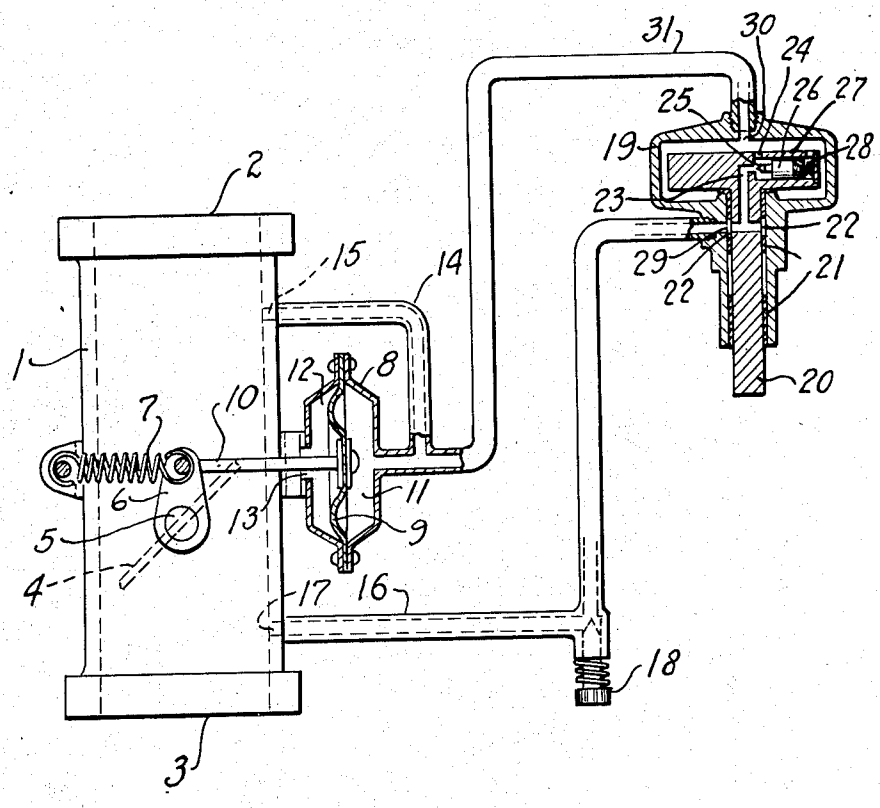
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ENGINE GOVERNOR

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ENGINE GOVERNOR

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9 Claims. (Cl. 123—103)

This invention relates to a governor for controlling the speed of an internal combustion engine.

It is the object of this invention to produce a governor for controlling the speed of an internal combustion engine which is considerably more efficient in operation and more simple than governors heretofore known.

This invention contemplates an engine governor which will control the speed of an internal combustion engine at any predetermined desired speed with greater precision and nicety than heretofore possible.

The drawing shows an elevation partly in section of my engine speed governor.

1 is a governor housing, 2 the inlet and 3 the outlet. 4 is a valve mounted on shaft 5 and journaled in housing 1. 6 is an arm fixed on shaft 5. 7 is a tension spring connected to one end of arm 6 and to housing 1. 8 is a suction device provided with a flexible diaphragm 9 which is connected by rod 10 with arms 6. 11 is the suction chamber of suction device 8. 12 is the atmospheric chamber of suction device 8. 13 is an atmospheric opening into chamber 12. 14 is a conduit connected to suction chamber 11 and to orifice 15 located in governor housing 1. 16 is a conduit connected to orifice 17 in governor housing 1. 18 is an adjusting valve in conduit 16. 19 is a centrifugal valve housing. 20 is a centrifugal valve shaft which rotates in bearings 21. 22 is a groove around shaft 20 which communicates with channel 23. 24 is a channel that communicates with channel 23. 25 is a needle valve fixed on centrifugal valve weight 26. 27 is a cylindrical housing (for valve weight 26) mounted on shaft 20. 28 is a spring which holds valve weight 26 inwardly. 29 is an orifice in centrifugal valve housing 19 which communicates with channel in shaft 20 through groove 22. 30 is an orifice in centrifugal valve housing 19. 31 is a conduit.

Operation of the device

It will be understood that governor housing 1 is part of the intake passageway of the internal combustion engine and that the charge flow is downwardly. It will also be understood that the centrifugal valve shaft 20 is driven by the engine. Assuming the engine is running at low speed, the spring 28 will hold centrifugal valve weight 26 inwardly closing channel 23 to channel 24. If spring 28 is adjusted to yield to the centrifugal force of weight 26 when the engine reaches a certain speed, needle valve 25 will open communication between orifice 17 and suction chamber 11 by way of conduit 16, orifice 29, groove 22, channel 23, channel 24, orifice 30, and conduit 31. The velocity of the charge by orifice 17 and 15 will create sufficient suction to start governor valve 4 toward a closed position. As this valve moves slightly toward a closed position, the suction below it will greatly increase, which increases the suction in chamber 11 of the suction device, pulling valve 4 toward a closed position to give the desired governing of the engine speed. As valve 4 moves toward a closed position, which greatly increases the suction at orifice 17, orifice 15 then begins to be an air-bleed to suction device 8 which prevents a sudden closing or plastering of valve 4. If the engine speed should slow down below the governed speed, spring 28 will close needle valve 25, cutting off the communication of orifice 17 to suction device 8. Valve 4 will then move toward an open position but as it does so the charge will speed up by orifice 15 and orifice 15 will become a suction orifice when valve 4 becomes wide open. In other words, orifice 15 gradually changes from an air-bleed orifice to a suction orifice as valve 4 moves toward an open position. This prevents valve 4 from flying open so rapidly. The orifice 15 functioning as it does prevents the well-known surging in governors.

Orifice 15 preferably is located in the intake passageway but orifice 15 can connect conduit 14 directly to atmosphere. However, where orifice 15 air bleeds conduit 14 directly to atmosphere, the governor will not operate quite as smoothly and will not govern the speed of the engine without some surging.

This application is a continuation-in-part of my application Serial No. 446,243, filed June 8, 1942.

I claim:

1. The combination with an internal combustion engine having an intake passageway provided with a throttle valve for controlling the flow of motive fluid to the engine, means actuated through changes of pressure in the intake passageway on the engine side of said valve for imparting movement to said valve, a conduit connecting said pressure actuated means with the intake passageway on the engine side of said throttle valve, and valve means responsive to changes in engine speed for controlling fluid flow through said conduit, said valve means tending to open said conduit when the engine reaches its governed speed and tending to close said conduit when the engine falls below its governed speed.

2. The combination with an internal combus-

tion engine having an intake passageway provided with a throttle valve for controlling the flow of motive fluid to the engine, means actuated through changes of pressure in the intake passageway on the engine side of said valve for imparting movement to said valve, a conduit connecting said pressure actuated means with the intake passageway on the engine side of said throttle valve, a centrifugally unbalanced valve responsive to changes in engine speed for controlling fluid flow through said conduit, said centrifugally unbalanced valve tending to open said conduit when the engine reaches its governed speed and tending to close said conduit when the engine falls below its governed speed.

3. The combination as set forth in claim 2 including an orifice in the intake passageway on the atmosphere side of said throttle valve, and a second conduit connecting said orifice with the pressure actuated means.

4. The combination with an internal combustion engine having an intake passageway provided with a throttle valve for controlling the flow of motive fluid to the engine, means actuated through changes of pressure in the intake passageway on the engine side of said valve for imparting movement to said valve, a conduit connecting said pressure actuated means with the intake passageway on the engine side of said throttle valve, a rotatable valve housing arranged to vary its speed in accordance with variations in the engine speed, said valve housing being connected into said conduit, and a centrifugally unbalanced valve in said housing responsive to changes in the speed of rotation of said valve housing for controlling said conduit, said centrifugally unbalanced valve tending to open said conduit when the engine reaches its governed speed to thereby decrease the pressure in said pressure actuated means and cause said throttle valve to move toward closed position and tending to close said conduit when the engine falls below its governed speed to thereby increase the pressure in said pressure actuated means and cause said throttle valve to move toward open position.

5. The combination with an internal combustion engine having an intake passageway provided with a throttle valve for controlling the flow of motive fluid to the engine, means actuated through changes of pressure in the intake passageway on the engine side of said valve for imparting movement to said valve, a conduit connecting said pressure actuated means with the intake passageway on the engine side of said throttle valve, and valve means responsive to changes in engine speed for controlling fluid flow through said conduit, said valve means tending to open said conduit when the engine reaches its governed speed and tending to close said conduit when the engine falls below its governed speed, and an air bleed to atmosphere for said suction device.

6. The combination with an internal combustion engine having an intake passageway provided with a throttle valve for controlling the flow of motive fluid to the engine, means actuated through changes of pressure in the intake passageway on the engine side of said valve for imparting movement to said valve, a conduit connecting said pressure actuated means with the intake passageway on the engine side of said throttle valve, and valve means located in said conduit and responsive to changes in engine speed for controlling fluid flow through said conduit, said valve means tending to open said conduit when the engine reaches its governed speed and tending to close said conduit when the engine falls below its governed speed, and an air bleed to atmosphere for said pressure actuated means positioned on the pressure actuated means side of said valve means.

7. The combination with an internal combustion engine having an intake passageway provided with a throttle valve for controlling the flow of motive fluid to the engine, a suction device including a housing and flexible diaphragm, a connection between the flexible diaphragm and the said throttle valve, a conduit connecting the inside of said housing with an orifice in the intake passageway on the engine side of said throttle valve, and valve means responsive to changes in engine speed for controlling fluid flow through said conduit, said valve means tending to open said conduit when the engine reaches its governed speed and tending to close said conduit when the engine falls below its governed speed.

8. The combination as set forth in claim 7 including a second conduit connecting the inside of said suction device with an orifice in the intake passageway on the atmosphere side of said throttle valve.

9. The combination with an internal combustion engine having an intake passageway provided with a throttle valve for controlling the flow of motive fluid to the engine, a suction device including a housing and flexible diaphragm, a connection between the flexible diaphragm and the said throttle valve, a conduit connecting the inside of said housing with an orifice in the intake passageway on the engine side of said throttle valve, a rotary valve housing connected into said conduit and arranged to change its speed of rotation in accordance with changes in the engine speed, a centrifugally unbalanced valve mounted in said valve housing responsive to changes in engine speed for controlling fluid flow through said conduit, said centrifugally unbalanced valve tending to open said conduit when the engine reaches its governed speed and tending to close said conduit when the engine falls below its governed speed, a second conduit connecting the inside of said suction device with an orifice in the intake passageway on the atmosphere side of said throttle valve.

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