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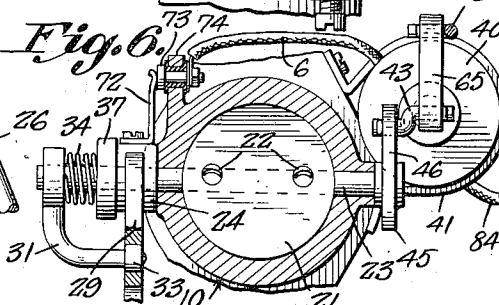
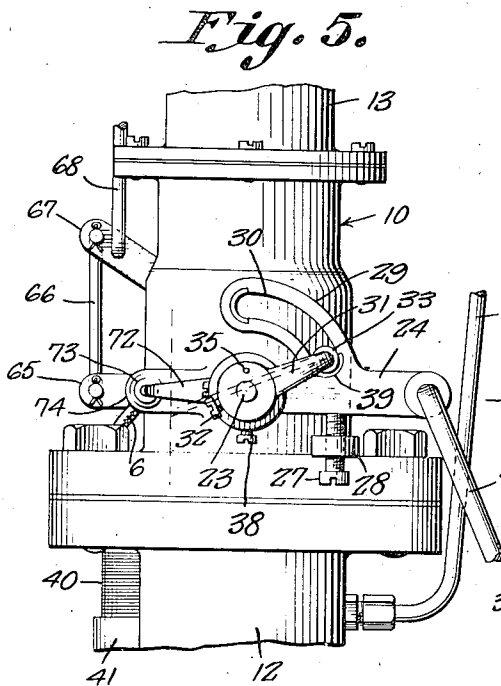
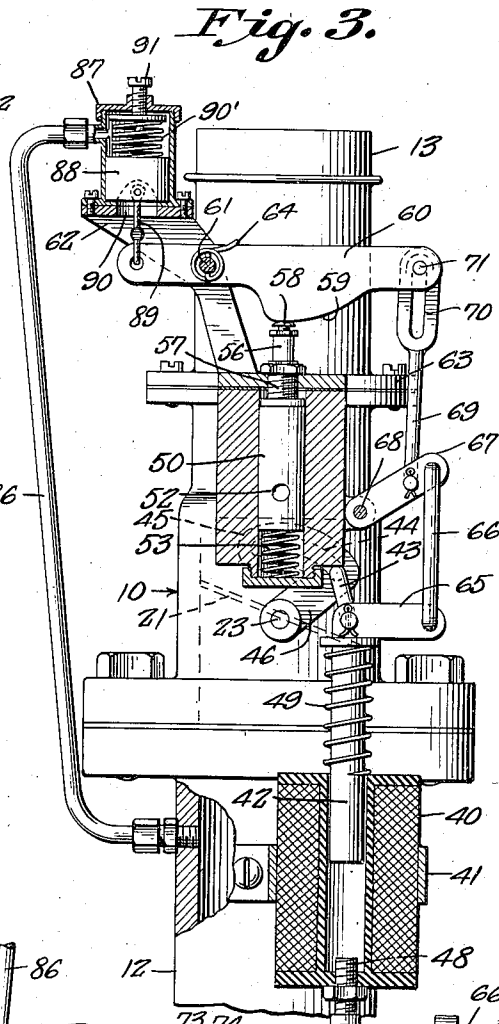
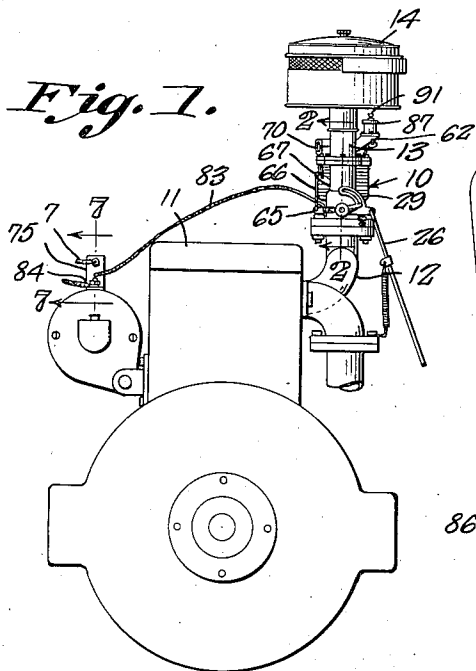
W. E. GOLDI

2,261,992

CARBURETOR

Filed Aug. 5, 1940

2 Sheets-Sheet 1.



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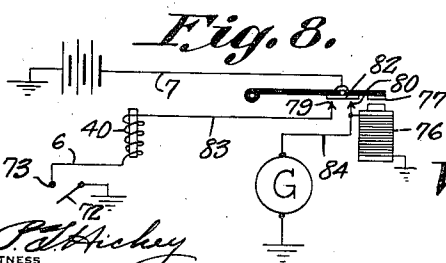
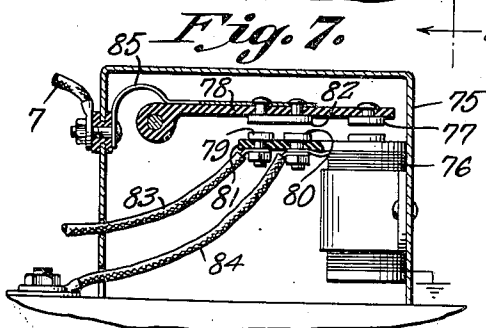
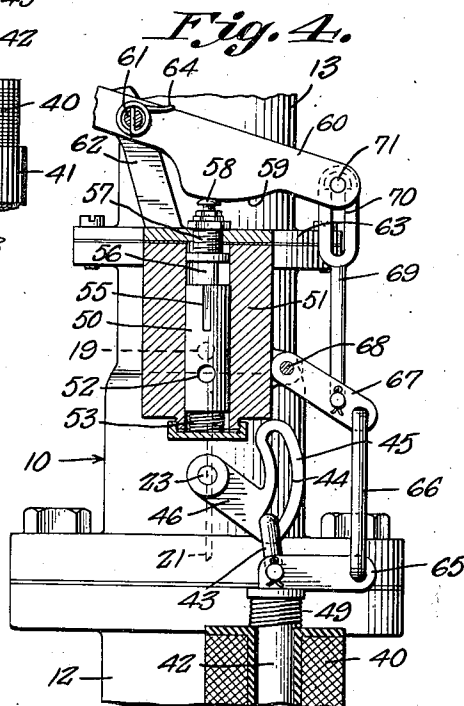
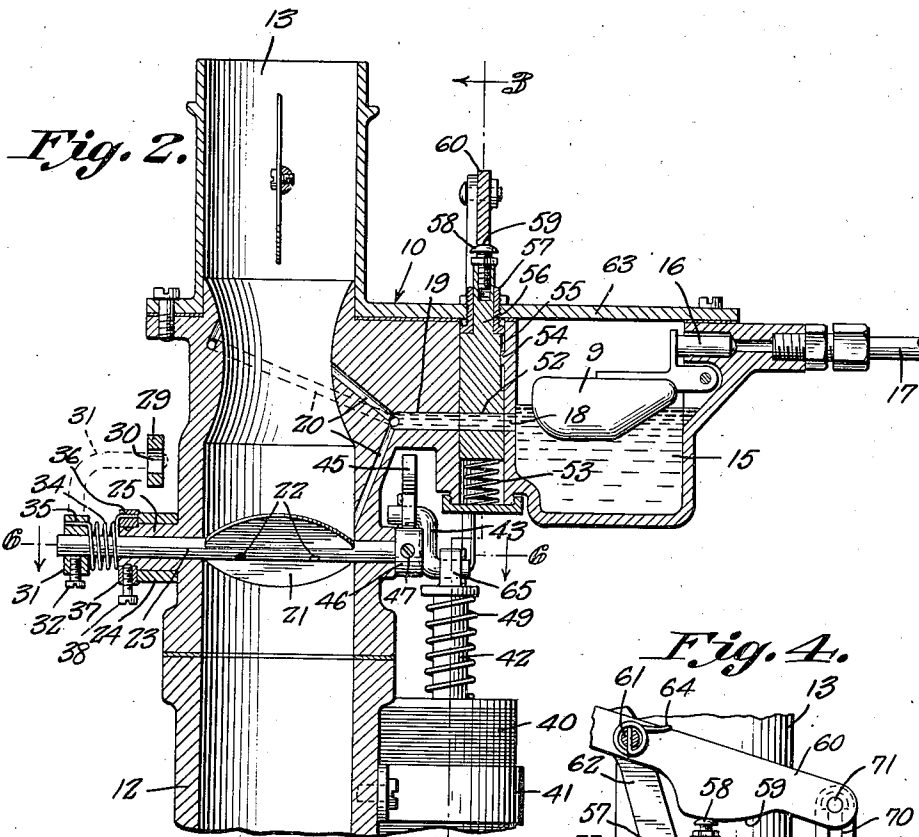
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CARBURETOR

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,261,992

CARBURETOR

William E. Goldi, Culver City, Calif.

Application August 5, 1940, Serial No. 351,503

8 Claims. (Cl. 123—97)

This invention relates to a carburetor and has for an object to provide a carburetor and connections therefor adapted to provide relief of harmful depression conditions in the combustion chamber of an internal combustion motor arising from the absence of a compressible medium whenever the motor is propelled by any outside force, such as the momentum of a vehicle descending a grade or preliminary to stopping with the carburetor throttle valve completely closed.

Carburetion creates an unnecessary waste of gasoline due to the idling position of the throttle valve, and also a suction is created by the piston rings whereby crank case oil is drawn into the combustion chamber due to the void in the combustion chamber. Upon resuming power the unnecessary oil is burned and creates carbon and unnecessary fouling of the plugs, chambers, pistons and rings and also throws an unnecessary strain upon the lower or connecting rod, bearing caps, etc. To distinguish between the two actions which are produced by the carburetor of this invention, it may be said that carburetion takes place when the throttle valve is operating normally as a mixture metering valve when the motor is propelling the vehicle, and no carburetion takes place, according to this invention, when the throttle valve is fully open and operating in conjunction with a fuel shut-off valve when the vehicle is propelling the motor.

Briefly, the present invention contemplates disconnecting the throttle valve from the direct control of the accelerator pedal and permitting it to be electrically controlled to open and close independently of the operation of the accelerator pedal in conjunction with an electrically controlled plunger valve which completely shuts off the fuel supply simultaneously with this independent movement of the throttle valve to fully open position. The advantage of this construction and operation is that of utilizing the idle or closed periods of the conventional carburetor throttle while the vehicle is propelling the motor, since the fully open throttle functions merely as an air inlet valve for supplying a compressible medium for the piston to relieve the above described detriment, and the fully closed fuel valve functions to promote fuel economy.

A further object is to provide apparatus of this character which will be formed of a few strong, simple and durable parts, which will be inexpensive to manufacture, and which will not easily get out of order.

With the above and other objects in view the invention consists of certain novel details of con-

struction and combinations of parts hereinafter fully described and claimed, it being understood that various modifications may be resorted to within the scope of the appended claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the accompanying drawings forming part of this specification:

Figure 1 is an end elevation of a conventional internal combustion engine and a carburetor constructed in accordance with the invention.

Figure 2 is a vertical sectional view taken on the line 2—2 of Figure 1 drawn to large scale showing the parts of the carburetor in normal idling position.

Figure 3 is a vertical sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a fragmentary view similar to Figure 3, but showing the parts in position to admit uncarbured air.

Figure 5 is a fragmentary end elevation of the carburetor, similar to Figure 1, but drawn to large scale.

Figure 6 is a cross sectional view of the carburetor taken on the line 6—6 of Figure 2.

Figure 7 is a detail cross sectional view of a generator cut-out taken on the line 7—7 of Figure 1.

Figure 8 is a diagrammatic view showing the electrical connections of the carburetor.

Referring now to the drawings in which like characters of reference designate similar parts in the various views, 10 designates a carburetor for an internal combustion motor 11, the carburetor as usual being connected at the bottom to the intake manifold 12 and at the top to the air intake pipe 13, which in the present embodiment of the invention is equipped with a conventional air cleaner 14. The carburetor is provided with a fuel chamber 15, the fuel level of which is controlled by a conventional valve 16 which controls a fuel inlet pipe 17 and is provided with a float 9 which maintains the required fuel level in the chamber. The chamber communicates through aligned fuel passages 18 and 19 with vent passages 20 which communicate with the mixing chamber in the usual manner. A throttle valve 21 is secured by screws 22, or other connectors, to a shaft 23 which projects at both ends from the carburetor. These parts are substantially conventional in all carburetors.

In carrying out the invention a throttle lever 24 is loosely mounted at one end on a hub 25 formed on the carburetor and which forms a bearing for one end of the throttle shaft 23.

The throttle lever is connected at the free end to an accelerator rod 26 which is as usual connected to an accelerator pedal not shown. The throttle lever is limited in movement toward closed throttle position by an adjusting screw 27 carried by a bracket arm 28 which projects from the carburetor.

The throttle lever is provided on the upper side intermediate its ends with a curved arm 29 whose center of curvature is on the axis of the throttle shaft 23 and which is provided with a curved longitudinal slot 30. A crank 31 is secured at one end to the projecting end of the throttle shaft 23 by a set screw 32 and at the opposite end is provided with a roller 33 which rides in the slot 30.

A helical spring 34 is sleeved on the projecting end of the throttle shaft 23 and one end is engaged in an opening 35 in the crank 31 and the opposite end is engaged in an opening 36 formed in a collar 37 which is adjustably secured on the hub 25 by a set screw 38. The spring normally tends to hold the crank 31 in such position that the roller 33 is disposed on a seat 39 formed at the lower end of the slot 30 in which position the throttle valve 21 is fully closed, or is in adjusted position according to the adjustment of the screw 27. When the accelerator rod 26 is moved upwardly to full open position, the seat 39 of the throttle lever will push the roller 33 ahead of it and rock the crank to open the throttle valve.

For moving the throttle valve 21 independently of the throttle lever 31 a solenoid 40 is secured to the carburetor, as shown in Figures 2, 3, 4, 5 and 6, by a band clamp 41, or other means. The core 42 of the solenoid is provided with a Z-shaped link 43 which is received in an arcuate slot 44 formed in an arcuate arm 45 which is integral with a lever 46 secured to the opposite end of the throttle shaft 23 from the throttle lever by means of a set screw 47.

When the solenoid is energized, the core 42 will swing the lever 46 downward to rock the throttle valve 21 fully open, the crank 31 and roller 33 moving longitudinally of the throttle lever's curved arm 30 during this operation. An adjusting screw 48 is disposed in the bottom of the solenoid 40 to limit downward movement of the core 42. A helical spring 49 is sleeved on the core 42 to return the core to initial position after each actuation, the core during such movement pushing the link 43 upwardly in the slot 44 to allow the throttle valve to be under the control of the accelerator rod 26.

When the parts are in the position shown in Figure 4, the vehicle is being propelled by the ground wheels, as when traveling downgrade while at the same time the solenoid is energized to move the throttle valve to fully open position to supply uncarbureted air to the combustion chambers of the cylinders to provide a compressible medium and prevent objectionable void in the cylinders.

By referring to Figure 2 it will be seen that a fuel controlling plunger valve 50 is slidably mounted in a valve housing 51, formed integral with the carburetor, and is provided with a transverse passage 52 which registers completely or partly with the passages 18 and 19 to control the flow of fuel to the jet passages 20. A compression spring 53 is mounted in the housing below the plunger valve and tends to normally open the valve. To prevent the valve from turning axially a projection 54 is formed on the

wall of the housing and enters a longitudinal groove 55 formed in the side of the valve.

The valve is equipped with a stem 56 which projects through an adjustable collar 57 carried by the top of the housing. The stem is equipped with an adjusting screw 58 which contacts with a cam surface 59 formed on the bottom of one end of a rocker arm 60 which is pivoted intermediate its ends, on a pivot pin 61, on a bracket 62 which rises from the top plate 63 of the carburetor. A spring 64 fixed to the pivot pin 61 engages the rocker arm 60 and tends to hold the rocker arm against the screw 58 and prevent rattle, see Figure 4.

A linkage connects the solenoid core 42 with the rocker arm and comprises a lever 65 which is secured rigidly to the top of the core and is connected to a link 66 which is connected to a reduction lever 67 which is pivoted, as shown at 68, to the side of the carburetor. A link 69 is connected to the lever 67 and at the upper end is provided with a longitudinal slot 70 which receives a pin 71 fixed to the rocker arm 60.

When the throttle lever 24 is in idling position, as will be the case when the vehicle coasts downhill, with the generator running at generating speed, the uncarbureted air supplying function of the carburetor takes place as previously explained, simultaneously therewith the core lever 65 will be at its downward limit of movement to pull the free end of the rocker arm downward with the result that the rocker arm cam portion pushes the fuel plunger valve 50 down to its extreme lower limit of movement to disconnect the passage 52 in the valve from the passages 18 and 19 and positively shut off the flow of fuel through the valve to the jets 20, thus saving fuel which normally is wasted in conventional carburetors.

When the valve 50 is thus operating during uncarbureted air valve function of the carburetor to shut off the fuel supply, the solenoid 40 is automatically energized by the generator by the closing of switch means in the solenoid circuit. The switch means comprises a switch contact 72 on the throttle lever as shown in Figures 5 and 6 and a stationary switch contact 73 on an arm 74 on the carburetor. When the throttle lever 24 is in idling position and the vehicle is coasting downhill the switch contact 72 will be disposed in circuit closing position with the stationary switch contact 73 and close the energizing circuit of the solenoid 40.

The electrical control for the solenoid 40 will now be described. As shown in Figure 7, the generator cut-out 75 comprises an electro-magnet 76 having an armature 77 carried by a pivoted arm 78 formed of insulating material. A pair of stationary contacts 79 and 80 is fixed to an insulating arm 81 which projects from the electro-magnet, and which underlie a bridging contact 82 disposed on the bottom face of the armature arm 78. The electro-magnet is grounded in the usual manner as shown. The contact 79 is connected to the solenoid 40 by a wire 83. The contact 80 is connected to the generator by a wire 84. The bridging contact 82 is connected by a spring conductor arm 85 and wire 7 to the battery. The solenoid 40 is connected to the stationary contact 73 on the carburetor by a wire 6.

Under normal running conditions when the carburetor is operating as a fuel metering device and the throttle lever 24 is in some degree of open position, the generator is charging the battery

through the wire 84, contacts 80 and 82, spring conductor 85 and wire 7.

Whenever the heretofore mentioned switch contacts 72 and 73 are brought into circuit closing position by movement of the throttle lever 24, the solenoid 40 will be automatically energized to open the throttle valve 21 fully if the generator contacts 79 and 82 are in circuit closing position. Energizing of the solenoid 40 occurs only when the generator is charging the battery and the throttle lever 24 is in idling position, which is only when the motor is operating above idling speed, as when the vehicle is propelling the motor when the vehicle is coasting down hill or when the vehicle is slowing down to come to a stop.

When the motor drops down to idling speed and the carburetor is functioning as a mixture metering device the generator no longer charges the battery so that the electro-magnet 40 is de-energized, the contacts 79, 80 and 82 are in open circuit position, and all the uncarbureted air valve parts are quiescent to cause the carburetor to operate as a normal carburetor.

It is contemplated in the present invention to economize in fuel under normal running or metering conditions of the carburetor. To effect this a pipe 86 is connected to the intake manifold 12 at one end and at the opposite end enters the top of a cylinder 87 which is mounted on the before-mentioned bracket arm 62. A piston 88 is disposed in the bottom of the cylinder and carries a cable 89 which passes through an opening 90 in the bottom of the cylinder and is connected to the rocker arm 60. A helical spring 90 is seated on top of the piston and the pressure of the spring is regulated by an adjusting screw 91.

During normal driving conditions when the operator slacks his foot pressure on the accelerating pedal, a vacuum will build up in the intake manifold and be communicated to the piston 88 to lift the piston and pull up the adjacent end of the rocker arm thereby pushing down the cam portion 59 of the rocker arm against the screw 58 carried by the fuel valve 50 to partly close the fuel valve and effect an appreciable saving of fuel over normal carburetors.

From the above description it is thought that the construction and operation of the invention will be fully understood without further explanation.

What is claimed is:

1. The combination with an internal combustion engine and a generator, of a carburetor, a throttle valve in the carburetor, a throttle lever releasably connected to the throttle valve, electro-magnetic means releasably connected to the throttle valve and responsive to pre-determined speed of the generator and to position of the throttle lever for opening the throttle valve independently of the throttle lever, a fuel valve in the carburetor, and means connected to the throttle valve and responsive to actuation of said electro-magnetic means for closing the fuel valve.

2. The combination with an internal combustion engine and a generator, of a carburetor, a throttle valve in the carburetor, a throttle lever releasably connected to the throttle valve, electro-magnetic means releasably connected to the throttle valve, a circuit for said means connected to the generator, switch means in the circuit controlled by the throttle lever and by pre-determined generator speed to energize the electro-magnetic means for opening the throttle valve

when the throttle lever is in idling position and the engine is operating above idling speed, a fuel valve in the carburetor, and link mechanism connected to the fuel valve and actuated by said electro-magnetic means for closing the fuel valve.

3. The combination with an internal combustion engine and a generator, of a carburetor, a throttle valve in the carburetor, a throttle lever releasably connected to the throttle valve, a solenoid having a spring-pressed core releasably connected to the throttle valve, a circuit and switch means therein connected to the solenoid and to the generator and controlled by the throttle lever and by battery charging speed of the generator for energizing the solenoid to actuate the core and open the throttle valve when the throttle lever is in idling position and the engine is operating above idling speed, a fuel valve in the carburetor, and means connected to said core and connected to the fuel valve for closing the fuel valve when the solenoid is energized.

4. The combination with an internal combustion engine and a generator, of a carburetor, a throttle valve in the carburetor, a throttle lever connected to the throttle valve, a solenoid having a spring-pressed core connected to the throttle valve, means disconnecting the throttle lever from the throttle valve and connecting the throttle valve to the core when the solenoid is energized, a circuit for the solenoid connected to the generator, switches in the circuit controlled by the throttle lever and by pre-determined speed of the generator for energizing the solenoid to actuate the core for opening the throttle valve when the throttle lever is in idling position and the engine is operating above idling speed, a fuel valve in the carburetor, and means connected to the core and connected to the fuel valve for closing the fuel valve when the solenoid is energized.

5. The combination with an internal combustion engine and a generator, of a carburetor, a throttle valve in the carburetor, a throttle lever, an arm on the throttle lever provided with an arcuate slot concentric with the axis of the throttle valve, a crank connected to the throttle lever movable by one end wall of said slot to open the throttle valve and movable longitudinally of the slot to disconnect the throttle lever from the throttle valve, a solenoid having a spring-pressed core, a second crank connected to the throttle valve, an arm on the second crank provided with an arcuate slot concentric with the axis of the throttle lever, a link connected to the solenoid core and adapted to engage an end wall of the second slot to open the throttle valve when the solenoid is energized and movable longitudinally of the second slot by said core to release the throttle valve for operation by the throttle lever when the solenoid is de-energized, a circuit for the solenoid, switch means in the circuit controlled by the throttle lever and by pre-determined speed of the generator to energize the solenoid when the throttle lever is in idling position and the engine is operating above idling speed, a fuel valve in the carburetor, and means connecting the core to the fuel valve for closing the fuel valve when the solenoid is energized.

6. The combination with an internal combustion engine and a generator, of a carburetor, a throttle valve in the carburetor, a throttle lever connected to the throttle valve, a solenoid having a spring-pressed core connected to the throttle valve, means disconnecting the throttle lever

from the throttle valve and connecting the throttle valve to be moved by the core when the solenoid is energized, a circuit for the solenoid connected to the generator, a switch of which the throttle lever is the movable member for closing the circuit at one point when the throttle lever is in idling position, an electro-magnetic controlled switch in said circuit controlled by the generator to close the circuit at another point when the generator is running at battery charging speed and the engine is operating above idling speed, closing of both switches simultaneously effecting the energizing of the solenoid, a fuel valve in the carburetor, and means connected to the core and connected to the fuel valve for closing the fuel valve when the solenoid is energized.

7. The combination with an internal combustion engine and a generator, of a carburetor, a throttle valve in the carburetor, a throttle lever connected to the throttle valve, a solenoid having a spring-pressed core connected to the throttle valve, means disconnecting the throttle lever from the throttle valve and connecting the throttle valve to be moved by the core when the solenoid is energized, a circuit for the solenoid connected to the generator, a switch of which the throttle lever is the movable member for closing the circuit at one point when the throttle lever is in idling position, an electro-magnetic controlled switch in said circuit controlled by the generator to close the circuit at another point when the generator is running at battery charging speed and the engine is operating above idling speed, closing of both switches simultaneously effecting the energizing of the solenoid, a fuel valve in the carburetor spring-pressed to normal open position, a rocker arm on the carburetor having a cam surface engaging the fuel valve to close the fuel valve against the tension of the controlling spring thereof, and linkage connected to said core and to the rocker arm for

moving the rocker arm to close the fuel valve when the solenoid is energized.

8. The combination with an internal combustion engine and a generator, of a carburetor, a throttle valve in the carburetor, a throttle lever connected to the throttle valve, a solenoid having a spring-pressed core connected to the throttle valve, means disconnecting the throttle lever from the throttle valve and connecting the throttle valve to be moved by the core when the solenoid is energized, a circuit for the solenoid connected to the generator, a switch of which the throttle lever is the movable member for closing the circuit at one point when the throttle lever is in idling position, an electro-magnetic controlled switch in said circuit controlled by the generator to close the circuit at another point when the generator is running at battery charging speed and the engine is operating above idling speed, closing of both switches simultaneously effecting the energizing of the solenoid, a fuel valve in the carburetor spring-pressed to normal open position, a rocker arm on the carburetor having a cam surface engaging the fuel valve to close the fuel valve against the tension of the controlling spring thereof, linkage connected to said core and to the rocker arm for moving the rocker arm to close the fuel valve when the solenoid is energized, a cylinder connected to the carburetor, a spring-controlled piston in the carburetor, a flexible connection between the piston and the rocker arm, a suction pipe connected to the carburetor and exerting suction on the piston against the tension of its controlling spring to move the piston when the engine operator slacks driving pressure on the throttle lever, and means releasably connecting said linkage to the rocker arm to permit operation of the rocker arm by said piston without affecting said linkage.

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