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W. A. GIRARDIER ET AL

GOVERNOR FOR GAS ENGINES

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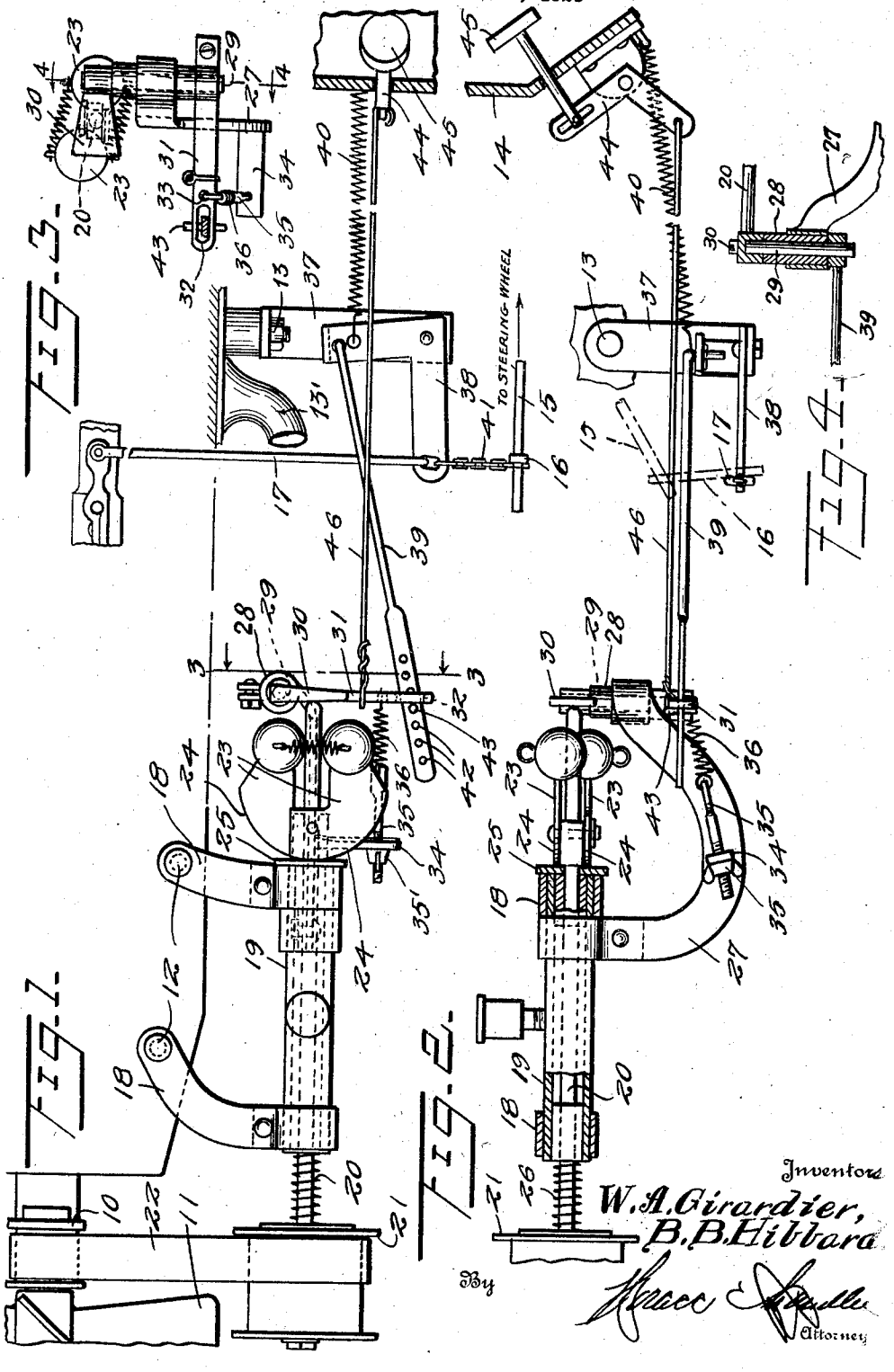



FIG. 3.

FIG. 4.

FIG. 1.

FIG. 2.

Inventors
W. A. Girardier,
B. B. Hibbard
By
Attorney

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WILTON A. GIRARDIER AND BENJAMIN B. HIBBARD, OF ST. CLAIR, MISSOURI.

## GOVERNOR FOR GAS ENGINES.

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This invention relates to governor devices, and particularly to governor devices for use in connection with automobile engines of the explosive type.

One object of the invention is to provide a governor which will automatically accelerate the engine when said engine begins to labor under a heavy load, or when ascending a steep grade.

Another object is to provide a governor which is adapted to be set to permit the engine to operate at a predetermined speed, by automatically regulating the amount of gas fed to the engine, and which will automatically increase the amount of gas fed to the engine, when said engine is subjected to heavy strain.

Another object is to provide a device of this character which permits the ordinary hand feeding of gas to the engine, should it be desired to travel at a speed greater than that normally permitted by the governor.

Other objects and advantages will be apparent from the following description when taken in connection with the accompanying drawings.

In the drawings:

Figure 1 is a top plan view of the invention and the associated portions of the automobile.

Figure 2 is a side elevation of the same, certain parts being in section.

Figure 3 is a vertical transverse sectional view on the line 3—3 of Figure 1, looking toward the governor.

Figure 4 is a section on the line 4—4 of Figure 3.

Referring particularly to the accompanying drawing, 10 represents the pulley of the cooling fan 11, 12 the engine block head securing bolts, 13 the bolts for securing the radiator outlet pipe 13′ to the engine, 14 the foot-board of the automobile, 15 the gas rod leading to the steering wheel of an automobile, not shown, and having the radial arm 16, and 17 the link which connects with and operates the throttle of the engine, all of which are associated in connection with the present invention.

Secured to the engine block, by means of two of the said bolts 12, are the arms 18, which carry the tubular member 19. Rotatably disposed in the tubular member 19 is a shaft 20, the forward end of which carries a pulley 21, over which the fan belt 22 engages, while the other end of the shaft projects beyond the rear end of the member, for a purpose which will presently appear herein. Pivotally mounted on this projecting end of the shaft 20 are the centrifugal governor arms 23, said arms having the cam portions 24, which bear against the washer ring 25, disposed on the shaft in contact with the adjacent end of the tubular member 19. Between the forward end of the member 19, and the pulley 21, is a coil spring 26 which urges the shaft forwardly, and swings the governor arms inwardly toward each other. It will be noted that the pulley 21 is of sufficient length to permit movement thereof, with the shaft 20, whereby not to interfere with the engagement of the fan belt thereon, when the governor arms swing outwardly and bear against the washer 25 to slide the shaft 20 rearwardly through the tubular member 19. Fixed to the rear end of the member 19 is a downwardly bowed arm 27, and formed on the rear end of said arm is the vertical bearing 28 in which is disposed the vertical rock shaft 29. Fixed on the upper end of the rock shaft 29 is a radial arm 30 which lies in the path of the adjacent end of the shaft 20 for movement thereby, when said shaft 20 is moved rearwardly by the governor arms. Fixed to the lower end of the rock shaft 29 is a radial arm 31, having an elongated opening 32 in its outer end, and a circular opening 33 inwardly of said elongated opening. Extending laterally from the intermediate portion of the bowed arm 27 is an apertured post 34, and disposed through the aperture of said post is an eye-bolt 35. Connected in the eye of said bolt, at one end, and in the opening 33, at its other end, is a coil spring 36, which normally draws the arm 31 in the direction of the post 34, whereby to engage and maintain the arm 30 in contact with the end of the shaft 20. Secured to the engine by means of one of the before-mentioned bolts 13 is an angle bracket 37, and pivotally supported on this bracket is a bell crank lever 38. Pivotally connected to one arm of this bell crank lever is one end of the throttle link 17, while a link 39 is pivotally connected to the end of the other arm of the crank 38. A spring 40 is also connected to this last-named arm of the crank, and to the foot-board 14, of the automobile, said spring serving to resiliently

and yieldably maintain the bell crank in a predetermined position. Connected to the outer end of the first-named arm of the bell crank lever 38, and to the radial arm 16 of the gas rod 15, is a section of chain 41, which is adapted to rock the bell crank when the gas rod 15 is rocked, in the ordinary hand feeding of gas, but which is inactive when the device operates in a manner to be later described hereinafter. The other end of the link 39 is flattened and provided with a longitudinal series of openings 42, said end being slidably disposed in the elongated opening 32 of the arm 31. Secured in one of the openings 42, at the spring side of the arm 31, is a pin 43, which is adapted to be engaged by said arm, whereby to exert a pulling force on the link, under the influence of the said spring 36. Pivotally mounted on the foot-board 14 is a bell crank lever 44, one arm of which carries a pedal button 45, disposed above the said board, for depression by the foot of the driver of the automobile. Connected to the other arm of the crank 44, at one of its ends, and to the arm 31, at its other end, is a wire 46, which is adapted to swing the arm rearwardly against the tension of the spring 36, whereby to rock the shaft 29 and move the other arm 30 away from the end of the shaft 20, and permit the spring 40 to rock the bell crank 38. The tension of the spring 36 is regulated by means of a winged nut 35′, on the bolt 35, which bears against the said post 34.

When the engine is at rest the parts are in the positions shown in Figures 1 and 2. The engine is started, and the gas fed by the use of the usual hand throttle arm or lever on the steering wheel of the automobile. The engine is then permitted to run at its maximum speed, which has been previously determined, and for which speed the parts of the mechanism have been properly adjusted. Under normal conditions the spring 36 draws the arm 31 forwardly so that it bears against the pin 43, thereby pulling on the link 39 to rock the bell crank lever 38, to partially open the throttle. The spring 40 normally tends to urge the bell crank so that the link 17 will move the throttle toward closed position, but the greater strength of the spring 36 counteracts this so that the crank 38 is rocked to cause the throttle to be opened. As the engine increases in speed the governor arms will swing away from each other whereby to urge the shaft 20 against the arm 30, with the result that the arm 31 will be swung outwardly against the tension of the spring 36. As the arm 31 moves outwardly the pressure against the pin 43 is relieved, whereupon the spring 40 exerts its force to rock the bell crank 38, and cause the partial closing of the throttle. This, then, causes the engine to slow down to its normal predetermined speed. When the engine slows down, as when climbing a steep grade, or upon application of a heavy load, the governor arms will move toward each other, thus permitting the spring 36 to pull on the arm 31, so that it will engage the pin 43, and rock the bell crank 38 so that the throttle will be opened to a greater extent. Thus the engine is given more gas, when under strain of a load, without attention of the driver. The automobile is thus automatically controlled, with respect to its speed, and a constant speed maintained under varying conditions.

By adjusting the nut 35′ the tension of the spring 36 may be varied, and hence the strength of action of the arm 31 with relation to the bell crank lever 38, can be regulated, whereby to permit the throttle valve to be held in open position, to different degrees. Also, by placing the pin 43 in a different opening 42, the maximum speed may be increased or diminished, according to the desires of the driver. The chain 41 is normally slack during the operation of the device.

What is claimed is:

1. An automatic speed regulator for an explosive engine including a governor actuated shaft, gas feeding means including a throttle opening and closing lever, spring means normally urging the lever toward throttle closed position, spring urged means normally engaged with the shaft and operatively connected with the lever for holding the latter in its throttle opened position and arranged to be moved by said shaft, and means for moving said spring urged means away from the shaft whereby to permit the closing lever to be moved toward throttle closed position by said spring means.

2. An automatic speed regulator for an explosive engine including a governor actuated shaft, means normally held engaged with the shaft and adapted to be moved thereby, gas feeding means including a throttle and the opening and closing lever connected therewith, spring means tending to move the lever into its throttle closed position, connections between the shaft engaging means and the lever for holding the lever in its throttle opened position and against the action of the spring means, and means for moving the shaft engaged means away from the shaft, whereby to permit the closing spring means to act upon said lever to close the throttle.

3. An automatic speed regulator for explosive engines including a governor actuated shaft, gas feeding means including a throttle and the opening and closing lever connected therewith, an arm movable in one direction by said shaft, spring means for retaining the arm in engagement with the shaft, a link connected with said lever and freely slidable through said arm in one direc-

tion, means on the link and engaged by the arm for maintaining the link against movement through the arm in the opposite direction, spring means operable to move the lever toward its throttle closing position when the arm is moved by said shaft, and means for moving the arm away from the shaft whereby to permit the lever to close the throttle.

In testimony whereof, we affix our signatures.

WILTON A. GIRARDIER.
BENJAMIN B. HIBBARD.