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W. W. WAKELEE ET AL.

HYDRAULIC GOVERNOR FOR HYDROCARBON ENGINES

Filed June 30, 1921

Fig. 1

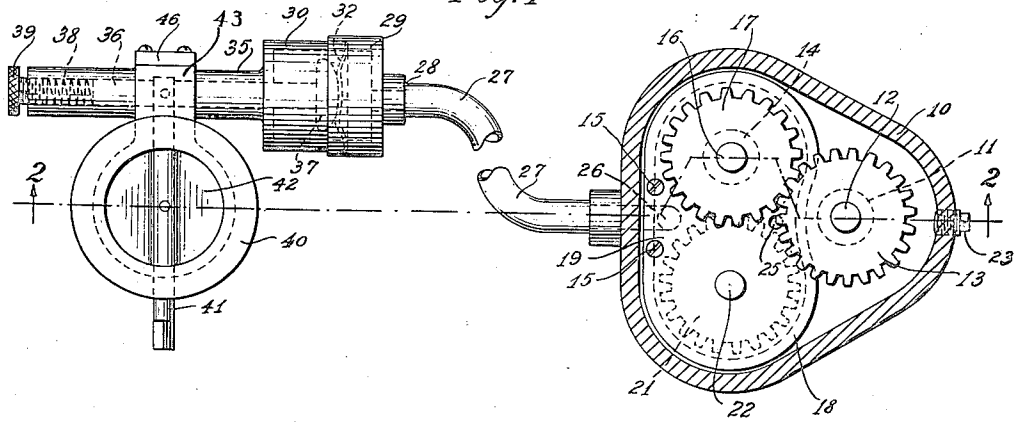
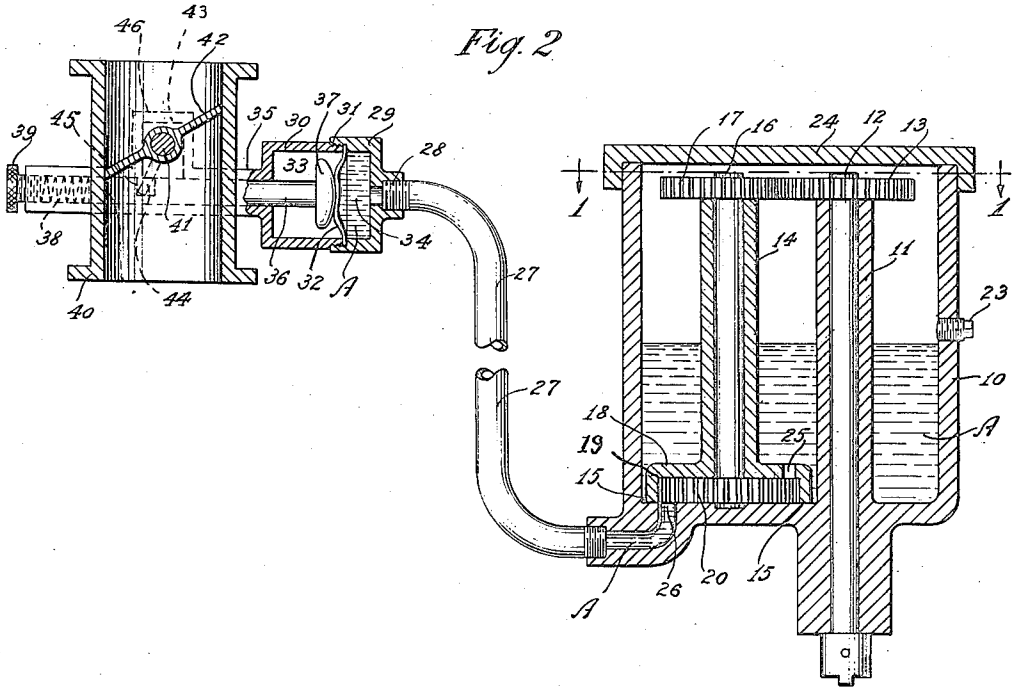


Fig. 2



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UNITED STATES PATENT OFFICE.

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HYDRAULIC GOVERNOR FOR HYDROCARBON ENGINES.

Application filed June 30, 1921. Serial No. 481,697.

To all whom it may concern:

Be it known that WILLIAM W. WAKELEE and ALFRED C. GRISCOM, citizens of the United States, and residents of Stratford and Sandy Hook, respectively, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Hydraulic Governors for Hydrocarbon Engines, of which the following is a specification.

This invention relates to a device for automatically controlling the amount of explosive mixture supplied to the cylinders of hydrocarbon engines and especially adapted for use in connection with engines of mechanically propelled vehicles such for instance as motor trucks, to govern the speed thereof.

An object of the invention is to provide a simple governor of the present character which can be economically constructed to be efficient and can be positively relied upon to perform its intended function.

A further and more specific object is to provide a governor, the simply constructed casing of which can be a casting capable of receiving the operating parts of the rotary pump and the liquid therefor without necessity for the utilization of any packing material whatsoever.

With the above and other objects in view the invention resides and consists in the construction and novel combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawings, and pointed out in the claim hereto appended, it being understood that various changes in the form, proportion, size and minor details of construction within the scope of the claim may be resorted to without departure from the spirit or sacrificing any of the advantages of the invention.

Similar characters of reference denote like or corresponding parts throughout the several figures of the accompanying drawings forming a part of this specification, and upon which,

Fig. 1 is a sectional view of the casing of the governor, taken on line 1—1 in Fig. 2 and looking in the direction of the arrows, showing the interior of the governor and its pipe connection with the intake manifold of a hydrocarbon engine in elevation; and

Fig. 2 is a sectional view on line 2—2 in Fig. 1, looking in the direction of the arrows.

In the drawing, 10 denotes the casing of the governor which is constructed to provide a bearing 11 for a shaft 12 adapted to be rotated and carrying a gear 13 upon its extremity which is located within the casing and arranged closely adjacent the free end of the bearing 11. A similar bearing 14 mounted within the casing and secured upon the base by screws 15 as indicated supports a shaft 16 which carries upon its upper extremity a gear 17 arranged closely adjacent the free end of said bearing and meshing with the gear 13. The lower end of the bearing 14 is shaped to provide a houseing 18 defining a pocket 19 between the housing and the base of the casing to receive the pump gears 20 and 21, the former being fixed upon the lower end of the shaft 16 and adapted to be rotated through the instrumentality of the gear 13 and shaft 12. The second pump gear 21 is also contained within the pocket 19 and is mounted upon a short shaft 22 secured in the casing.

The casing is adapted to receive oil, denoted by A, which oil may be placed in the casing through the hole shown plugged by the screw 23, the depth of the oil being preferably about one-half the depth of the casing as shown. 24 denotes a cover for the casing precluding the possibility of the escape of oil.

The oil surrounds the lower portions of the bearing 11 and 14 as well as the housing 18, said housing being provided with a hole 25 adjacent the gears 20 and 21 allowing entrance of oil to the pocket 19.

The base of the casing is ported adjacent the gears 20 and 21 as denoted at 26 for the connection of one end of a pipe 27 between pocket 19 and the diaphragm chamber 34.

The diaphragm chamber preferably consists of a pair of cylindrical members 29 and 30 screwed to each other as at 31, numeral 32 denotes a diaphragm of ordinary or preferred construction the circumferential margin of which is secured between the adjacent ends of the screwed together portions 29 and 30 to separate the smaller casing into two distinct and separate chambers represented by 33 and 34 respectively.

The member 30 of the diaphragm chamber is provided with a reduced extension 35 having a longitudinal opening communicat-

ing with the chamber 33, said opening slidably receiving a rod 36 upon which is an enlargement 37 located within the chamber 33 and held into engagement with the diaphragm 32 by means of a spring 38 within the reduced extension 35 and bearing against the rod 36, and a set screw 39 adjustably situated in the free end of said reduced extension and against said spring.

Numeral 40 denotes a pipe which may communicate with the carburetor of an engine and with the intake manifold thereof, neither said carburetor nor said intake manifold being shown. Transversely arranged in said pipe 40 is a short shaft 41 upon which is fixed an ordinary throttle valve 42 for opening and closing the passage through the pipe. The ends of the shaft 41 extend through the pipe 40 and one end enters a hollow supporting boss 43, formed integrally with the pipe 40 and of the tubular guide 35. An arm 44 fixed to the shaft 41 freely engages a recess 45 in the rod 36 providing a connection between said shaft and rod whereby the butterfly valve is oscillated when said rod is reciprocated. A cover plate 46 may be employed upon the boss 43 to enclose the end of the shaft and its connecting parts.

As clearly shown in Fig. 1, the gears 20 and 21 are spaced from the walls of the housing 18, so that a cushion of oil surrounds the gears and is constantly in free communication with the chamber 10 through the hole 25, so that when the force of the spring 38 is greater than the propelling force of the pump, the latter will be ineffective to build up pressure behind the diaphragm 32. In other words, the oil surrounding the gears is in free communication between the casing 10 and chamber 34, while the oil entrapped between the gear teeth, will either balance, overcome, or be overcome by the force of the spring 38, depending upon the speed of rotation of the gears.

The gears 20 and 21 are constructed and arranged to constitute a rotary pump forcing oil from the pocket 19 through the pipe connection 27 when the driving shaft is in operation as will be understood from Fig. 2 where the throttle valve is shown closed as would be the case from excessive speed of the motor.

When the engine is idle the spring 38 holds the rod 36 against the diaphragm 32 and the diaphragm is free to move to its relaxed position toward the base of the member 29. The arrangement is such that at this time the throttle valve is in wide open position. When then the engine starts operating oil is pumped through the connection 27 to the chamber 34 to force the diaphragm against the end of the rod 36 and to cause said rod to slide against the action of the spring 38 and rotate the throttle valve a corresponding distance toward its closed position in a manner to cut off the supply of fuel and thus automatically slow down the motor.

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

A governor comprising a casing adapted to receive a supply of liquid, a bearing integral with the base of said casing and extending upwardly therefrom beyond the level of said supply of liquid, a rotatable shaft in said bearing, a gear upon said shaft and within said casing, a bearing mounted upon the base of the casing and providing a pocket, a shaft in said last mentioned bearing, a gear upon the upper end of said last mentioned shaft and meshing with said first mentioned gear, a rotary pump within said pocket and actuated from said shafts and gears, there being communication between said pocket and supply of liquid, a fluid chamber having therein a diaphragm adapted to be actuated from said pump, a pipe connection between said fluid chamber and pump, a valve, and means actuated by said diaphragm for controlling said valve.

Signed at Bridgeport, in the county of Fairfield and State of Connecticut, this 28th day of June, A. D. 1921.

WILLIAM W. WAKELEE.
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Witnesses:
C. M. NEWMAN,
LILLIAN M. AILING.