Aug. 26, 1924. 1,506,588

J. HURST

GOVERNOR

Filed July 8, 1920

Fig. 1.

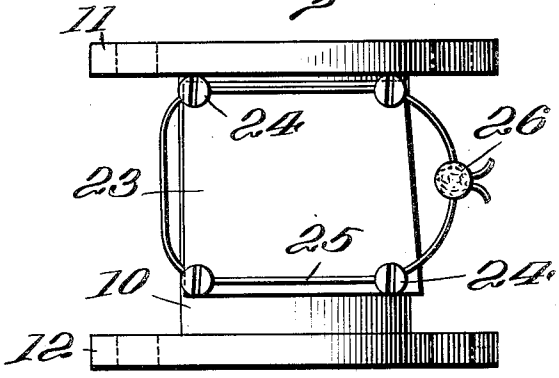


Fig. 2.

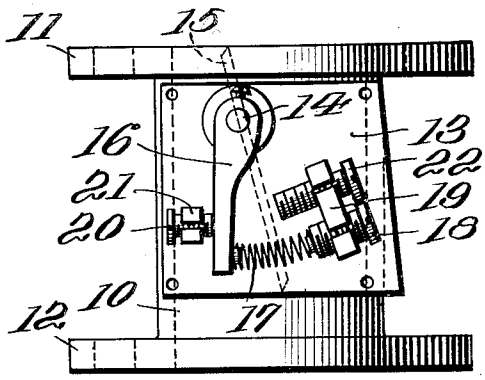


Fig. 3.

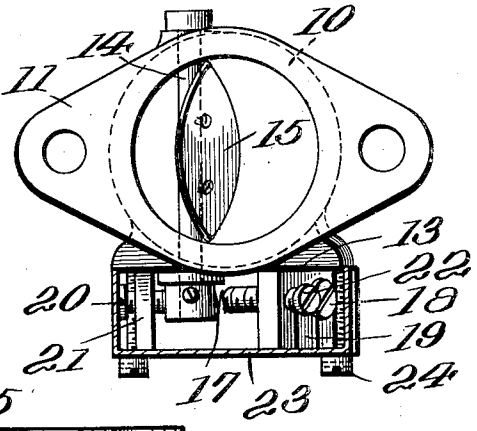
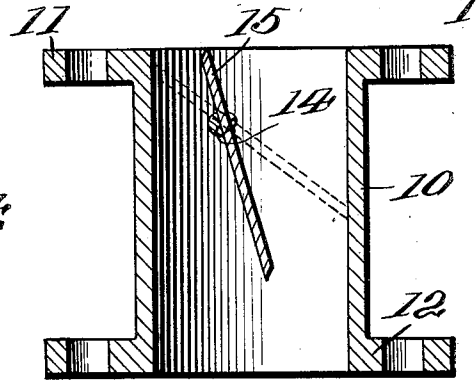


Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES HURST, OF SAN FRANCISCO, CALIFORNIA.

GOVERNOR.

Application filed July 8, 1920. Serial No. 394,852.

To all whom it may concern:

Be it known that I, JAMES HURST, a citizen of the United States, residing at San Francisco, in the county of San Francisco and State of California, have invented a new and useful Governor, of which the following is a specification.

This invention is a device for automatically regulating the speed of an engine of the internal combustion type.

One of the objects of the invention is to provide a governor, the operation of which is controlled solely by variations in the velocity of the inflowing explosive mixture. A further object is to provide a governor of the type mentioned, in which the control member is in the form of a pivotally mounted butterfly valve, having its lower portion normally maintained at such an angle that the traveling mixture will impinge thereagainst, whereby the valve will start to close when the speed of the mixture is too great, and will thereby cut down the motor speed by obstructing the flow of the mixture. A further object is to provide means whereby the incident angle of the valve may be varied. A further object is to provide means for normally maintaining the valve at the angle to which it is adjusted.

The invention will be hereinafter fully set forth and particularly pointed out in the claims.

In the accompanying drawing:—

Figure 1 is a side elevation illustrating a governor constructed in accordance with the invention. Figure 2 is a similar view with the cover for the control parts removed. Figure 3 is a top plan view and Figure 4 is a longitudinal sectional view.

Referring to the drawing, 10 designates a casing provided with a central bore or chamber, and with flanges 11 and 12, by means of which it may be connected to the manifold of an internal combustion engine. Said casing is preferably provided with a flattened face 13, as shown.

Extending transversely through the casing is a rock shaft 14, having one end projecting through the flattened portion 13. Secured to the shaft 14, in any suitable manner, is a butterfly valve 15 of well-known type. Mounted on the projecting end of the shaft 14, is a regulating arm 16, normally held against movement by a set screw. The lower end of the arm 16 is engaged by a spring 17, interposed between the arm and an adjustable abutment screw 18, mounted in a lug 19, projecting from the face of the casing. Spring 17 acts to hold the arm 16 against an adjustable stop 20, illustrated as consisting of a screw mounted in a lug 21, projecting from the face of the casing. A second stop screw 22 is adjustably mounted in the lug 19, the same being positioned to limit movement of the arm 16 away from the stop 20.

The arm 16, spring 17, adjustable abutment 18, and the stops 20 and 22 are preferably enclosed by a cover 23, which is secured in place by means of screws 24, the heads of which are provided with transverse bores, through which is extended a wire 25, the ends of which are connected by a seal 26.

In practice the abutment 18 is adjusted to produce sufficient tension upon the spring 17 to normally hold the arm 16 against the stop 20. Said stop 20, is adjusted to arrest movement of the arm 16 in a position to maintain the valve 15 at an angle to the bore of the casing 10. The stop 22 is then adjusted to arrest movement of the arm 16 away from the stop 20 and thereby limit the closing movement of the valve. After the desired adjustments have been made the cover 23 is secured in position, and the sealing wire 25 connected with the screws 24, and sealed to prevent unauthorized tampering with the adjustments.

It will be observed that the butterfly valve is supported on its axis in an off-center position, in such a manner that the lower half will have the necessary additional surface to make its angle of incidence effective. When the intake gases strike the angle of incidence, at a speed sufficient to move the valve, the latter will start to close, and thereby obstruct the passage of said gases, and this in turn will cut down the motor speed, the valve moving against the pressure of the spring 17. The incident angle of the valve is variable by adjusting the position of arm 16. This may be accomplished by loosening the set screw and swinging the arm on the shaft 14 until the desired angle is reached, and again tightening the screw. An increase in the angle of the valve requires less gas velocity to close it and a decrease has the opposite effect. The spring 17 serves

to open the valve upon the slightest drop in the velocity of the gas. For instance, assuming that the valve is adjusted to such an angle that a motor running 1,000 R. P. M. would cause sufficient gas velocity to start it to close. If the spring were not present the valve will be immediately closed and would remain so until the motor had dropped to a very low speed. The effect of the pressure of the spring however, is to force the valve back to its normally open position upon the slightest drop in the gas velocity. The angle of incidence of the valve is maintained to insure initiation of closing movement, but of course after the valve starts to close, the spring tension must be overcome to complete the closing operation. It must be understood that after the valve has once started to close, the tendency to complete the operation is naturally greater than before, due to the increase of the incident angle, which causes more pressure and at the same time requires less gas velocity. Therefore, it is necessary to introduce the spring to exert pressure in the opposite direction, to offset the additional pressure on the butterfly, and to balance the operation so that the valve will perform its functions at a constant or very slightly increased gas velocity. The closed position of the valve allowing the maximum motor speed desired is regulated by means of screw 22. Slight adjustments of the incident angle of the valve are accomplished by means of the screw 20 acting against the arm 16.

Having thus explained the nature of the invention and described an operative manner of constructing and using the same, although without attempting to set forth all of the forms in which it may be made, or all of the forms of its use, what is claimed is:—

1. A governor of the character described comprising a casing, a shaft extending transversely through the casing, a butterfly valve connected to said shaft within the casing and having its wings in alignment, an external arm secured to said shaft, a spring having one end engaging and pressing against said arm, an external lug carried by the casing and having an abutment for the other end of said spring, a stop positioned exteriorly of the casing to limit movement of said arm under the influence of the spring, whereby the valve when open is held at an angle to the bore of the casing, and a second stop adjustably mounted in said external lug and positioned to limit movement of the arm in the other direction, whereby closing movement of the valve may be interrupted at any desired point.

2. A governor of the character described comprising a casing, a shaft extending transversely through the casing, a butterfly valve connected to the shaft within the casing and having its wings in alignment, an external arm secured to the shaft, a spring having one end engaging and pressing against said arm, an external lug carried by the casing and having an abutment for the other end of said spring, a stop screw adjustably mounted exteriorly on said casing and positioned to limit movement of the arm in one direction under the influence of said spring, whereby the valve when open is held at an angle to the bore of the casing, and a second stop adjustably mounted in said external lug and positioned to limit movement of the arm in the other direction, whereby closing movement of the valve may be interrupted at any desired point.

3. A governor of the character described comprising a casing, a shaft extending transversely through the casing, a butterfly valve carried by said shaft within the casing and having its wings in alignment, an external arm secured to said shaft, a spring bearing at one end against said arm, an external lug carried by said casing, a screw adjustably mounted in said lug and engaging the other end of the spring, a stop positioned exteriorly of the casing to limit movement of said arm in one direction under the influence of said spring, whereby the valve when open is held at an angle to the bore of the casing, and a second stop adjustably mounted in said lug and positioned to limit movement of the arm in the other direction, whereby closing movement of the valve may be interrupted at any desired point.

4. A governor of the character described comprising a casing, a shaft extending transversely through the casing and provided with a butterfly valve located in the casing, an external arm radially adjustable on said shaft, a set screw holding said arm in any adjusted position, a spring acting against said arm, a stop positioned to limit movement of said arm in one direction under the influence of said spring whereby the valve when open is held at an angle to the bore of the casing, and a second stop positioned to limit movement of the arm in the other direction.

5. A governor of the character described comprising a casing, a shaft extending transversely through the casing and provided with a butterfly valve located in the casing, an external arm secured to said shaft, a spring bearing at one end against said arm, an adjustable screw supported by said casing and engaging the other end of said spring, a stop screw adjustably supported by said casing and positioned to limit movement of said arm in one direction under the influence of said spring whereby the valve when open is held at an angle to the bore of the casing, and a second stop screw adjustably supported by the casing and positioned to limit movement of the arm in the other direction.

6. A governor of the character described comprising a casing provided with a bore and a flattened face, a shaft extending transversely through the casing and provided with a butterfly valve located in the casing, an external arm secured to said shaft and extended over said flattened face, means positioned on said flattened face and co-operating with said arm for maintaining the valve at an angle to the bore of the casing, a cover, and means whereby the cover may be secured to the flattened face over said arm and said co-operating means.

7. A governor of the character described comprising a casing provided with a bore and a flattened face, a shaft extending transversely through the casing and provided with a butterfly valve located in the casing, external means on the squared portion of the casing co-operating with said shaft to control the angular position of the valve, a cover for said external means, screws for securing said cover to the squared portion of the casing, and a sealing wire passed through said screws.

In testimony whereof I have hereunto set my hand.

JAMES HURST.