

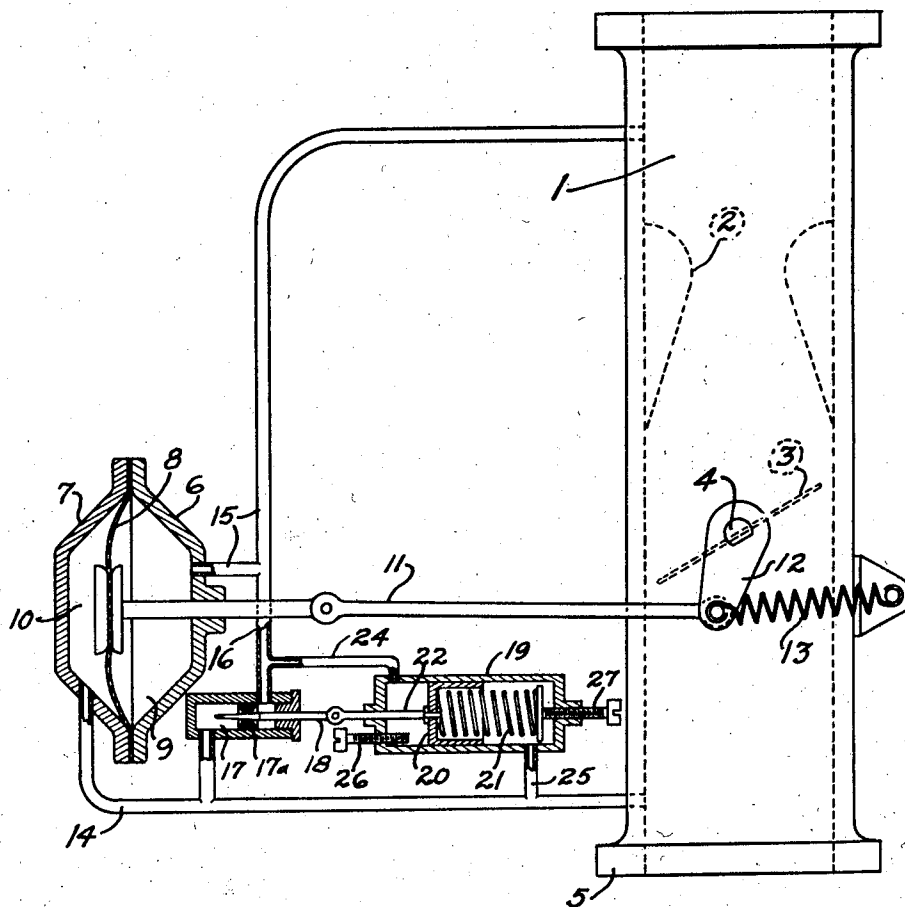
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GOVERNOR

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GOVERNOR

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7 Claims. (Cl. 137—153)

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This invention relates to governors, particularly for internal combustion engines, in which the governing function is performed by a valve located in the fuel intake conduit. In a co-pending application, Serial No. 545,344, filed July 17, 1944, in the name of the present inventor, there is illustrated such a governor in which the governing valve is controlled by a diaphragm operated by the difference of static pressures on opposite sides of the valve. Various means are provided therein for adjusting the torque applied to the valve in accordance with its position, including a manually adjustable air bleed in the suction connection. It has been found, however, that although this device operates satisfactorily when adjusted for a certain locality, further adjustments must be made when the governor is used in a region at a different altitude. Specifically, at a higher altitude, the governor is affected so as to permit the engine to operate faster than the intended governed speed. This is because the difference of pressure for a given speed on opposite sides of the valve decreases as the altitude increases.

Accordingly, it is an object of the present invention to provide a governor of the above type including means to compensate for changes of altitude.

A more specific object is to provide for moderating and adjusting a governor control, specifically of the static suction type, so that the governed speed is maintained irrespective of altitude.

These objects and other more detailed objects hereafter appearing are attained by the device illustrated in the accompanying drawing in which the figure is a diagrammatic elevation illustrating an internal combustion engine intake conduit with a governing valve and control according to the present invention.

The drawing shows a section 1 of an engine intake conduit including a Venturi tube 2 into which a fuel nozzle (not shown) may open, and a butterfly throttle valve 3 mounted on shaft 4 posterior to the Venturi tube. The conduit is flanged at the lower end as at 5 for attachment to the usual engine intake manifold (not shown).

Mounted adjacent to the intake conduit is a control housing formed by a pair of cup-shaped members 6 and 7 clamped about the periphery of a flexible diaphragm 8 which divides the housing into differential pressure chambers 9 and 10. Diaphragm 8 is connected by linkage 11 to an arm 12 rigidly secured to a throttle shaft 4. A tension spring 13, anchored at one end, is connected at

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its other end to arm 12 so as to constantly urge the governing valve open.

Chamber 10 is connected by a suction tube 14 to the intake conduit posterior to valve 3. Chamber 9 is connected by an air bleed tube 15 to this conduit anterior to valve 3 and the venturi tube. The differential pressures thus produced during operation of the engine act on the diaphragm and cooperate with spring 13 to balance the governing valve so as to maintain the governed speed of the engine. Tubes 14 and 15 are connected through a chamber 17 having a valve seat 17a controlled by a needle valve 18. Adjacent chamber 17 there is provided a second pressure casing 19 having a piston 20 working therein and constantly urged toward the left by a coiled spring 21. This piston is connected by a link 22 to metering pin 18 which adjusts the effective size of the air bleed. Casing 19 at the left side of piston 20 is connected by a tube 24 to cross passage 16. Cylinder 19 on the opposite side of the piston is connected by a tube 25 to suction connection 14. The extent of movement of the piston may be adjusted by one or more screws threaded into the cylinder, as at 26, and spring 21 may be adjusted by screw 27.

In operation, diaphragm 8 responds to variations in the pressure differential in tubes 14 and 15 to actuate the throttle valve in opposition to spring 13. The system of pressures and forces acting on the throttle is such that this valve will be balanced to maintain the governed speed under all load conditions. As in the above mentioned co-pending application, the positioning and shaping of lever 12 additionally aid in balancing the throttle. When the device is operated at higher altitudes, the atmospheric pressure acting on the right side of diaphragm 8 is reduced tending to further open the throttle and increase the governed speed. However, the consequent leftward movement of piston 20 and metering pin 18 reduces the effective size of orifice 17a so as to increase the effectiveness of the suction in tube 14 acting on the left side of the diaphragm to close the throttle. All changes in atmospheric pressure acting through tube 15 are compensated in this manner by the automatic control of cross passage 16.

Thus, the governor will operate uniformly regardless of altitude changes. Of course, the governing control may incorporate other modifying or compensating features, such as shown in the above mentioned co-pending application, for instance, while retaining the advantages of the novel air bleed control above described. The

invention may be modified in these and other respects as will occur to those skilled in the art and the exclusive use of all modifications as come within the scope of the appended claims is contemplated.

I claim:

1. In a governor for an internal combustion engine having an intake conduit, a governing valve in said conduit, a device responsive to pressures in said conduit for actuating said valve, means tending to moderate the effect of said device, and means independently responsive to the intake conduit pressures for adjusting said moderating means.
2. In a governor for an engine having an intake conduit, a governing valve, a device responsive to pressures in said conduit for actuating said valve, said device including an air bleed for moderating the effect of said device, and means independently responsive to intake conduit pressures for adjusting said bleed.
3. In a governor for an engine having an intake conduit, a governing valve in the conduit, a device responsive to intake conduit pressures for actuating said valve, said device having an air bleed for moderating the effect thereof, a metering valve associated with said bleed, and means independently responsive to intake conduit pressures for actuating said metering valve.
4. In a governor for an engine having an intake conduit, a governing valve in the conduit, a device responsive to static pressures produced in said conduit for actuating said valve, said device including an air bleed for affecting the action thereof, a metering valve for adjusting said bleed,

and means responsive to intake conduit pressures for operating said metering valve.

5. In a governor for an engine having an intake conduit, a governing valve in said conduit, a device responsive to increases of suction in said conduit for closing said valve and responsive to decreases of suction therein for opening said valve, said device including a suction connection to said conduit and an air bleed in said connection, a metering control for said bleed, and a device independently responsive to intake conduit suctions for operating said metering control.
6. In a governor for an engine having an intake conduit, a governing valve in said conduit, means responsive to pressures in said conduit on opposite sides of said valve for controlling the same, said means including a suction chamber having a movable wall, connections to said conduit, and an air bleed in one of said connections, and a second suction operated device for controlling said air bleed.
7. In a governor for an engine having an intake conduit, a governing valve in said conduit, pressure chambers separated by a movable wall connected to said valve for operating the same, connections between said chambers and said conduit, respectively, anterior and posterior to said valve, a cross passage between said connections, an air bleed in said cross passage, a metering control for said bleed, and a device responsive to suction in said conduit posterior to said valve for adjusting said bleed control.

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No references cited.