Oct. 26, 1926. 1,604,936

W. T. TABB ET AL

SPEED REGULATOR

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Fig. 1

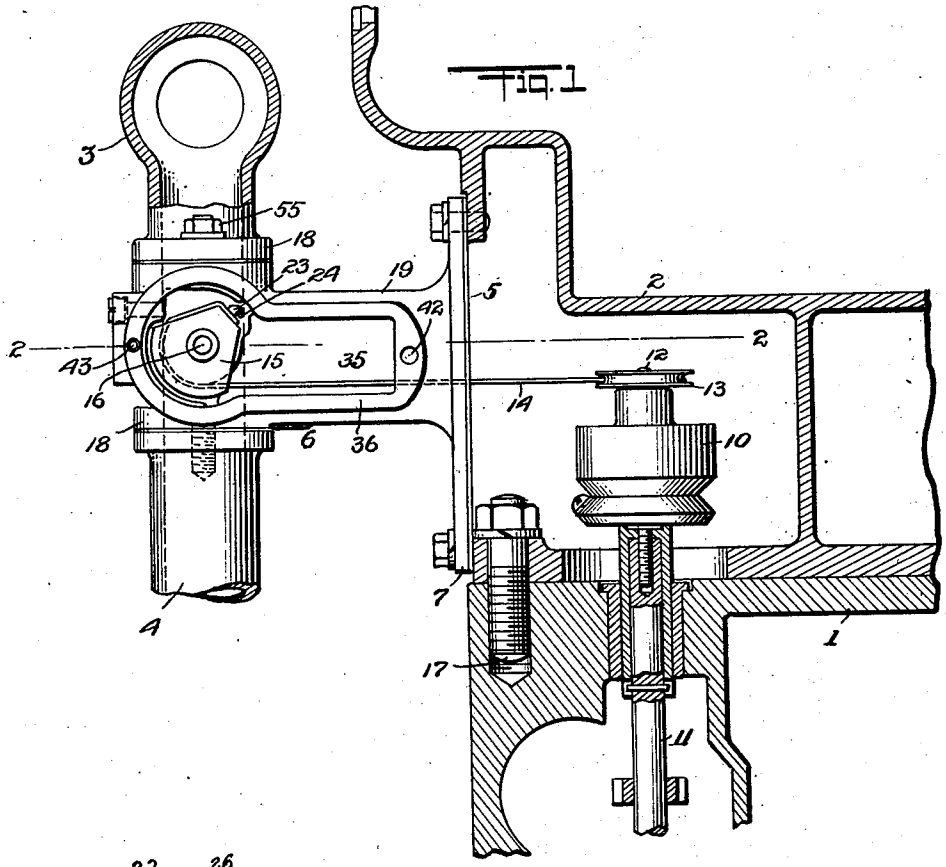
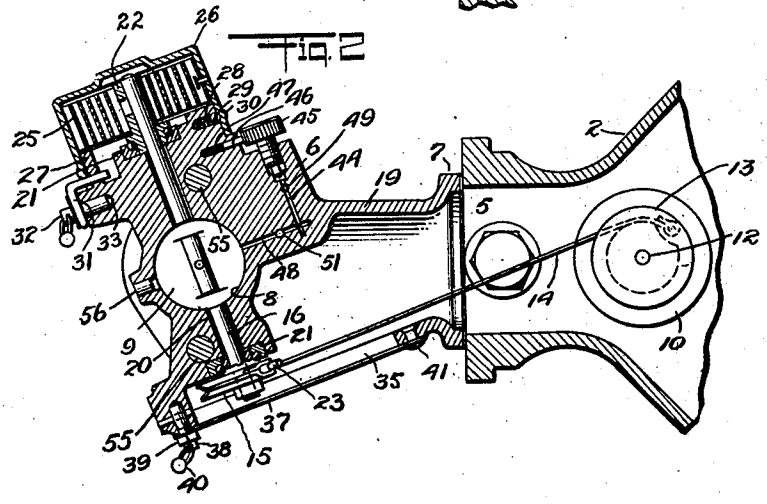


Fig. 2



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Fig. 3

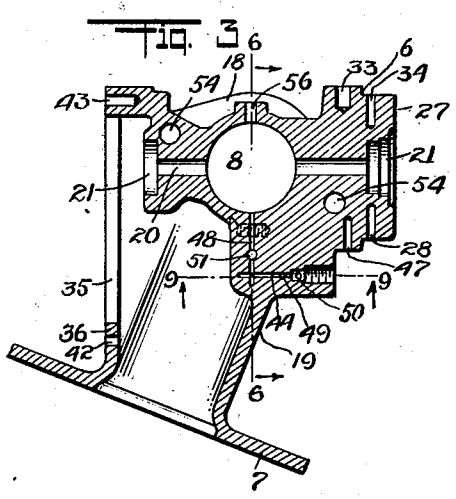


Fig. 4

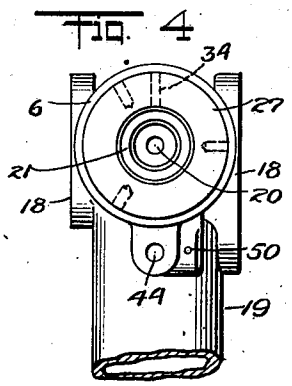


Fig. 5

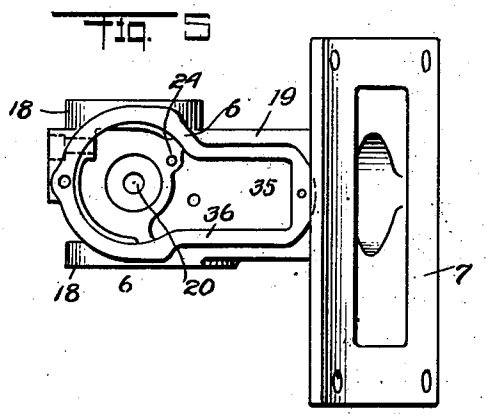


Fig. 6

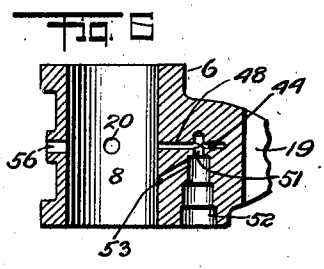


Fig. 7

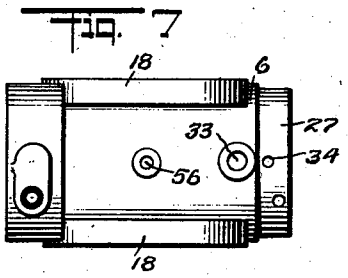


Fig. 8

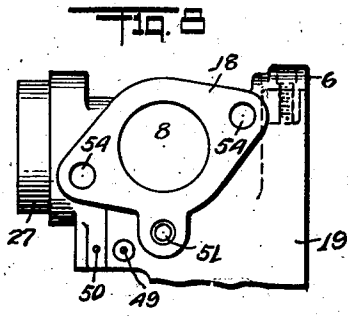
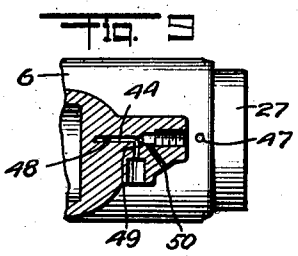


Fig. 9



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UNITED STATES PATENT OFFICE.

WARNER T. TABB AND HYMAN G. ADLER, OF BROOKLYN, NEW YORK, ASSIGNORS TO DUPLEX ENGINE GOVERNOR COMPANY, INC., OF BROOKLYN, NEW YORK, A CORPORATION OF NEW YORK.

SPEED REGULATOR.

Application filed November 25, 1921. Serial No. 517,781.

This invention relates to an improvement in speed regulators; particularly a speed regulator adapted to be attached to an engine, and to operate by throttling the motive agent when the engine approaches or reaches a predetermined limiting speed.

An object of this invention is to provide a speed regulator that can be conveniently mounted partly on the exterior and partly on the interior of special types of engines, and connected to respond to variations in the speed thereof, without necessitating any material change in the construction of the engine or any extensive alteration or rearrangement of the parts of same.

A further object of this invention is to provide a speed regulator which is easy to install, simple and inexpensive to manufacture, and at the same time practical and efficient in use.

Other objects and advantages of this invention will appear from the following description and drawings, and the novel features of our improvement will be defined in the appended claims. But this disclosure of course sets forth only the preferred embodiment of our speed regulator, and we may resort to variations in the shape, size and arrangement of the parts, to the full extent indicated by the broad and general meanings of the terms in which the claims are expressed.

On the drawings:

Figure 1 is a view showing in operative position, a regulator according to our invention; with the adjacent portions of the engine upon which it is disposed, in vertical section.

Figure 2 is a section taken substantially on line 2—2 in Figure 1.

Figure 3 is a horizontal section of a member which houses the throttle valve of our regulator.

Figure 4 is an end view of the parts shown in Figure 3 seen from the right.

Figure 5 is a front view of the member shown in Figure 3 in the position which it occupies when secured to the engine upon which it is employed.

Figure 6 is a section on line 6—6 of Figure 3.

Figure 7 is a view of the casting shown in Figure 3, seen from above.

Figure 8 is a bottom plan of said casting, presented as it appears when the casting shown in Figure 4 is looked at from the right; and

Figure 9 is a section on the line 9—9 of Figure 3.

On the drawings, the same numerals identify the same parts throughout.

In the detailed description of the embodiment of our speed regulator herewith set forth, we use the numeral 1 to indicate a portion of the lower part of the frame work of an engine, such as an internal combustion engine, for example; although the regulator may be used upon a steam engine and other motors as well. The frame work or body 1 may be the crank case of the engine and the part 2 above same will be that portion of the frame work or body which contains the power cylinders and the pistons. In the case of an internal combustion engine there will be an intake conduit or manifold 3 for the fuel that is supplied to the engine to be ignited and burnt; and this manifold will be in connection with the usual carburetor not shown, through a pipe or conduit 4. In the practice of our invention we make an opening 5 in the side of the part 2 of the frame work of the engine and secure over this opening a member, such as a casting 6, having a flange 7 which fits against the edges of the opening 5 and can be held fast by bolts or screws. This casting 6 has a bore 8 through same so that it can be inserted between the manifold 3 and conduit 4 to connect one with the other and maintain communication between the two; and in the bore 8 is a pivoted throttle valve 9, to be connected to a governor and be controlled thereby; so as to throttle or shut off the fuel or motive agent, normally flowing through the pipe 4, the bore 8 in the casting 6 and the manifold 3; when the engine approaches or reaches its maximum allowable speed. This valve 8 is under the influence of a spring to hold it in open position, but when the governor acts, the springs is overcome and the valve moved towards closed position. The casting is on the outside of the engine and the governor on the inside, being housed by the parts 1 and 2 and connected to a moving part of the engine to be driven thereby. This governor is indicated in Figure 1 as embracing a rotatable casing 10 secured to a shaft 11, which is connected

to the engine in a manner that need not be shown; the shaft and the casing rotating together. Inside the casing 10 may be a number of radial vanes which agitate a liquid and throw the liquid against similar vanes on a member in the casing 10 and mounted therein so as to be free to turn with respect to same. This member (not shown) has a rigid shaft 12 that projects through the top of the casing 10 and carries fixed to its outer end a grooved wheel 13. This wheel 13 is joined by a flexible element, such as a cord 14, to a grooved member or segment 15, secured to the stem 16 of the valve 9. This stem is mounted in bearings in the casting 6 and extends through the bore 8; and whenever the speed of the engine rises sufficiently, the vanes on the inside of the casing 10 will act through the medium of the liquid in this casing to exert sufficient turning force or torque upon the shaft 12 to make the cord 14 pull the valve fully or partly shut; and thus prevent the safe speed of the engine from being exceeded.

Of course it is not material to this invention just how the shaft 11 is connected to the engine to be actuated or how the shaft 11 is supported to turn in the frame work 1. We also do not find it necessary to describe the particular structure of the governor 10, as this governor may be of the same design as is disclosed in the application of Warner T. Tabb, No. 450,261, for a patent on speed regulator, filed March 7th, 1921; and we may use the same governor, or a governor of a different type, if circumstances require. The parts 1 and 2 of the frame work of the engine may be in one piece or in two pieces as shown, and can be connected together by suitable bolts, one of which is indicated at 17.

The casting 6 may have any required shape and we illustrate same as being provided with upper and lower flanges 18, to enable the casting to be bolted to the manifold 3 and conduit 4; the valve stem 16 passing through the casting across the bore 8 between these flanges; and the portion having the flanges and the bore 8 may also have a neck or extension 19 with the aforesaid flange 7 at its outer extremity. This neck is hollow so that the cord 14 may pass freely from the wheel 13 through the opening 5 into the neck to the segment 15. The casting is drilled through between the flanges as indicated at 20 to receive the spindle 16 of the valve 9; and the opposite extremities of the passage 20 may be counter-bored, as indicated at 21, to receive ball bearings. The ball bearings may be of the usual type consisting of a ring having a race-way for the balls therein; and at one end of the spindle the balls mentioned may be engaged by the hub of the segment 15, which is of course rigid with the spindle; and at the other end of the spindle the balls may be engaged by a sleeve 22 made fast to same. The segment 15 has a projection 23 to engage a stop 24 inside the casting 6. To the sleeve 22 is fixed one end of a coiled spiral spring 25; which is anchored at its other end to a cap 26; and acts to hold the valve open; the stop 24 limiting the extent to which the spring 25 can turn the spindle 16. The cap 26 is removable and adjustable. It fits over a cylindrical projection 27 on the casting 6 and this projection may have at one or more points a bore 28 containing a spring pressed ball 29 to engage a circular groove 30 on the inside of the rim of the cap 26, to hold the cap in place. To remove the cap it is grasped by hand and given a pull to make the inside of the cap beyond the groove 30 force the ball inward. To prevent turning of the cap, and to hold the spring under tension when the projection 23 strikes against the stop 24, and at all other times in the operation of the speed regulator, we use an element 31 in the form of a bent eyelet pin which passes through the side or rim of the cap 26 into a recess or bore in the boss 27, and is engaged by a stud or pin 32 passing through the opening in the outer end of the pin and made fast to the casting 6 by being tightly driven into a bore 33. The opening in the projection 27 for the pin 31 is indicated at 34 and there is of course a corresponding perforation in the rim of the cap 26. A number of perforations may be made in the rim of the cap 26 so as to permit variation of the tension of the spring 25, as by withdrawing the pin 31 and then turning the cap 26 on the projection 27 through the desired angle. Whenever anyone of the perforations in the rim of the cap 26 registers with the bore 34 in the projection 27, the pin 31 can be replaced. Of course the cap cannot be removed till the pin 31 is taken out.

One side of the casting 6 is provided with an opening 35 to give access to the cord 14 and the segment 15; and the edges 36 of this opening afford a seat for a closure plate 37, which can be made fast by means of a screw stud 38 and nut 39. The plate 37 may have an opening to receive the stud 38; the nut 39 being screwed over the outer end of the stud to engage the plate, and a seal comprising a wire loop 40 passed through a hole in the end of the stud, the ends of the loop being soldered or otherwise secured together, may be employed to prevent removal of the nut and the displacement of the plate 37. At its opposite end the plate 37 may be attached to the neck 19 by a rivet 41; the openings for the rivet 41 and the stud 38, which is driven tightly into a hole in the casting 6, being indicated at 42 and 43.

In operation, spring 25 normally holds the valve 9 open, so that the motive agent can flow freely up through the pipe 4 to the

manifold 3 and into the power cylinders; but whenever the speed of the engine reaches a certain point the governor will take effect upon the cord 14 to move the valve 9 against the force of the spring 25 to throttle the motive agent or to shut it off entirely.

In order to secure more perfect regulation and consumption of the fuel to the best advantage we may provide the casting 6 with a duct 44 which opens through side of the casting to the exterior thereof, and is enlarged and threaded at its outer extremity to receive a screw 45. This screw has a milled head and it is engaged by a spring-pressed stud or stop 46 in a bore or recess 47 in the casting. The duct 44 communicates with another duct 48 which leads into the bore 8 about the level of the valve 9. These two ducts are so located as to be horizontal when the casting 6 is attached to the frame work 2, and make a single continuous passage; and the duct 44 will communicate with a duct 49 and a duct 50, (see Figure 9) both of which lead downward through the bottom of the casting 6. The duct 49 will be connected to a pipe or by-pass from the float chamber of the carburetor, and the duct 50 will communicate with the atmosphere and allow more or less air to enter the duct 44 according to the position of the screw 45. A third duct 51 is drilled in the casting 6 up through the bottom thereof so that it intersects and communicates with the duct 48. This duct 51 is enlarged below the duct 48, as indicated at 52 in Figure 6, and the upper part of this enlarged portion communicates through a duct 53 with the bore 8 below the bearings 20 of the valve 9. The purpose of the enlarged portion 52 of the duct 51 is to receive an automatically acting plunger which will obstruct the passage of air and gasoline through the duct 48 under certain conditions and thus enable the regulator to be provided with a fuel compensator when desired. The particular structure and mode of operation of this compensator does not need to be set forth in detail herein; because, outside of the precise location of the ducts 44, 48, 49, 50 and 53; it is not a part of this invention; being shown and described in the co-pending application of Warner T. Tabb, No. 491,319 for a patent on a fuel compensator for governing devices, filed August 10th, 1921. The compensator prevents the motive agent or fuel from becoming too lean when the manually controlled valve of the carburetor is open and the valve 9 closed, and from becoming too rich when the carburetor throttle valve is closed and the valve 9 open. We deem it advisable to be able to use such a compensator with the regulator of this application, although the regulator will operate sufficiently well without such a compensator under all ordinary conditions.

The casting 6 has openings 54 for bolts to hold it and the manifold 3 and conduit 4 together, and for convenience in drilling the duct 48 there may be a hole 56 for them in the opposite side of the casting to be afterward closed by a stopper or plug when the casting has been machined and finished.

Having described our invention, what we believe to be new and desire to secure and protect by Letters Patent of the United States is:—

1. A speed regulator comprising a member having a bore therethrough, a throttle valve in said bore, the member being also provided with a passage extending from the exterior of said member to the inside of said bore adjacent said valve, a duct intersecting said passage and adapted to receive an automatically acting plunger to open and close the passage, another duct to enable said passage to be connected to the carburetor, and a duct to connect said passage with the atmosphere, and an adjustable screw to control said last-named duct.

2. A speed regulator for an engine comprising a governor to be mounted inside the engine and be driven thereby, said engine having an opening in line with said governor, and a member having a hollow neck with a flange to be secured to the edges of said opening, the member having a bore therethrough, a valve in said bore, to be connected to the governor through said neck and said opening and be controlled by the governor to throttle the motive agent for the engine, an adjustable spring at one end of said member to act upon the valve in opposition to the governor, and a closure plate at the other end of said member, said member having a passage therethrough leading to the bore adjacent said valve, and ducts communicating with the passage.

In witness whereof, we have signed our names to this specification this 30th day of September 1921.

WARNER T. TABB.
HYMAN G. ADLER.