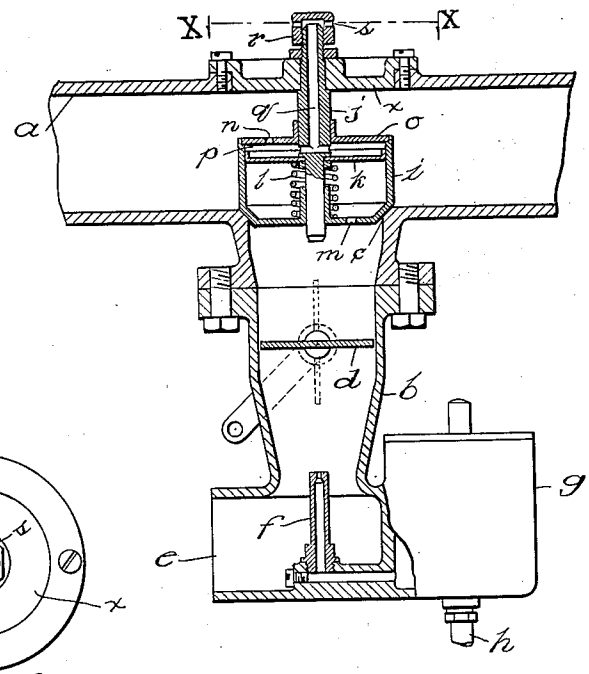
P. S. TICE.

GOVERNING APPARATUS.

APPLICATION FILED OCT. 23, 1916. RENEWED OCT. 10, 1918.

1,305,320. Patented June 3, 1919.

Fig. 1.



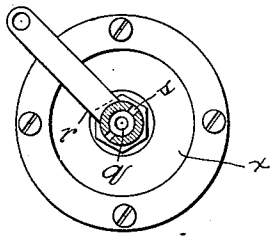


Fig. 2.

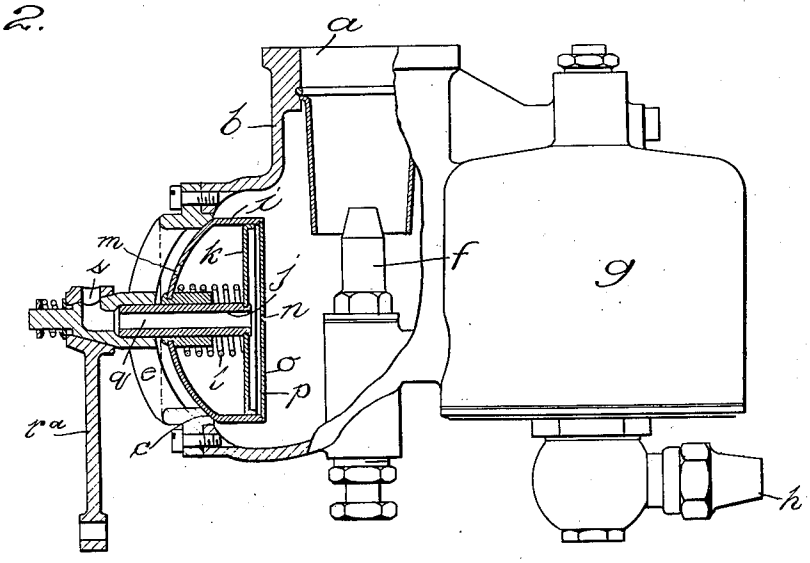


Fig. 3.

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UNITED STATES PATENT OFFICE.

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GOVERNING APPARATUS.

1,305,320. Specification of Letters Patent. Patented June 3, 1919.

Application filed October 23, 1916, Serial No. 127,233. Renewed October 10, 1918. Serial No. 257,671.

To all whom it may concern:

Be it known that I, PERCIVAL S. TICE, a citizen of the United States, residing at Detroit, county of Wayne, State of Michigan, have invented a certain new and useful Improvement in Governing Apparatus, and declare the following to be a full, clear, and exact description of the same, such as will enable others skilled in the art to which it pertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to governing apparatus for internal combustion engines and objects of my improvements are to provide an improved throttle valve, an improved speed regulator and a combination speed-regulator and throttle valve.

I secure these objects in the device illustrated in the accompanying drawings in which:

Figure 1 is a sectional elevation of an apparatus embodying my invention and so much of the intake passage of an internal combustion engine as is necessary to illustrate its connection therewith.

Fig. 2 is a detail plan view of the line X—X Fig. 1.

Fig. 3 is a sectional elevation of an apparatus embodying my invention and adjacent parts showing a modified construction from that shown in Fig. 1.

a is the passage leading to an internal combustion engine. *b* is the passageway in the carbureter forming an extension of the intake passage of the engine. *g* is the float chamber, and *f* the delivery nozzle. *e* is the entrance passage for atmospheric air. *c* is a valve seat in the device shown in Fig. 1 located at the junction of the passage from the carbureter and the branching passage to the intake of the engine and in the modification of Fig. 3 shown as located at the entrance *e* to the air passage of the carbureter. *d* is a throttle valve of the ordinary construction. *h* is the induction pipe through which liquid hydrocarbon is supplied to the float chamber *g*.

i is a hollow cylindrical valve having one end formed to engage against the valve seat *c* and the other end closed by a disk *o* except for the small aperture *n* through said disk. The interior of the valve *i* is in constant communication with the intake to the engine outside of the valve seat *c* by an aperture *m*, or otherwise, so as to equalize the pressure within the valve *i* and in the intake passage outside of the valve seat *c*.

j is a spindle rigidly fixed in a stationary support *x* and so located that the valve *i* may reciprocate thereon in engaging and disengaging from the seat *c*. *k* is a disk immovably fixed on the spindle *j*. The valve *i* has a sliding engagement upon the spindle *j* and upon the disk *k* around which it fits substantially air tight so as to form a chamber *p* between said stationary disk *k* and the disk *o* upon the inner end of said valve. *q* is a passage formed in the spindle *j* opening at one end to the outer air and at the other end into the chamber *p*. *r* is a threaded nut engaging upon screw threads on the outer end of the spindle *j* provided with apertures *s* and adapted to be screwed in or out upon the spindle *j* to regulate the area of communication between the passage *q* and the outer air. *l* is a compression spring resting at one end upon the stationary disk *k* and at the other end against the outer end of the valve *i* and tending to hold said valve upon its seat.

The valve *i* is of greater diameter than the port surrounded by the valve seat *c*.

The modification of Fig. 3 shows the application of the apparatus embodying my invention to a carbureter of the type described in Letters Patent #1,123,955 granted to me January 5, 1915, in which the throttle valve for the control of the engine is located at the intake passage *e* of the carbureter. The parts are lettered to correspond with the parts of Fig. 1 and it is thought will require no further description. It is however to be noticed that in the modification of Fig. 3 the opening *n* is directly in line with the intake passage *q* which is not the case in the form shown in Fig. 1.

The operation of the above described device is as follows:

When the engine is set in operation a partial vacuum is formed in the intake *a* and the air is therefore drawn through the aperture *n* from the chamber *p* lowering the pressure in said chamber. The air withdrawn from the chamber *p* is however partly replaced by air drawn from the atmosphere through the passage *q* so that the pressure in the chamber *p* will be greater than that in the intake passage and less than the pressure of the atmosphere. The pressure in the chamber *p* will be regulated by

the degree of opening to the passage q. If such opening is contracted the difference between the pressure on the opposite sides of the valve disk, o, that is, in the intake, a, and in the chamber, p, will be smaller and if it is extended, the difference will be larger. Consequently by turning the regulating device r or $r\ a$ the opening to the passage q may be regulated to control the pressure in the chamber p.

With a large pressure in the chamber p the valve i will be withdrawn further from its seat against the action of the spring l and with a smaller pressure therein the valve i will be held nearer to its seat. Thus one may regulate the intake to the engine, as by a throttle, by simply adjusting the area of opening to the passage q and the ordinary throttle valve may be dispensed with as in the modification of Fig. 3.

When the opening to the passage q has been adjusted to the degree required the speed of the engine will be automatically controlled. If the engine slows down the draft from the chamber p will be diminished and the pressure in said chamber will therefore rise drawing the valve i from its seat and enlarging the intake passage of engine. When the speed of the engine increases the draft from the chamber p will be increased and the pressure therein will fall; therefore the valve i will move toward its seat contracting the intake passage.

What I claim is:

1. In a carbureter for internal combustion engines, in combination with the engine intake passage having a main air inlet, a valve for controlling said inlet having a chamber; a piston carried fixedly with respect to the seat of said valve in the opening and closing movement of the latter, said valve having a head between which and the piston an air space is inclosed which is enlarged and reduced by the opening and closing movement of the valve; means of atmospheric inlet into said chamber and means for regulating such inlet.

2. In the construction described in claim 1, means for restricted communication of the chamber of the valve with the engine intake passage for affording air leakage through said chamber into the air intake passage regardless of the closing of said main air inlet valve.

3. In the structure defined in claim 1, a stem rigid with respect to the main inlet valve seat, the piston head being carried by said stem and the main air inlet valve being guided on the stem in its opening and closing movement.

4. In the structure defined in claim 1, a stem rigid with respect to the main inlet valve seat, said valve being mounted for guidance on said stem in its opening and closing movement, the stem having the means of atmospheric inlet into the valve chamber consisting of a passage opening into said chamber between the piston head and the chamber head.

5. In the structure defined in claim 1, a stem rigid with the main inlet valve seat, the piston head being carried by said stem and the main inlet valve being guided on the stem in its opening and closing movement, the stem having the means of atmposheric inlet into the valve chamber consisting of a passage opening into said chamber between the piston head and the head of the chamber, and a spring reacting between the valve and the stem for yieldingly resisting the opening movement of the valve.

6. In the structure defined in claim 1, a stem rigid with the main inlet valve seat, the piston head being carried by said stem within the chamber of the valve, the stem having the means of atmospheric inlet into the valve chamber consisting of a passage whose intake is outside of the valve and the means for regulating such inlet consisting of an adjustable closure for said intake.

7. In the structure defined in claim 1, the chamber of the valve having a suction leak port for communication with the engine intake passage, whereby air is restrictedly admitted into the engine intake passage regardless of the opening or closing of said main air inlet valve.

8. In the structure defined in claim 1, the main air inlet valve being substantially of cup form having its head or bottom facing outwardly with respect to the air inlet, a stem fixed with respect to the valve seat and extending inward through the air inlet opening, the piston being carried on said stem in the chamber of the valve, said stem having the means of atmospheric inlet into said valve chamber consisting of a passage open at its outer end for intake and communicating with the chamber of the valve between the piston head and the head of the valve chamber, and means for restricted suction communication of the chamber of the valve with the engine intake passage past the piston head.

9. In the construction defined in claim 1, the main air inlet valve being a shell, a stem rigid with the valve seat which extends in through the outer head of said shell and affords means of guidance of the valve in its opening and closing movement, the piston head being carried on said stem in the chamber of the valve between the two heads thereof, the stem having the means of atmospheric inlet into the valve chamber consisting of a passage opening at its outer end for air inlet, and opening, at its inner end between the piston head and the inner head of the valve chamber, said inner head having a suction leak port for communication with the engine intake passage.

10. In the construction defined in claim 1, the main air inlet valve being a shell having its cavity in general of cylindrical form and adapted for relative reciprocation of the said valve and piston therein, said cylindrical cavity having atmospheric communication at the outer end, a stem rigid with the valve stem which protrudes into the chamber of the shell through said outer end thereof and carries the piston head in said chamber of the valve, said stem having the means of atmospheric inlet into the valve chamber consisting of a passage opening at its outer end for air inlet and at its inner end beyond the piston head in the chamber of the valve, the inner head of said valve chamber having a suction leak port for communication of said chamber of the valve with the engine intake passage.

11. In the construction defined in claim 1, a stem rigid with the valve seat extending into the chamber of the valve through the outer end thereof, and constituting the means for carrying the piston head in said chamber, and a spring on said stem reacting between the same and the valve to yieldingly resist the opening movement of the valve.

In testimony whereof I sign this specification.

PERCIVAL S. TICE.