

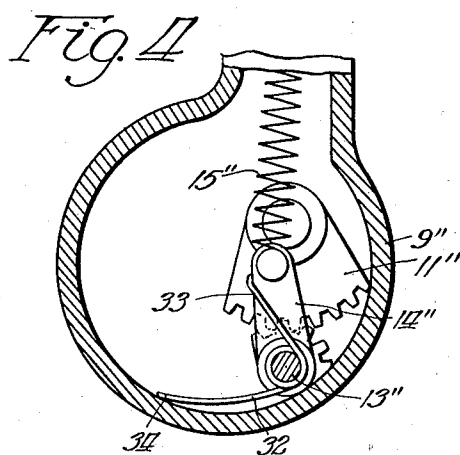
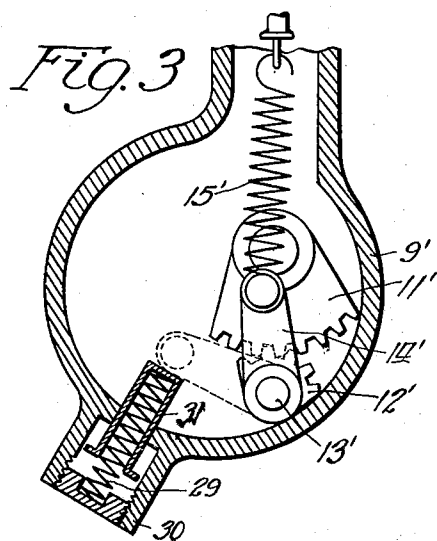
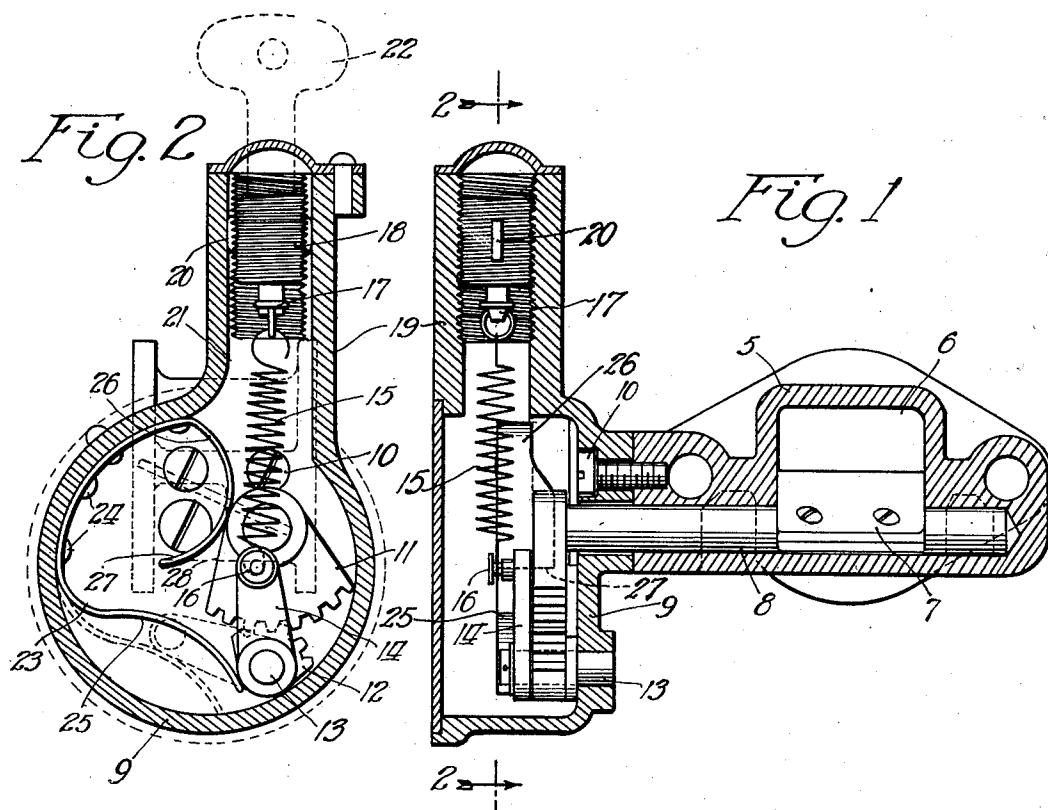
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A. A. ALTENBERG

1,959,515

GOVERNOR FOR INTERNAL COMBUSTION ENGINES

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Inventor
 Alfons A. Altenberg
 By *Jabel & Baumgardner* Attys.

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GOVERNOR FOR INTERNAL COMBUSTION
ENGINESAlfons A. Altenberg, Maywood, Ill., assignor to
U. S. Governor Corporation, a corporation of
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8 Claims. (Cl. 137—152)

My invention relates to governors for internal combustion engines having provisions for maintaining automatically a nearly constant engine speed under varying load conditions.

5 One object is to provide an automatic governor such as is inserted between the intake manifold and the carburetor of an internal combustion engine to control the engine speed and to prevent racing of the engine with novel means whereby
10 to increase the exactness with which this speed may be controlled.

Another object of the invention is to provide such a governor as referred to above with means to automatically force the valve controlled by
15 the governor open immediately upon a decrease in the speed of the engine whereby more gas is fed to the engine to meet the increased load demand.

It is also an object of the invention to provide
20 in a governing device, such as referred to, means for obtaining a corrective resistance to the throttling of the engine which increases as the throttling action increases whereby it is capable upon termination of the necessity of throttling to reduce speed to immediately reverse the throttling
25 action and thereby prevent loss of power of the engine.

Other and more specific objects of the invention will appear as the description proceeds in connection with the accompanying drawing wherein—

Fig. 1 is a vertical section through the governor illustrating the valve to be controlled;

Fig. 2 is a section substantially on the line
35 2—2 of Fig. 1;

Figs. 3 and 4 are sections similar to Fig. 2 of slightly modified forms.

Referring now in detail to the drawing, the numeral 5 indicates a housing which may be
40 inserted for example between the intake manifold and carburetor of an internal combustion engine which has the passageway 6 therethrough by means of which fluid from the carburetor may pass through the intake manifold to the
45 combustion chamber. Within this passageway 6 there is pivoted a valve 7 which, as shown in the drawing, has a shaft 8 for a pivot. This valve is preferably positioned as in the usual governors of this type so that upon passage of
50 fluid through the passage 6 toward the combustion chambers the force of the fluid tends to close the valve 7 by turning it across the passageway 6. Thus as the speed of the fluid increases in the chamber 6 due to an increase in
55 the speed of an engine, the tendency of the

valve will be to cut down the amount of fluid passing through the passage so that at a certain speed the valve will have so nearly closed as to make the supply of combustible fluid to the engine too small to further increase the speed
60 thereof.

Now in order to make the operation of the valve successful, it is necessary to oppose to some extent the action of the fluid tending to close the valve, and it is with this opposing means
65 that my invention deals.

It will be noted that shaft 8 projects above the housing 5 and a second housing 9 fits over the end of the shaft and is secured to the housing 5 in any suitable manner such for instance as by
70 means of the screws 10. Within the second housing 9, the end of the shaft 8 is provided with a gear sector 11 which meshes with the gear sector 12 pivoted on the stub shaft 13 and having fixed thereto a lever arm 14.

Now, as the valve moves into closed position, it is obvious that the gear segment 11 will rotate in a clockwise direction as shown in Fig. 2 and in so rotating will move gear sector 12 in a counter-clockwise direction at a much higher rate of
80 angular speed due to the difference in radius of the two gears. Thus the lever 14 will be given a considerably higher angular speed of movement than that of the valve 7. This lever 14 is then subjected to a resistive force which opposes the
85 closing of the valve 7 and tends to maintain it in open position. This resistive force may be obtained in various ways, and a portion of it in the present instance is obtained by means of the coil
90 spring 15 which as shown has one end pivoted to the post 16 on the lever 14, the other end being secured by a swivel connection 17 to the adjustable lock member 18 which screw threads into the tubular projection 19 of the housing 9.

In this connection, it will be noted that the lock member 18 has legs such as 20 normally projecting into the groove such as 21 of the tubular portion 19, and these projections 20 may be withdrawn as by inserting the key 22 so as to rotate the member 18 and thus adjust the tension upon the spring 15 to the desired value.

The interior mechanism of the lock 18 may be of any well known type and forms no part of the present invention.

One of the novel features of this invention, however, consists in the provision of the locking member in adjustable form, that is, with the external screw threads which enables adjustment of the locking member direct without the inter-
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position of any auxiliary connecting means between the locking member and the spring 15 for accomplishing the adjustment.

From the showing in Fig. 2, it will be seen that as the lever 14 is moved in a counterclockwise direction, the resistive force of the spring 15 exerts an increasing resistance to the movement of the valve by reason of the fact that its force is directed at a greater distance from the fulcrum of the lever 14 on the shaft 13.

In order to provide a further resistive effort to overcome the force exerted by the valve 7 of the fluid, I provide an additional yielding means consisting of the flat spring 23 which may be secured to the wall of the housing 9 in any suitable manner such for instance as by rivets 24. This spring 23 is curved as indicated at 25 so that the free end thereof when the valve is in open position bears against the lever 14 in the full line position shown in Fig. 2 which, of course, exerts no resistive effort whatsoever to the turning of the lever 14. However, if the lever 14 is moved in counterclockwise direction in response to movement of the valve, the point of engagement between the spring 25 and lever 14 moves toward the free end of the lever 14 as this lever moves in a counterclockwise direction thus causing the spring to exert its force at an increasingly greater distance from the pivot of the lever 14 as this lever moves in a counterclockwise direction.

Moreover, another result of this movement is to shorten the distance from the securing point of the spring to its bearing point on the lever 14 which also increases the resistive effort due to this spring. In this way a relatively small movement of the spring 23 is caused to exert a considerable resistive force to oppose the opening of the valve and this, of course, tends to reduce the strain upon the spring and give it a longer useful life.

I may, for the purpose of obtaining more resistive effort, also direct the spring 26 which may or may not be a continuation of spring 23 in the curve 27 and position this curved portion 27 so as to engage with the edge 28 of the gear sector 11 so that as this gear sector moves in a clockwise direction such movement will be resisted by the curved portion 27.

In Fig. 3 there is shown a slightly modified form of resilient means for engaging the lever 14', and this consists of a spring 29 which is adjustably mounted in the extension 30 of housing 9' and forces the plunger 31 against the free end of lever 14'. This device, however, is not so successful as that shown in Figs. 1 and 2. In Fig. 4 there is shown a further means for resisting movement of the lever 14'' which in this form consists of a spring 32 having one end 33 hooked over the lever so as to tend to move it in clockwise direction and having the other end 34 bearing against the wall of the casing 9'', the intermediate portion being coiled around the stub shaft 13''. The remaining structures in Figs. 3 and 4 may be the same as that shown in Figs. 1 and 2 although it is obvious, of course, that if desired spring 26 may be omitted, and it has been so omitted in Figs. 3 and 4.

From the above description, it is thought the construction and operation of this device will be clear to those skilled in this art and the advantages thereof readily apparent.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is:

1. In a governor, a housing having a fluid passage, a valve member positioned within said passage to control the effective opening there-through, said member being positioned in the path of the fluid so as to move in response to movement of the fluid, and means connected with said member exerting a resistance to the passage closing movement thereof progressively increasing with the displacement of the member due to the fluid, said means including a gear sector driven by said member, a second gear sector driven by said first gear at a higher speed, a lever associated with said second gear sector, and yielding means opposing movement of said lever in one direction.

2. In a governor, a housing having a fluid passage, a valve member positioned within said passage to control the effective opening there-through, said member being positioned in the path of the fluid so as to move in response to movement of the fluid, and means connected with said member exerting a resistance to the passage closing movement thereof progressively increasing with the displacement of the member due to the fluid, said means including a gear sector driven by said member, a second gear sector driven by said first gear sector at a higher speed, a lever associated with said second gear sector, and yielding means opposing movement of said lever in one direction, said yielding means exerting its opposing force at an increasingly greater distance from the fulcrum of the lever as the lever moves in said direction.

3. In a governor, a housing having a fluid passage, a valve member positioned within said passage to control the effective opening there-through, said member being positioned in the path of the fluid so as to move in response to movement of the fluid, and means connected with said member exerting a resistance to the passage closing movement thereof progressively increasing with the displacement of the member due to the fluid, said means including a gear sector driven by said member, a second gear sector driven by said first gear, a lever associated with said second gear sector, and yielding means opposing movement of said lever in one direction, said yielding means including springs engaging said lever and first named gear sector.

4. In a governor, a housing having a fluid passage, a control valve therein movable toward passage closing position in response to flow of fluid through said passage in one direction, a gear sector driven by said valve, a second gear sector driven by said first named gear sector, and means associated with said last named sector yieldingly opposing movement of said valve in response to flow of fluid in said direction, said last named means including a spring and means interposed between the spring and said last named sector for causing said spring to exert its opposing force at an increasingly greater distance from the pivot of said last named sector as the fluid responsive movement increases.

5. In a governor, a housing having a fluid passage, a control valve therein movable toward passage closing position in response to flow of fluid through said passage in one direction, a gear sector driven by said valve, a second gear sector driven by said first named gear sector, and means associated with said last named sector yieldingly opposing movement of said valve in response to flow of fluid in said direction, said means including a lever fixed to said last named sector, and spring means associated with said

lever to exert the movement resisting force thereon at an increasing distance from the pivot thereof as said valve moves in response to the fluid flow.

5 6. In a governor, a housing having a fluid passage, a control valve therein movable toward passage closing position in response to flow of fluid through said passage in one direction, a gear sector driven by said valve, a second gear sector driven by said first named gear sector, and means associated with said last named sector yieldingly opposing movement of said valve in response to flow of fluid in said direction, said means including a resilient member having one end connected to said last named gear sector and a lock member carried by said governor and adjustable toward and away from said second gear sector to which the other end of said resilient member connects.

20 7. In a governor, a housing having a fluid passage, a control valve therein movable toward passage closing position in response to flow of fluid through said passage in one direction, a lever driven from said valve, and a pair of separate yielding means resisting movement of said lever in response to passage closing movement of said valve, one of said yielding means having a fixed point of engagement with said lever and the other yielding means having a movable point of engagement with said lever, and both of said means exerting a progressively increasing pressure on said lever as it is advanced by said movement.

rate yielding means resisting movement of said lever in response to passage closing movement of said valve, one of said yielding means having a fixed point of engagement with said lever, and the other of said means pressing upon said lever at an increasingly greater distance from its fulcrum as it moves in response to said passage closing movement.

8. In a governor, a housing having a fluid passage, a control valve therein movable toward passage closing position in response to flow of fluid through said passage in one direction, a lever driven from said valve, and a pair of separate yielding means resisting movement of said lever in response to passage closing movement of said valve, one of said yielding means having a fixed point of engagement with said lever and the other yielding means having a movable point of engagement with said lever, and both of said means exerting a progressively increasing pressure on said lever as it is advanced by said movement.

ALFONS A. ALTENBERG.

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