July 22, 1924. 1,502,476

B. T. McCANNA ET AL

GAS ENGINE GOVERNOR

Filed Nov. 15, 1920

Fig. 1

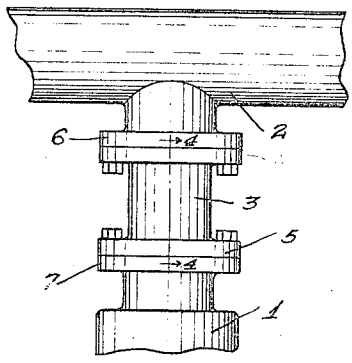


Fig. 4

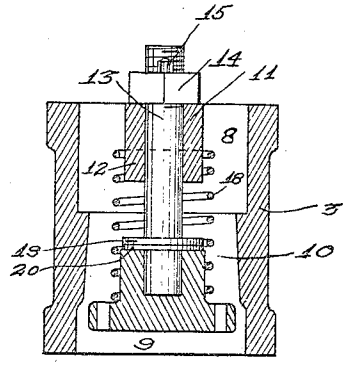


Fig. 2

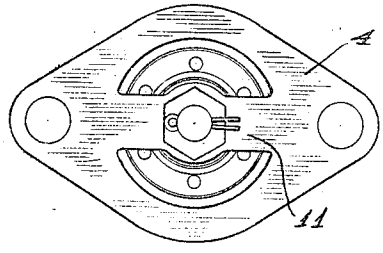


Fig. 5

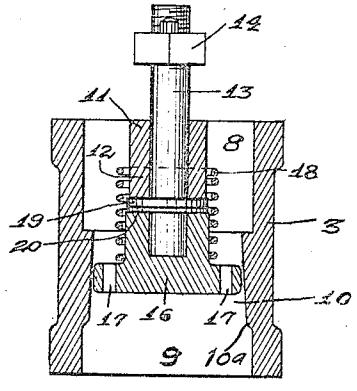
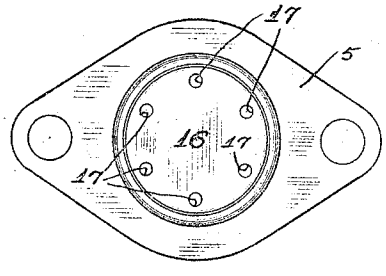


Fig. 3



Witnesses

Rudolph J. Berg.

Charles W. Fields Jr.

By

Inventor

BENJAMIN T. McCANNA

EMIL R. KLEMM.

Charles W. Fields

Atty

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UNITED STATES PATENT OFFICE.

BENJAMIN T. McCANNA AND EMIL R. KLEMM, OF CHICAGO, ILLINOIS.

GAS-ENGINE GOVERNOR.

Application filed November 15, 1920. Serial No. 424,323.

To all whom it may concern:

Be it known that we, BENJAMIN T. McCANNA and EMIL R. KLEMM, citizens of the United States, and residents of the city of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Gas-Engine Governor, and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the numerals of reference marked thereon, which form a part of this specification.

This invention embodies improvements in the gas engine governor disclosed in U. S. Letters Patent #1,298,068, which was granted to us on March 25th, 1919, and relates to a governor mechanism for internal combustion engines and particularly to a governor mechanism which is actuated by the dynamic effects of the inflowing fuel mixture to control the quantity of the same entering the combustion chambers of the engine, whereby the maximum output thereof is limited.

The present invention provides an arrangement whereby automatic compensation for the increased spring compression near the limiting point is attained, and also provides for a positive and convenient adjustment to a desired limiting point.

It is an object of this invention to provide a spring controlled governor for internal combustion engines which is adapted to limit the quantity of fuel mixture delivered thereto and in which the maximum limitation may be varied by the addition of regulating means of predetermined size.

It is also an object of this invention to provide a governor for internal combustion engines in which a control valve is slidably mounted in a tapered chamber intermediate inlet and outlet chambers of greater diameter than said tapered chamber in such a manner that the governing movement is promptly effected when the limiting point is reached.

It is a further object of this invention to provide a valve adapted to automatically limit the amount of fuel mixture flowing through an inlet conduit, the limiting movement of said valve being varied by the insertion of means to prevent closure thereof.

It is an important object of this invention to provide a governor adapted to act in conjunction with inflowing fuel mixture to limit the maximum output of an internal combustion engine and at the same time to add to the homogeneity of said fuel mixture.

It is finally an important object of this invention to provide an efficient governor for internal combustion engines which is of simple construction and which may be positively adjusted.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

The invention (in a preferred form) is shown on the drawings and hereinafter more fully described.

On the drawings:

Figure 1 is a side elevation of a fuel mixture inlet conduit of an internal combustion engine showing the same equipped with the governor mechanism of this invention.

Figure 2 is a top plan view of the governor mechanism of this invention.

Figure 3 is a bottom plan view of the same.

Figure 4 is an enlarged section on the line 4—4 of Figure 1.

Figure 5 is a view similar to Figure 4 showing the control valve in extreme limiting position.

As shown on the drawings:

The governor mechanism of this invention is adapted to be interposed between the carbureter outlet 1 and the intake manifold 2 of an internal combustion engine and comprises a cylindrical casing 3 which is provided at its upper and lower ends with flanges 4 and 5 respectively, which are adapted to be secured to flanges 6 and 7 whereby said cylinder is connected to said carbureter outlet and to the intake manifold. In the upper and lower ends of said casing 3 are chambers 8 and 9 respectively, and connecting said chambers 8 and 9 is a cham-

ber 10 which tapers gradually from a somewhat abrupt shoulder 10^a towards the chamber 8, as clearly shown in Figures 4 and 5. Integral with the flange 4 and extending transversely of the chamber 8 is a supporting member 11 which is apertured and provided with an integral inwardly extending boss 12 at a point opposite the center of said chamber 8. Slidably mounted in the aperture in the member 11 is a rod 13 and said rod 13 is threaded at its outer end and has a nut 14 engaged on said threaded end whereby the downward movement of the rod through the aperture in the member 11 is limited. For holding said nut 14 in adjusted position on the center portion of the rod 13 a cotter pin 15 is ordinarily inserted through an aperture in the threaded end of said rod in the usual manner. The inner end of said rod 13 extends downwardly into the tapered chamber 10 and has secured thereon a valve 16 which has a plurality of apertures 17 therein. A coil spring 18 is engaged around the rod 13 between the transverse member 11 and said valve 16 and acts to normally hold said valve 16 and rod 13 in the position shown in Figure 4, and which resists the outward movement on said valve caused by the dynamic effect of the fuel mixture flowing through the chambered casing 3. This outward movement of the valve 16 of course tends to close the tapered chamber 10 to the passage of fuel mixture, and said closing action is limited by the abutting of the hub of the valve 16 against the inwardly extending boss 12 on the transverse member 11. In order to regulate this closing action of the valve 16, washers 19 and 20 may be engaged on the rod 13 adjacent the outer end of said valve and the closing action of the valve will depend upon the thickness and number of said washers.

The operation is as follows:

Fuel mixture leaving the carbureter of an internal combustion engine is normally drawn by suction into the intake manifold of said engine and since the governor of this invention is interposed between the mixture outlet of the carbureter and said intake manifold, the valve 16 of the governor mechanism is affected by the dynamic effect of the moving fuel mixture and is moved in the tapered chamber 10 until the outer end thereof abuts the boss 12 on the transverse member 11, whereupon the maximum quantity of fuel mixture admitted and consequently the maximum output or speed of the engine is determined. When the engine is running at normal speeds the valve 16 is in the position shown in Figure 4 and the fuel mixture flows freely through the governor around said valve and through the passages 17 therein, the dynamic effect thereof not being sufficient to compress the spring 18. When, however, the limiting point is approached the valve is forced upwardly to a position opposite the shoulder 10^a formed at the junction of the chambers 9 and 10 and because of the abrupt constriction of the passage around said valve, the spring 18 is quickly compressed and the valve promptly moved into limiting position.

It will thus be seen that the tapered chamber provides in effect a means whereby proper compensation for the increased compressive effort needed to finally close the valve is attained. This is a feature which is particularly valuable in the case of the smaller type engines wherein a lag in the governing effect has to be overcome. In this improved construction the quick final movement of the valve into limiting position due to its resistance to the flow of fuel mixture in the tapered chamber effectually overcomes the lagging. This limitation of maximum output may of course be varied by interposing one or more washers 19 or 20 on the rod 13 between the inner end of said valve and the boss 12 whereby the range of said valve in the tapered chamber 10 is limited. These washers 19 or 20 may be of a predetermined size so that the addition of each washer will provide for a predetermined increase in engine speed. By making the chamber 9 of greater diameter than the tapered chamber 10, the inflowing fuel mixture is deflected towards the center of said tapered chamber and is thus thoroughly mixed before it enters the intake manifold of the engine. The apertures 17 in the flange of the valve 16 provide for the admission of a definite quantity of fuel mixture at all times regardless of the position of said valve.

The construction provided by this invention is simple and economical and the device affords a convenient and easily adjustable means for automatically regulating the speed or the maximum output of an internal combustion engine.

We are aware that numerous details of construction may be varied through a wide range without departing from the principles of this invention, and we therefore do not purpose limiting the patent granted otherwise than necessitated by the prior art.

We claim as our invention:

1. A governor device, comprising a casing, a tapered chamber therein, a chamber at the intake end of said casing of larger diameter than said tapered chamber and connected thereto by a shoulder, and a governor valve normally below said shoulder and movable in said casing past said shoulder, the diameter of said valve being substantially the same as that of the lower larger end of said tapered chamber.

2. A governor device, comprising a casing, a tapered chamber therein, a chamber

at the intake end of said casing of larger diameter than said tapered chamber and connected thereto by a shoulder, and a spring-controlled governor valve normally below said shoulder and movable in said casing past said shoulder, the diameter of said valve being substantially the same as that of the lower larger end of said tapered chamber.

In testimony whereof we have hereunto subscribed our names in the presence of two subscribing witnesses.

BENJAMIN T. McCANNA.
EMIL R. KLEMM.

Witnesses:
CARLTON HILL,
EARL M. HARDINE.