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E. KNAUSS

GOVERNOR FOR INTERNAL COMBUSTION MOTORS

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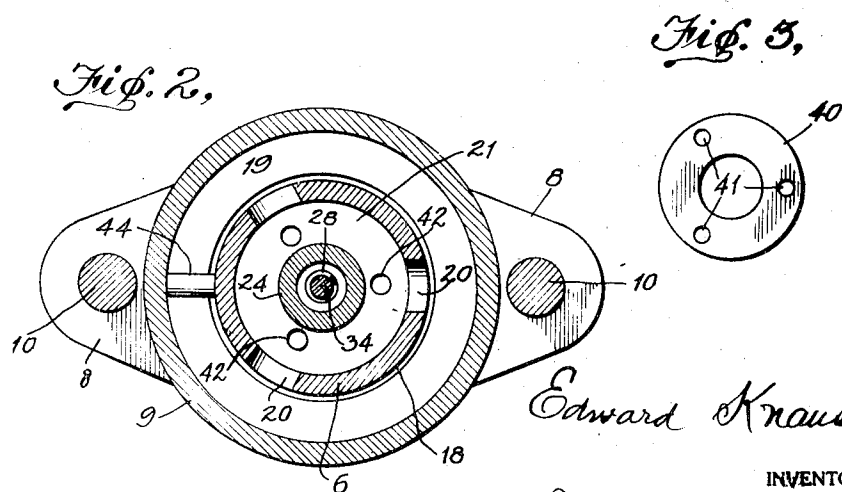
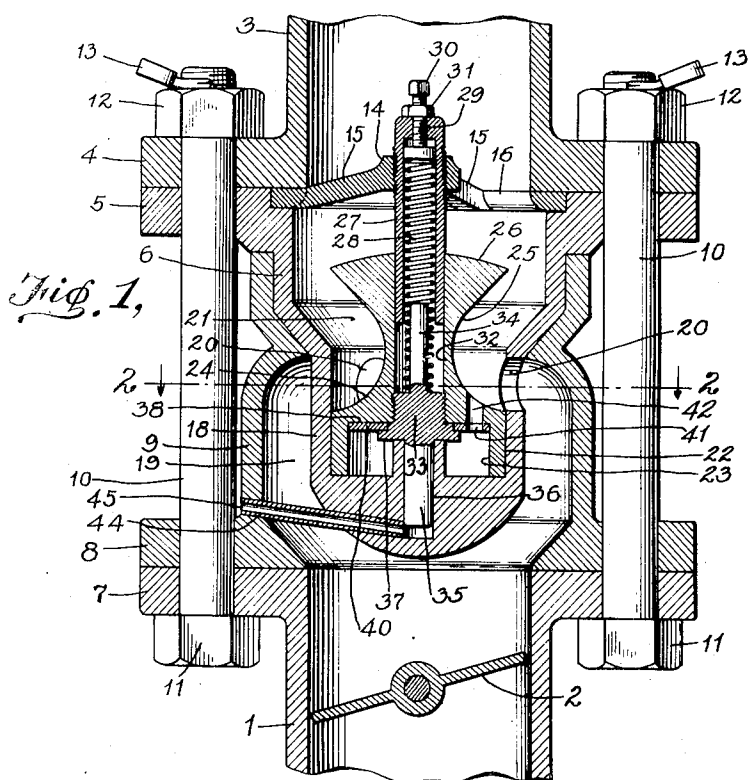
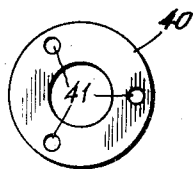


Fig. 3,



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UNITED STATES PATENT OFFICE.

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GOVERNOR FOR INTERNAL-COMBUSTION MOTORS.

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To all whom it may concern:

Be it known that I, EDWARD KNAUSS, a citizen of the United States, residing at Florin, in the county of Sacramento, in the State of California, have invented certain new and useful Improvements in Governors for Internal-Combustion Motors, of which the following is a specification.

My invention relates to governors for limiting the speed of internal combustion motors and has for its object to provide a governor for this purpose which will be more efficient and accurate in its action, more easily and accurately regulated, more durable and less costly to construct than those heretofore in use. The other objects will be more particularly set forth in the following specification.

I accomplish these objects by the mechanism illustrated in the accompanying drawings in which Figure 1 is a vertical sectional view of a governor made in accordance with my invention, Fig. 2 is a view taken on the line 2—2 of Figure 1 and Figure 3 is a plan view of a washer illustrated in Figure 1.

Like numerals designate like parts in all the views.

1 indicates a pipe leading from the carburetor of a gasoline engine, 2 a main throttle valve of the usual type therein and 3 a pipe leading to the intake manifold of the engine. Beneath the flange 4 of the pipe 3, I fit the flange 5 of one of the shells 6 of the governor, and above the flange 7 of the pipe 1 I fit the flange 8 of another shell 9 of the governor as shown. Through the flanges 4, 5, 7 and 8 I pass the bolts 10, having the heads 11, the nuts 12, and the seals 13, applied to said nuts, so that said bolts cannot be removed without breaking said seals. Between the flanges 4 and 5 is located the spider member 14, having the arms 15 providing passages 16. The shell 6 fits the interior of the outer shell 9 and is provided with a reduced lower portion 18 co-acting with the shell 9 to form the annular passage 19 for the fuel mixture passing the main throttle valve 2. Said lower portion 18 is provided with a plurality of ports 20 connecting the passage 19 with the interior 21 of the shell 6. In the lower portion of the shell 6 is formed a cylinder 22 in which is

reciprocally mounted a hollow piston valve 23. Said hollow piston valve 23 is provided with an extension member 24 having inwardly and the outwardly curved surface 25 terminating in a head 26. Said extension 24 is centrally bored to accommodate the guide sleeve member 27. The spider 14 is centrally bored and threaded and guide sleeve 27 is externally threaded and adjustably secured in the spider 14. In the interior of the guide sleeve 27 is mounted a spring 28 the compression of which may be adjusted by any suitable means such as the screw threaded rod 29 having the head 30 and lock nut 31. Screw threaded into the bore 32 of the extension 24 is the plug 33 having the upwardly extending stem 34 encircled by the spring 28 and the downwardly extending piston 35 adapted to reciprocate in the cylinder 36 preferably concentrically disposed with respect to the cylinder 22 in the base of the member 8. Said plug 33 is provided with a flange 37 between which and the top 38 of the hollow piston valve 33 is clamped the washer 40 having a port or ports 41 adapted to register with a like port or ports 42 formed in the top 38 of the hollow piston valve 23. Communicating with the cylinder 36 at or near the lower end thereof is the pipe 44 whose outer end 45 is always open to the atmosphere outside of the governor. The cylinder 22 and piston 23 serve as a dash-pot and prevent fluttering of the valve 22. The action of this dash-pot may be regulated by so disposing the disk 40 so that the port or ports 41 will register in whole or in part with the port or ports 42. The operation of my invention is as follows:

If the main throttle valve 2 which is manually manipulated is open and the valve 23 is in the lower position as shown in Figure 1 and the ports 20 are open the mixture will stream freely through the tube 1, passage 19 and ports 20 to the interior 21 of the shell 6, and hence through the ports 16 and the pipe 3 to the motor, impinging in its passage on the outwardly curved surface 25 of the head 26.

Under these conditions when the motor is running slowly there will be but a small reduction of pressure downstream from the main throttle valve 2 or between the main throttle valve and the motor and the impact

of the mixture on the curved surface 25 of the head 26 and the difference in pressure acting on the piston 35 will not be sufficient to elevate the hollow piston valve 23 and close the ports 20.

When however the speed of the motor approximates the speed for which the governor has been adjusted by the adjustment of the tension of the spring 28, the impact of the mixture on the surface 25 of the head 26 and the somewhat increased difference in the pressure acting on the piston 35 will cause the hollow piston valve 23 to be lifted till the ports 20 are partially closed. As the ports 20 are closed the difference in pressure is rapidly increased and if the engine speed is increased will become so great that the piston 35 and the impact of the mixture on the head 26 will move the hollow piston valve 23 toward the closed position until the flow of mixture through the ports 20 is so reduced that further engine speed is prevented. When the main throttle valve 2 is nearly closed the flow of mixture is so restricted that high engine speed cannot be obtained except when the engine is running under a light load and under these conditions the impact of the mixture on the surface 25 of the head 26 would not alone be sufficient to lift the hollow piston valve 23 toward the closed position when the engine is running at the speed for which the governor is adjusted. Under such conditions however as the engine speed is increased the drop in pressure downstream or on the engine side of the main throttle valve 2 rapidly increases as the engine speed is increased and when the engine speed approximates the maximum speed for which the governor has been adjusted the drop in pressure becomes so great that the piston 35 the lower end of which is subjected to atmospheric pressure will, aided by impact of the mixture on the head 26, move the hollow piston valve 23 toward the closed position and when the maximum speed for which the governor has been adjusted is reached the hollow piston valve 23 will be raised to such a position that the ports 20 will be so far closed that further engine speed is prevented.

When the main throttle valve 2 is open it is apparent that the impact of the mixture is the predominant force which is utilized to actuate the hollow piston valve 23 during its initial closing movement and that this force is increasingly supplemented by the piston 35 as the hollow piston valve 23 is moved toward the closed position. It is also apparent that when the main throttle valve 2 is nearly closed the flow of mixture through the governor is small in volume and at comparatively low velocity and that the difference in pressure is comparatively great and that, therefore, under these conditions the piston 35 is the dominant

means for initiating and continuing the closing movement of the hollow piston valve 23.

I claim:

1. A governor for internal combustion motors comprising in combination an induction duct, a main throttle valve therein, a supplementary engine speed governing valve located downstream from said main throttle valve and means actuated by the differential between the pressure in said duct downstream from said supplementary engine speed governing valve in all positions of such valve and atmospheric pressure for moving said supplementary throttle valve toward its closed position.

2. In a governor for internal combustion engines, the combination of a casing comprising a cylinder and a port through which fuel may enter said casing; a piston fitting said cylinder and controlling said port; said piston also provided with an extension having a curved surface varying in cross section, against which said fuel may impinge, and said piston being responsive to the suction action of said engine; means entering said extension for guiding the motions of said piston; a second cylinder open to the atmosphere with which said casing is provided; and a second piston rigid with said first named piston fitting said second cylinder, substantially as described.

3. In a governor for internal combustion engines, the combination of a casing comprising a cylinder and a port through which fuel may enter said casing; a piston fitting said cylinder and controlling said port; said piston also provided with an extension having a curved surface varying in cross section, against which said fuel may impinge, and said piston being responsive to the suction action of said engine; means entering said extension for guiding the motions of said piston; resilient means for controlling the movements of said piston; means to adjust said resilient means; a second cylinder open to the atmosphere with which said casing is provided; and a second piston rigid with said first named piston fitting said second cylinder, substantially as described.

4. In a governor for internal combustion motors the combination of a casing member comprising a cylinder provided with a plurality of fuel ports; a second member associated with said first member providing an annular chamber communicating with said ports; a balanced piston provided with a smaller piston slidably mounted in said cylinder and having an extension with a curved surface variable in cross section, said piston being responsive to the suction of said motor, and said first named piston being adapted to control said ports; a guide means for said extension and telescopically associated therewith; a spring associated with said

piston and adapted to control the movements thereof; means to adjust the compression of said spring; and means for subjecting said smaller piston to atmospheric pressure, substantially as described.

5 5. In a governor for internal combustion engines the combination of a casing made in two parts provided with a port and a cylinder; a hollow partially balanced piston in
10 said cylinder adapted to control said port and provided with a curved extension variable in cross section mounted in the path of the entering mixture; a second piston and cylinder adapted to receive the pressure of
15 the atmosphere co-acting with said first mentioned piston and concentrically disposed relatively thereto; and a guide and spring associated with said first named piston, substantially as described.

20 6. In an internal combustion engine the combination of an intake pipe; a fuel feed pipe; a governor mechanism comprising two shells the one fitting within the other, located between said pipes; sealed securing
25 means for said shells; a pair of pistons and a pair of cylinders associated with said shells; a port for fuel controlled by one of said pistons; a curved extension variable in cross sectional area rigid with said pistons;
30 mounted in the path of the entering mixture

an adjustable spring associated with said pistons; and means for admitting atmospheric pressure to one of said pistons, substantially as described.

7. A governor for internal combustion 35 motors comprising in combination an induction duct, a main throttle valve therein, a supplementary throttle valve located downstream from said main throttle valve and means actuated by the differential between 40 the pressure in said duct downstream from said supplementary throttle valve and atmospheric pressure for moving said supplementary throttle valve toward its closed position. 45

8. A governor for internal combustion motors comprising in combination an induction duct, a main throttle valve therein, a supplementary throttle valve located downstream from said main throttle valve, means 50 for normally maintaining said supplementary throttle valve in its open position and means actuated by the differential between the pressure in said duct down stream from said supplementary throttle valve and atmospheric pressure for moving said supplementary throttle valve toward its closed position against the opposition of the means 55 for maintaining it in its open position.

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