R. B. BENJAMIN.

GOVERNING DEVICE FOR GAS ENGINES.

APPLICATION FILED DEC. 26, 1913.

1,201,240.

Patented Oct. 17, 1916.

2 SHEETS—SHEET 1.

Fig. 1.

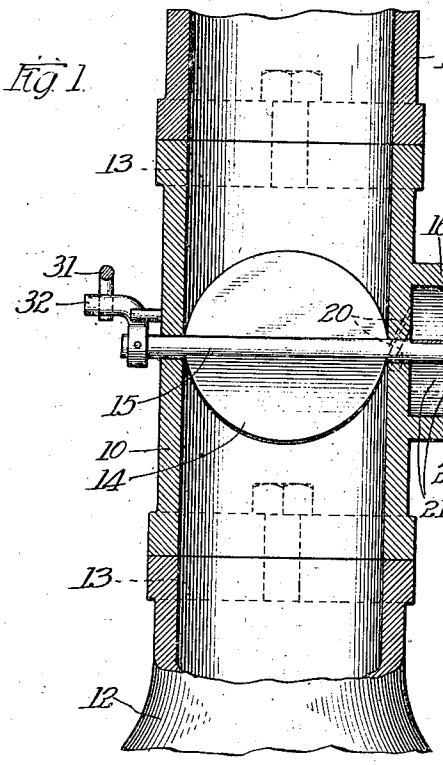


Fig. 3.

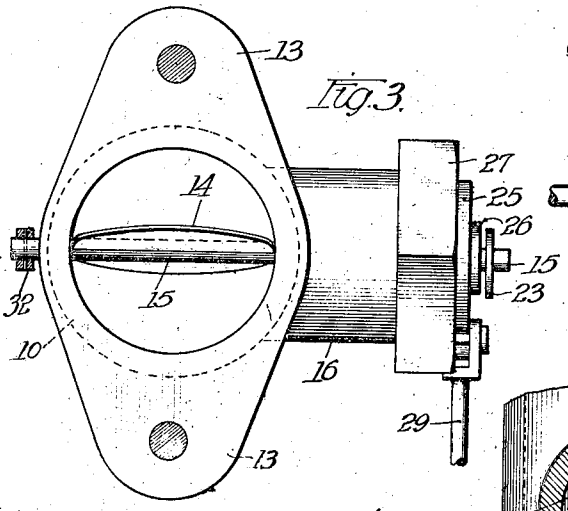


Fig. 4.

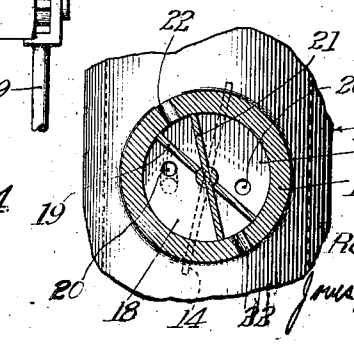


Fig. 2.

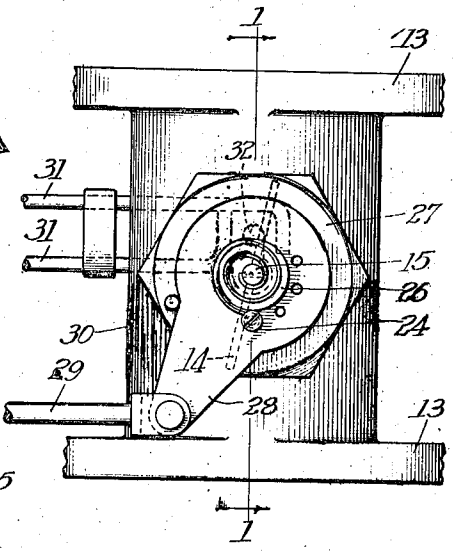
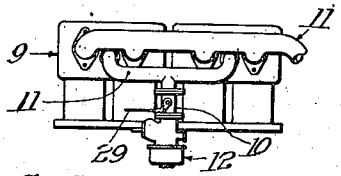


Fig. 8.



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2 SHEETS—SHEET 2.

Fig. 5

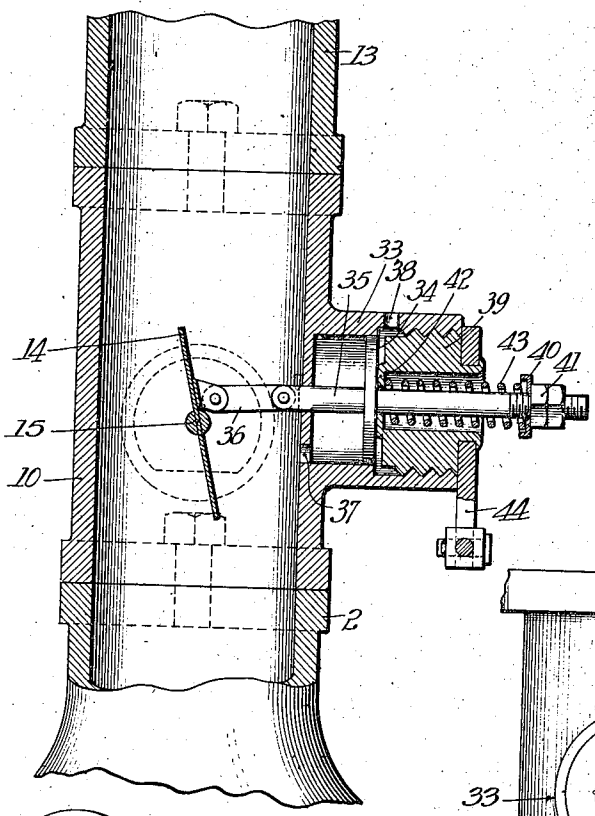


Fig. 6

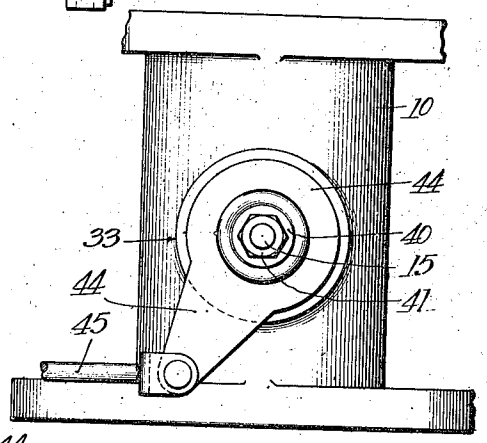
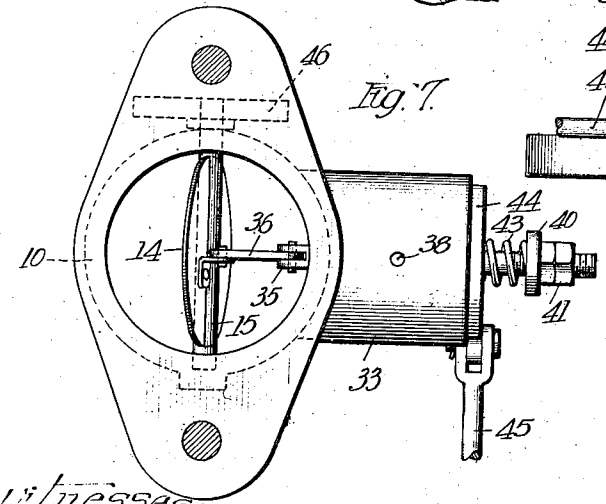


Fig. 7



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UNITED STATES PATENT OFFICE.

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GOVERNING DEVICE FOR GAS-ENGINES.

1,201,240. Specification of Letters Patent. Patented Oct. 17, 1916.

Application filed December 26, 1913. Serial No. 808,881.

To all whom it may concern:

Be it known that I, REUBEN B. BENJAMIN, 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 Governing Devices for Gas-Engines, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawing, forming a part of this specification.

My invention relates to improvements in governing devices for gas engines.

One of the objects of my invention is to maintain the engine at a substantially constant speed.

Another object of my invention is to provide a governor by which the speed may be determined and the speed of the engine maintained constant at this predetermined speed as long as desired irrespective the variations in load upon the engine.

For the purpose of disclosing my invention I have illustrated in the accompanying drawings certain preferred embodiments thereof, and in said drawings: Figure 1 is a longitudinal sectional view of one form of my invention showing the same applied to the throttle valve of a gasolene engine; Fig. 2 is an end view of the device shown in Fig. 1; Fig. 3 is a top plan view; Fig. 4 is a sectional view taken on the line 4—4 of Fig. 1; Fig. 5 is a longitudinal sectional view showing a modification of my invention; Fig. 6 is an end view thereof; Fig. 7 is a top plan view; and Fig. 8 is a view of a gas engine showing my invention applied.

In the embodiment illustrated in Figs. 1–4 I provide an insertible section 10 of the manifold or intake 11 of a gas engine 9. This section is inserted between the end of the manifold and the carbureter 12 and forms a part of the manifold. It is provided with laterally extending flanges 13 by which it is secured to corresponding flanges on the intake pipe and on the top of the carbureter. Arranged within this section is the usual throttle valve 14 which is adapted to control the admission of gas to the engine. This valve is mounted upon a suitable rotatable shaft 15, one end of which shaft is adapted to extend through the side wall of the section 10 and into a cylinder 16, integrally formed on the side of the section 10. Arranged within the cylinder to longitudinally divide the same into two chambers 17 and 18 is a web 19. Each one of these chambers communicates, through ports 20, with the interior of the section 10 below the throttle valve. Operating in each one of these chambers are movable pistons 21 which are rigidly mounted on the shaft 15. In practice the pistons preferably take the form of a single rotating vane secured on the shaft and extending in opposite directions to the side walls of the cylinder, thus forming a pair of oscillating pistons operating in the chambers 17 and 18. Ports 22 extending to the atmosphere are formed in each chamber between the pistons and the web 19.

As is well understood, an increase in speed of the engine increases the suction in the manifold, therefore an increase in speed of the engine will create a partial vacuum in each one of the chambers 17 and 18 on one side of the pistons 21. Due to this arrangement, as the speed of the engine increases, the partial vacuum created in the chambers 17 and 18 will tend to rotate the pistons 21 and with them the shaft 15 on which the throttle valve 14 is mounted. The valve is so set that when the suction of the engine tends to rotate the pistons 21, as above described, this rotation will tend to close the valve. The pistons 21 are held in normal position by a spring 23, one end of which is connected to the shaft 15 and the other end of which is connected by a screw 24 to a rotatable disk 25 mounted on the sleeve 26 secured to the head 27 of the cylinder. This disk 25 is provided with an arm 28 by which it is connected with a suitable operating rod 29 and is held against rotating in one direction by a pin 30. The tendency of this spring is, when the arm 28 is bearing against the pin 30, to rotate the pistons 21 to open the throttle valve 14. By moving or rotating the disk 25 in a contra-clockwise direction the spring 23 will be wound up and thereby the normal pull to open the valve increased so that it will take an increased suction to overcome the tension of the spring and the engine may run up to a greater speed before the pistons will commence to rotate to close the throttle valve.

The valve may also be closed and opened independently of this governing device by means of a pair of operating rods 31.

These rods are supported by suitable guides and have their ends turned so as to be in a position to engage a crank pin 32 on the end of the shaft 15. The turned ends of the rods are sufficiently spaced apart to permit the crank pin to turn with the valve when the valve is turned by the influence of the pistons 21, but by a continued movement of either of the rods 31 the pin can be engaged for the purpose of rotating the valve 14 completely open or completely closed. These rods 31 and the rod 29 may be lead to a position where they can be operated by the driver from his seat when the governor is applied to an explosive engine driving a vehicle.

In Figs. 5, 6 and 7 I have illustrated a modification of the invention disclosed in Figs. 1 to 4. In the structure illustrated in Figs. 5 to 7, I have provided the same insertible section 10 provided with the throttle valve 14 mounted upon the shaft 15. Extending laterally from the section 10 is a cylinder 33 within which operates a suitable reciprocating piston 34. This piston has connected thereto a piston rod 35 which extends through the side wall of the section 10 and is connected, by suitable pivotal link connections 36, with the throttle valve 14. The cylinder 33 has a port 37 communicating with the interior of the section 10 in front of the piston 34, and at the rear of the piston a port 38 communicating with the atmosphere. The top of the cylinder is closed by a nut 39 which is screw-threaded into the cylinder on screw-threads having a large pitch. The piston rod 35 is extended through the nut 39 and is provided, at its upper end, with a suitable bearing washer 40 held in position by nuts 41 screwed on the end of the rod, and interposed between this washer and a shoulder 42 in the nut 39 is a coiled spring 43, which tends to maintain the throttle valve 14 in its open position and forms a resistance device against which the suction or partial vacuum created in the cylinder 33 operates. The nut 39 is provided with a square head to which is connected an operating lever arm 44 connected by a suitable rod 45 to a foot or hand lever leading to the driver's seat, if the engine is used for operating a vehicle. By operating the lever arm 44 the nut can be moved inward or outward to decrease or increase the tension of the spring 43 and thereby increasing the pull against which the piston 34 operates. In order to prevent a slight fluctuation in speed from affecting the valve 14, I provide a deadener wheel 46 mounted on the shaft 15 the inertia of which tends to prevent fluttering of the valve. The operation of this form of my invention is substantially the same as that illustrated in Figs. 1 to 4, it being understood of course that as the speed of the engine increases the suction of its pistons increases and this suction tends to create a partial vacuum in the cylinder 33, thereby causing the piston to move in the cylinder against the tension of the coiled spring 43, and in a direction to close the valve 14. By adjusting the tension of the spring to the desired point the piston will be held against movement until a predetermined speed has been reached. After this speed has been reached, however, an increased suction in the manifold by the pistons of the engine operating at an increased speed will move the piston 34, thereby closing or partially closing the valve 14 and cutting off the fuel supply to the engine.

While I have shown and described certain forms of my invention it will be understood that various modifications and changes may be made therein without departing from the spirit of the invention as set forth in the appended claims.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. The combination with a throttle valve of an explosive engine, of a cylinder having the pressure therein varied in accordance with the variations in pressure in the intake pipe of an engine, an oscillating piston in said cylinder connected with said valve, and a tension device against which said piston operates.

2. The combination with a throttle valve of an explosive engine, of a cylinder having the pressure therein varied in accordance with the variations in pressure in the intake pipe of the engine, an oscillating piston operating in said cylinder and connected with said valve, a tension device against which said piston operates, and means for varying the tension of said device.

3. The combination with a throttle valve of an explosive engine, of a cylinder having the pressure therein varied in accordance with the variations in pressure in the intake pipe of the engine, a piston connected with said valve and operating in said cylinder, and means for opening and closing said valve independently of said piston while permitting said piston to operate upon the valve.

4. The combination with a throttle valve of an explosive engine, of a cylinder longitudinally divided into sections, each section having the pressure therein varied in accordance with the variations in pressure in the intake pipe of the engine, and an oscillating piston in each of said chambers.

5. The combination with a throttle valve of an explosive engine, of a cylinder communicating with the intake pipe of the engine, a web dividing said cylinder into two longitudinal chambers, each of said chambers communicating with the intake pipe of the engine, a pair of pistons connected with

the shaft of the throttle valve and operating in said chambers, and a spring tending to move said pistons in one direction while the variations in pressure in said chambers tend to move the pistons in the opposite direction.

In witness whereof, I have hereunto subscribed my name in the presence of two witnesses.

REUBEN B. BENJAMIN.

Witnesses:
E. R. KING,
W. PERRY HALEY.