J. C. L. KREBS AND W. W. WELLS.

VARIABLE SPEED GOVERNOR CONTROL.

APPLICATION FILED NOV. 18, 1918.

1,325,478. Patented Dec. 16, 1919.

FIG - 3 -

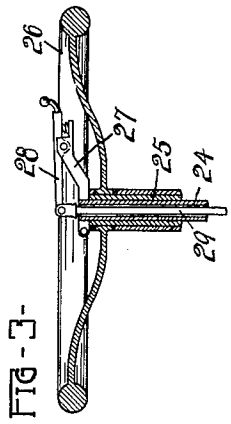
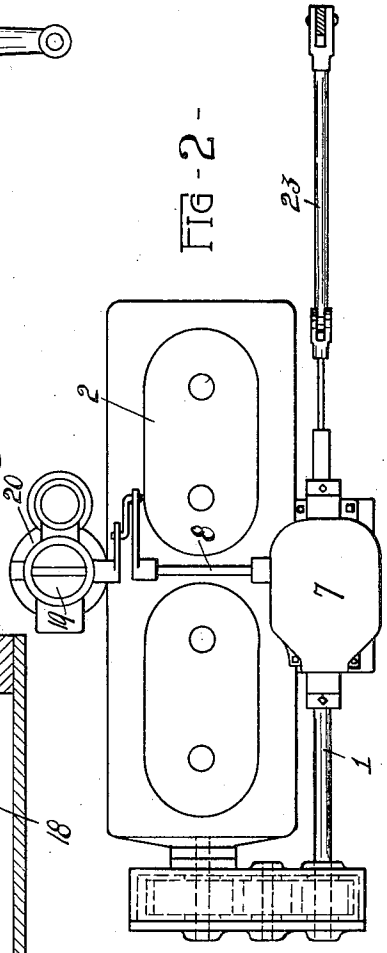


FIG - 1 -

FIG - 2 -



INVENTOR

John C. L. Krebs,
Walter W. Wells,
By Owen, Owen & Crampton,
Their attys.

UNITED STATES PATENT OFFICE.

JOHN C. L. KREBS AND WALTER W. WELLS, OF CLYDE, OHIO.

VARIABLE-SPEED-GOVERNOR CONTROL.

1,325,478. Specification of Letters Patent. Patented Dec. 16, 1919.

Original application filed April 7, 1916, Serial No. 89,565. Divided and this application filed November 18, 1918. Serial No. 263,062.

To all whom it may concern:

Be it known that we, JOHN C. L. KREBS and WALTER W. WELLS, citizens of the United States, and residents of Clyde, in the county of Sandusky and State of Ohio, have invented a certain new and useful Variable-Speed-Governor Control; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawing, and to the characters of reference marked thereon, which form a part of this specification.

This invention relates to variable speed governors of the centrifugal type, and particularly to control means therefor.

The object of this invention is to provide a simple and efficient governor control which is easily and quickly adjustable to vary the speed of running of the associated engine and which renders the governor accurate at low speeds as well as at high speeds.

In the use of governors of this class it will be borne in mind that the force exerted by the governor weights is very much greater at high speed than at low speed, since centrifugal force varies with the square of the R. P. M., and consequently the increase in such force, as the weights move from inner to outer position, is correspondingly greater. Accordingly, the spring which is employed to resist the outward movements of the governor weights must be so designed as to balance the centrifugal force under all conditions. This was accomplished in an earlier invention described and claimed in Patent No. 1,117,759, dated November 17, 1914, by so changing the position or relation of the spring with respect to the weights that the leverage with which it acted on the weights was greater at high speeds. In the present instance, the relation of the spring to the governor weights remains the same, but the spring is designed so that its stiffness may be adjusted by changing the effective length thereof.

The invention is fully described in the following specification, and while, in its broader aspect, it is capable of embodiment in numerous forms, a preferred embodiment thereof is illustrated in the accompanying drawings, in which,—

Figure 1 is a sectional view of a governor equipped with the invention with the control part in slow speed running position. Fig. 2 is a plan of an engine of the internal combustion type equipped with the invention, and Fig. 3 is a section of an automobile steering wheel with the governor control parts associated therewith.

This application is filed as a division of our former application Serial No. 89,565, filed April 7, 1916.

Referring to the drawings, 1 designates the governor shaft, which, in the present instance, is geared or connected in any suitable manner to the crank shaft of an associated engine 2. 3 designates the governor weights which are pivotally carried by arms 4, fixedly projecting from opposite sides of the shaft 1, whereby the weights are permitted to have swinging movements in planes which are longitudinal of the shaft, as is well understood in the art. The weights 3 have arms 5 projecting inwardly from their inner ends toward the shaft 1 for contact with an end of a sleeve 6 that is mounted for free sliding movements on the shaft 1. The contact of the sleeve 6 with the weight arms 5 is such, in the present instance, that an outward movement of the weights will cause the sleeve to have movement to the right of the shaft.

The governor housing is designated 7, and mounted in suitable bearings in this housing, transverse to the shaft 1, adjacent to the outer end of the sleeve 6, is a rock shaft 8 having an arm 9 projecting upward therefrom and in contact with the outer end of said sleeve. The arm 9 is preferably forked to adapt it to straddle the shaft 1. The rock shaft has another arm 10 projecting therefrom at an angle to the arm 9 and cooperating with said first arm to form a bell-crank lever, and the outer end of the arm 10 is connected by a link 11 to the free end of a spring 12.

This spring is of multiple leaf bar form and is mounted on a rocker member 13, which has an arm 14 projecting from its rocker axis toward the link connecting end of the spring and on which a greater or less portion of the length of the spring may rest as the arm is raised or lowered upon a rocking of the member 13. The spring 13 is fixed at its rear end, or that opposed to the link connecting end thereof, to the rear end portion of the rocker member 13, in the pres-

ent instance, by a screw 15 and is disposed at the side of the rocker member adjacent to the shaft 1, the spring being substantially parallel to such shaft. The rocker member 13 is mounted on a rock-shaft 16 disposed at one side of the spring, and has an arm 17 projecting downwardly from its rear end and connected to a control rod 18, which projects forwardly therefrom through a suitable bearing in the governor housing and has connection with a suitable control means.

It is evident that an upward swinging of the arm 13 from the position shown in Fig. 1, which is its slow speed position, causes an increase of the spring tension due to the spring straightening out and resting on the flat surface of the arm and a consequent reduction in length of the effective portion of the spring. For instance, if the arm 14 of the rocker member is in parallel relation to the spring 12 so that the spring rests on the entire length of said arm, it is apparent that the effective length of the spring would only be the portion thereof projecting beyond the supporting arm.

The rock shaft 8 is connected in a suitable manner to a throttle valve 19, which, in the present instance, forms a part of the carbureter 20 of the engine 2. A rotation of the shaft 8 occasioned by an outward movement of the sleeve 6 is intended to impart a closing movement to the throttle valve thereby limiting the flow of operating fluid to the engine cylinders.

In order that the movement of the control rod 18 may be controlled by the driver of an automobile without leaving his seat in the same, a simple mechanism is illustrated for such purpose. This mechanism comprises a set of bevel gears 21 which are disposed at the lower end of the steering wheel column, one bevel gear having an arm 22 projecting radially therefrom and connected to the outer end of the rod 18 through the medium of a link 23, and the other beveled gear being fixed to the lower end of a shaft 24 that is mounted for rotary movement in the steering shaft 25, to which the hand steering wheel 26 is attached. The shaft 24 extends without the upper end of the steering shaft 25 and is provided at such end with a control arm 27. A lever member 28 is fulcrumed to the arm 27 and has its inner end attached to the upper end of a rod 29, which extends down through the shaft 24 and attaches at its lower end to a latch lever 30, which is fulcrumed to the outer end portion of the bevel gear 21, attached to the shaft 24. The free end of the latch lever 30 is adapted to engage within any one of a series of notches on a segmental rack 31, which is fixed to a stationary part of the steering column.

It will be understood in the operation of this invention that by moving the control rod 18 forward from the slow speed position shown in Fig. 1, the spring 12 is shortened to a greater or less extent depending on the degree of rocking movement imparted to the rocker member 13, and it is accordingly stiffened to balance the increased centrifugal force of the governor weights when revolving at high speed, thus enabling the desired maximum speed of running to be obtained by the adjustment of the rocker member. It will also be understood that the normal position of the throttle control rock shaft 8 is such that the throttle will be in open position, the closing of the throttle to effect a slowing down of the engine being effected by an outward movement of the sleeve 6 under the centrifugal action of the governor weights 3 against the tension of the spring 12.

We wish it understood that our invention is not limited to any specific construction, arrangement or form of the parts, as it is capable of numerous modifications and changes without departing from the spirit of the claims.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent, is:—

1. In an engine, a governor, a throttle control lever movable by the governor when actuated by a rotation of its shaft, a bar spring connected to said lever to resist a movement thereof by the governor, and control means carrying said spring and mounted for rocking movements to vary the flexibility of the spring.

2. In an engine, a governor, a throttle control lever movable by the governor when actuated by a rotation of its shaft, a manually operable rocker member, and a bar spring fixed at one end to said member and having its other end connected to said lever to resist a movement thereof by the governor, the effective length of said spring being varied by a rocking movement of said member.

3. In an engine, a governor, a throttle control member movable by said governor when actuated by a rotation of its shaft, a manually controlled rocker element having an elongated surface, and a bar spring mounted on said surface and fixed at one end thereto and connected at its other end to said member to resist a movement thereof by the governor, the flexibility of said spring being determined by a rocking of the lever to vary the length of the portion of the spring having supporting contact with said surface.

4. In an engine, a governor, a throttle control member movable by said governor when actuated by a rotation of its shaft, a bar spring substantially parallel to the governor shaft and having one end connected

to said member, a rocker element fixed to the other end of said spring and having an elongated spring contacting surface whereby a movement of said element from one position will effect a flexing of the spring from normal position and a movement of a portion of the spring contacting surface of said element away from the spring will vary the effective length of the spring.

5. In an engine, a governor, a throttle control lever movable by said governor when actuated by a rotation of its shaft, a bar spring connected at one end to said lever to resist a movement thereof by the governor, and a member carrying the spring and forming a lateral support therefor for a considerable portion of its length and being manually movable to vary the length of the portion of the spring having supporting contact therewith whereby to vary the flexibility of the spring.

6. In an engine, a governor, a throttle control rock shaft transverse to the governor shaft, a lever fixed to said rock shaft and movable by said governor when actuated by a rotation of its shaft, a bar spring disposed in transverse relation to said rock shaft and having one end connected to said lever to resist a movement thereof by the governor, and a member carrying the spring and to which the other end thereof is fixed, said member forming a lateral support for the spring for a considerable portion of its length and being manually movable to vary the length of the portion of the spring having supporting contact therewith whereby to vary the flexibility of the spring.

In testimony whereof, we have hereunto signed our names to this specification.

JOHN C. L. KREBS.
WALTER W. WELLS.