of a full load, to permit this speed the spring resistance means of resisting the closure of the governor valve permits ⅛" opening. If the carburetor valve is set by manipulation to the same opening or a trifle smaller opening than the governor valve, it creates a partial vacuum above the governor valve equivalent to approximately ⅔ the vacuum below the governor valve.

This condition has been recognized for many years in the manufacture of vacuum and velocity type of governors, and by some manufacturers a partial correction has been made by inserting a dash-pot or piston and plunger in a separate opening to the atmosphere and attached to the butterfly valve of the governor. This piston is placed between the governor valve and the carburetor so that when a partial vacuum is created at this point, the atmosphere pressure creates an additional means of overcoming this spring resistance means, and closes the valve to the predetermined set speed of 40 M. P. H., thereby defeating the attempt of overspeeding on the part of the operator or manipulator of the carburetor valve.

It will be evident to any one skilled in the art that a piston and dashpot must necessarily be mounted frictionally upon the governor so that a substantial frictional resistance is set up to movement thereof. Obviously, these frictional forces would tend to interfere with the normal action of the governor and, accordingly, it has been practically impossible in the past to employ the piston by itself. The piston construction has therefore only been practically usable by virtue of a special combination with a spring which urges the piston to an inoperative position when the anti-cheat device is not required. The use of the valve has necessitated careful balancing of the action of the piston against the action of the spring, as well as the use of a larger piston than would be theoretically necessary in order to counteract the action of the spring. Moreover, the problem is even more serious since, as is known, the construction of the conventional spring is such that the resisting forces set up thereby vary widely in accordance with the flexing of the spring. Furthermore, in spite of careful initial balancing of the parts, it is evident that the necessarily close fit required by the piston will result in an uncontrollable variation in frictional resistance to the piston movement when in operation since such things as normal wear, variation in the lubricant, expansion and contraction of the parts from the heat of the engine, gum and carbon deposits, dust and abrasives and the like, render the operation of the device strictly unpredictable.

The principal object of my invention is to provide an improved type of governor having means associated therewith to absolutely prevent "cheating."

A further object of the invention is to provide an improved mechanism of the type described so constructed that the valve is capable of moving to any position without appreciable interference by the "cheat" mechanism. That is to say, in accordance with the present invention, there is provided a diaphragm actuating means for the cheat mechanism which obviates the foregoing difficulties inherent in a piston type control and

permits the application of an accurately predetermined anti-cheat closing force to the valve while obviating all appreciable resistance to return of the anti-cheat actuating mechanism to inoperative position when its action is suspended.

It is therefore a yet more specific object of the present invention to provide an anti-cheat mechanism which is free from springs or other yielding means for returning the anti-cheat mechanism to the inoperative position.

A further object of my invention is to provide an improved construction of "cheat" mechanism that is extremely simple in construction and operation, is manufactured from a minimum number of parts and is incapable of becoming broken or out of order.

Other objects and advantages will be more apparent from the following description, wherein reference is had to the accompanying three sheets of drawings, upon which:

Fig. 1 is a side elevational view of a standard form of governor embodying my new improvements;

Fig. 2 is a plan sectional view thereof taken generally on the lines 2—2 of Fig. 1;

Fig. 3 is an enlarged cross-sectional view through the operating mechanism taken generally on the lines 3—3 of Fig. 2;

Fig. 4 is a vertical cross-sectional view of one form of diaphragm which may be employed;

Fig. 5 is a front elevational view thereof;

Fig. 6 is a cross-sectional view similar to Fig. 3 showing a modified form of mechanism, and

Fig. 7 is a similar view showing a still further modified form of mechanism.

In the embodiment of my invention in which I have chosen to illustrate the same I provide the usual type of governor including the block 10 adapted to be fastened between the end of the carburetor and the intake manifold of an internal combustion engine by suitable bolt members that pass through the openings 12. The block 10 is formed with a conduit 14 within which I mount a governor valve 16. The governor valve 16 is of the offset type mounted upon a valve shaft 18 which passes through a suitable opening 20 in the block 10 and into a chamber 22 in the interior of a resistance means housing 24 formed integral with the block 10.

The spring resistance means which I have illustrated may be generally similar to that shown in my Patent No. 1,999,758, issued on April 30, 1935, and may generally comprise the crank arm 26, resistant element 28, and adjusting means designated generally by the numeral 30.

I provide a bracket 32 adapted to be secured to the upper side of the governor valve 16 by a suitable rivet member. The bracket 32 may have an arm 34 pivotally connected to one end of a hollow rod member 36. The rod member 36 is adapted to telescopically engage a pin member 38 secured to one side of a flexible diaphragm 40. The rod 36 and pin 38 may extend through a passageway 42 formed in the block 10 and communicating with an enlarged chamber 44.

The chamber 44 is formed with a cylindrical wall 46 within which a cap member 48 is rigidly mounted to fixedly position the diaphragm 40. Diaphragm 40 may be formed with a metallic edge ring 48 within which the edges of the diaphragm are fixedly mounted. The diaphragm is preferably formed of rubberized cloth or similar material, but it will be understood that the same may be formed of metal or any other material that is flexible. The pin 38 is secured to the diaphragm through the opening 52 by means of a reduced shoulder portion 54 and a pair of supporting washers 56 and 58.

As shown in Fig. 1, the cap member 48 is provided with an opening 60 that communicates with a passageway 62 with the interior of housing 24. A trap 64 may be provided in this passageway filled with felt or other cleaning material to prevent the admittance of sediment to the interior of cap 48.

The operation of the device thus described and shown in Figs. 1 to 5 is as follows:

Assuming that a condition has been reached such as has been heretofore explained in the introduction. At this point the suction normally present below the valve 16 has now been transferred above the same to a position below the carburetor valve. Without the presence of the diaphragm and associated parts, the governor valve would thus cease to function and would be open under the influence of the spring member 28 to a point where operation of the engine would be speeded up ten or twenty miles per hour. However, with the construction shown, upon the transfer of the vacuum to a point above the governor valve 16 and with an atmospheric air condition in the cap 48, the diaphragm will move to the left as shown in Fig. 3, and actuate the valve to move the same back into a governing position.

In Fig. 6, I have shown a modified form of my invention in which I provide a pair of bellows 70 and 72 connected to the pin member 38. These bellows are free to move in the chamber 44, being connected at an opposite end to a plug member 74 fastened in a closure cap 76. It will be apparent that the action of the bellows is identical to that of the diaphragm 40 hereinbefore described, due to the fact that the portion of chamber 44 to the right of the metallic ring 48 is exposed to atmospheric pressure through the passageway 62 and the housing 24.

In Fig. 7, I have shown a still further modified form of my invention in which I have eliminated the rod 36 and pin 38 and the slip connection therebetween. In this modification I provide a bracket 80 secured to the face of governor valve 16, and a bracket 82 secured to the side valve of the conduit 14. The bracket 82 has a bore therethrough which communicates with a passageway 84 that connects with the interior of housing 24. I secure a plurality of bellows members 88 between the two aforementioned brackets. The bellows are connected together in such a manner that as the valve is rotated to an open or closed position the same will open or shut in the same manner as the pleats of an accordion. It will be obvious that by the use of this construction the action upon the governor valve will be similar to that described in connection with the preferred form. Upon the creating of a vacuum in the conduit 14 above the governor valve 16, and because of the fact that the interior of the bellows is open to atmosphere, the same will have a tendency to open up and thus urge the valve 16 back to a closed governing position.

While I have illustrated and described a specific embodiment of my invention and several variations thereof, it will be apparent to those skilled in the art that changes and modifications may be made in the specific details shown and I do not wish to be limited in any particular. Rather, what I desire to secure and protect by Letters Patent of the United States is:

In a governor for an internal combustion engine, having an intake conduit extending there-

through, one end of said conduit being adapted to communicate with the intake manifold of said engine, the other end of said conduit being adapted to communicate with the throttle passageway of a carburetor, and a valve in said conduit adapted to be urged toward closed position by fluid flow in the conduit toward the intake manifold, the improvement which comprises an anti-cheat mechanism having a flexible diaphragm mounted on said governor, the outer surface of said diaphragm being in communication with atmosphere at all times, the inner surface of said diaphragm being in communication with said conduit on the carburetor side of said valve, and means operatively associated with said diaphragm and being operatively connected with the valve for urging the valve toward a closed position in response to actuation of the diaphragm under the influence of a negative pressure on the carburetor side of the valve, said diaphragm being flexible and said flexibility comprising the sole means resisting shifting of said diaphragm by the valve, said valve urging means comprising a member pivotally associated with the valve, a second member engaged with said first member for relative movement in the direction of movement of the diaphragm only, and means for limiting the relative movement of said members at a predetermined relative point for permitting said second named member to shift the valve when predetermined negative pressures exist adjacent said valve.

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