B. G. KRAMER.

HYDROCARBON ENGINE GOVERNOR.

APPLICATION FILED FEB. 3, 1912. RENEWED AUG. 22, 1914.

1,127,645.

Patented Feb. 9, 1915.

2 SHEETS—SHEET 1.

Fig. 1

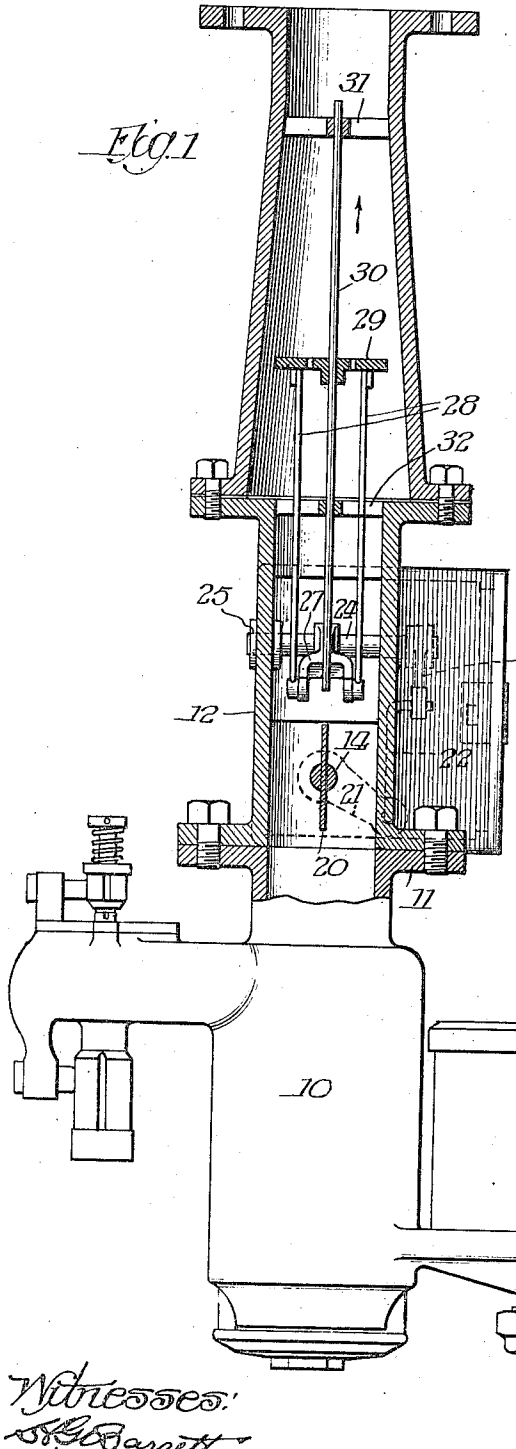
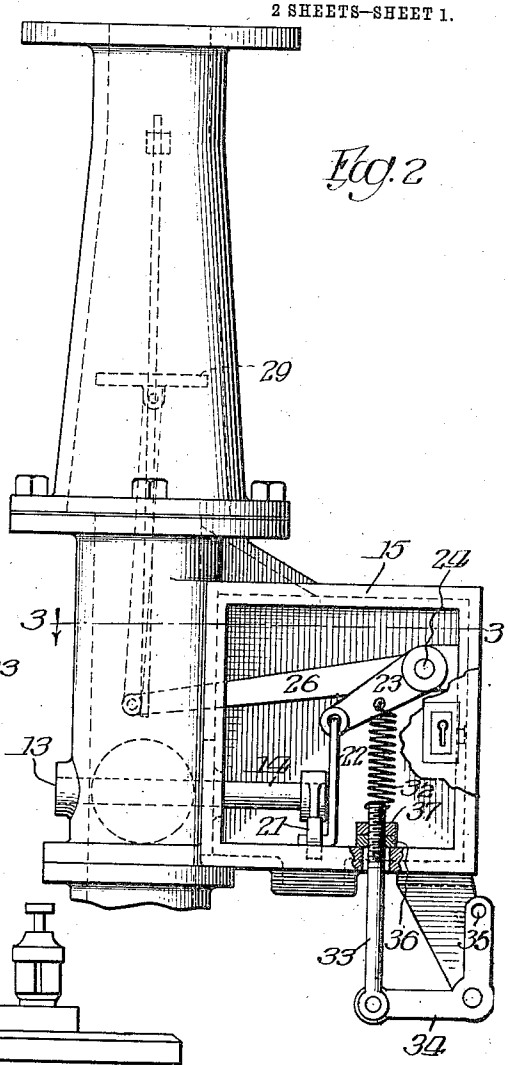


Fig. 2



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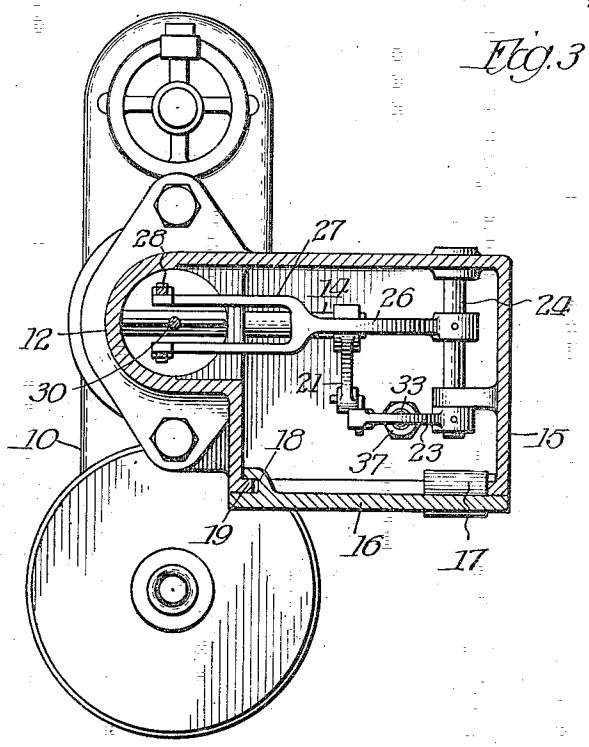
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2 SHEETS—SHEET 2.

Fig. 3



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UNITED STATES PATENT OFFICE.

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HYDROCARBON-ENGINE GOVERNOR.

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To all whom it may concern:

Be it known that I, BENJAMIN G. KRAMER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented new and useful Improvements in Hydrocarbon-Engine Governors, of which the following is a specification.

My invention relates to hydro-carbon engines and has particular reference to a novel governor for attachment thereto.

In the construction of hydro-carbon engines for use on automobiles and particularly for use on heavy commercial trucks it is desirable that a governor shall be installed, first, in order to provide a check which shall restrain the driver from exceeding a predetermined speed and further, to provide against the racing of the engine due to inefficient handling with consequent increase in operating expenses. I am aware that many governors have been suggested, many of which are deficient within certain limits. I believe I am the first, however, to provide a governor which shall be absolutely automatic in action—which shall utilize the force of the incoming charge as the controlling agent, which shall be instant in response to slight changes in engine speed and which shall be arranged to permit throttling of the engine to its lowest point irrespective of the governor. Furthermore, I believe I am the first to provide in connection with a governor an arrangement which may be inclosed and locked against tampering by the operator.

As will be seen my governor includes an intake conduit of unequal area at different points. The variable area of intake is secured by the use of a pipe or coupling which is flared, that is, a longitudinal section outlines a truncated cone.

My invention will be more readily understood by reference to the accompanying drawings, wherein,

Figure 1 is a vertical section through a device constructed in accordance with my invention; Fig. 2 is a side elevation of the same with the removable cover for the adjusting mechanism partly broken away; Fig. 3 is a transverse section on the line 3—3 of Fig. 2.

It will be understood that my device may be applied to any well known form of hydro-carbon engine, the application being made to the intake manifold between the carbureter and the cylinders. In the construction shown the carbureter 10, which may be of any preferred construction, is provided on its upper edge with an attaching flange 11, to which my novel governor is secured. This governor may be as shown formed in two parts, that is, a lower portion containing the actuating levers and throttle and an upper portion or coupling which is flared, although it would be practical and possible to form these parts integral. However, in the construction shown, the lower portion is formed of a single casting having a conduit 12 provided with bearings 13, within which bearings is mounted a short shaft 14. This shaft extends through one of the bearings and projects into an integral box 15, open on one side, which opening is preferably closed by a separable door 16, having a lock 17 thereon. In place of hinges I may form a lug 18 on the inside of the door, this lug being undercut and coöperating with a flange 19 on the box to form a substitute for a hinge and at the same time securely interlock the parts when in closed position. The shaft 14 carries the throttle 20, the shaft having on its ends projecting into the box, a lever 21, to which is attached a link 22, the upper end of the link coöperating with a rocker 23, secured to a shaft 24 mounted in bearings 25 in the member 12. Also rigid with the shaft 24 is a lever 26, to the free end of which is secured a yoke 27. To the bifurcated ends of the yoke 27 are secured links 28 supporting at their upper ends a piston 29, arranged for vertical movement within the flared upper portion of the device. This piston 29 is guided by means of a rod 30, secured to the piston, this rod passing through an opening in a cross-bar 31, at the top and a similar bar 32 at the bottom, the latter bar being formed with the lower member 12. It will thus be seen that the piston 29 is permitted extended movement in a direct vertical line. In order to provide the governing feature I attach to the rocker 23 a coiled contractile spring 32, the lower end of the spring being secured to a rod 33, which rod is pivoted to a rocker 34, and at its reverse end has an opening 35, to which is attached the throttle rod, not shown, extending from

the steering post of the machine. On the rod 33 I provide an adjusting nut 36 and a lock nut 37.

The operation of the device as heretofore described, is as follows: Assuming the device to be connected to a hydrocarbon engine and the different parts to be in the positions shown in the drawings, if it is desired to start the engine it will be seen that a full throttle opening is provided. At once after the starting of the engine the suction of the incoming gases in the direction of the arrow (Fig. 1), tends to elevate the piston 29 and through the connecting parts close the throttle 20. Should the speed be increased, of course, the suction tends to still further elevate the piston 29 and still further close the throttle 20 until the speed is reduced to the desired point. The elevation of the piston 29 is opposed to the spring 32 and the tension on the spring determines the greatest speed at which the engine may run, that is, determines the extent to which the piston 29 may be elevated. If the adjusting nut 36 be turned up thereby permitting greater tension to be placed on the spring 32, the incoming gases cannot elevate the piston 29 without overcoming greater resistance by the spring, that is, assuming that the rod 33 has been lowered as far as permitted by the nut 36. Of course, should the operator wish to run the engine more slowly than is contemplated, the rod 33 may be elevated, the tension on the spring reduced and thereby permitting the piston 29 to be further elevated by the force of the incoming charge.

It will be obvious that by the arrangement shown, that is, with the spring and adjusting nut all inclosed within the box, the highest speed at which the engine may be run may be regulated and placed out of the control of the operator. Thus any desired speed of the vehicle may be determined by its owner and this speed cannot be exceeded by the driver without change in the adjustments, and as the means for adjusting are locked such change cannot be made. The advantage in this construction lies in the fact that the driver is not limited as to the development of power. In case the load is increased due to changes in the elevation of the road, etc., the engine will slow down and thus as the force of the incoming charge decreases the throttle will be opened permitting the entrance of more fuel.

It is obvious that the construction shown is only typical of many forms wherein the incoming charge is used as the regulating force and wherein the extent of cut-off of the charge may be predetermined and so arranged as to be unchangeable by the operator.

It is further obvious that many modifications may be made in the construction described, all without departing from the spirit of my invention.

I claim:

1. The combination with a throttle for governing the speed of a motor, of controlling mechanism therefor which comprises adjustable means for limiting the speed of the motor and automatic means and manually operable means for controlling the throttle within the limit set by the limiting means, and means for preventing tampering with the adjustment of the means for limiting the speed of the motor.

2. In a governor, the combination of a conduit having a piston therein arranged to change the effective area of said conduit, a throttle valve, said piston and throttle valve being operatively connected, a spring tending to maintain said throttle valve in non-throttling position, the parts being arranged whereby the force of the incoming charge upon the piston causes the shifting of said throttle valve against the resistance of said spring, substantially as described.

3. In a governor, the combination of a conduit having different transverse areas at different points in its length, a piston working in the conduit, a throttle valve, said piston and throttle valve being operatively connected, a spring tending to maintain the throttle valve in non-throttling position, the parts being arranged whereby the force of the incoming charge upon the piston is utilized to cause shifting of the throttle valve against the force of said spring, and means for regulating the resistance of said spring, substantially as described.

4. In a governor, the combination of a conduit having different transverse areas at different points in its length, a piston working in said conduit, a throttle valve, said piston and throttle valve being operatively connected, a spring tending to maintain said throttle valve in non-throttling position, the parts being arranged whereby the force of the incoming charge upon the piston is utilized to cause shifting of said throttle valve against the force of said spring, means for regulating the resistance of said spring, and a casing inclosing the connecting parts between the piston and the throttle valve, including the adjusting means, and preventing unauthorized access thereto.

5. The combination with a conduit leading from a carbureter to an internal explosive engine and a throttle therein, of a piston in the conduit and movable therein under the influence of the explosive charge passing therethrough, means connecting the piston and throttle for moving said throttle toward its closed position by movement of the piston, and a casing inclosing said means and preventing unauthorized access thereto.

6. A governor for internal explosive en-

gines, comprising a piston subject to and actuated by the incoming explosive charge, means for connecting the piston with the throttle valve of an explosive engine for controlling the throttle valve by movement of the piston, a tension device yieldingly resisting movement of the piston by the charge, means for adjusting the tension of said tension device, and a casing inclosing the adjusting means and preventing unauthorized access thereto.

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