

March 25, 1941.

P. H. KOLB

2,236,145

MAGNETIC THROTTLE CONTROL

Filed Aug. 28, 1939

2 Sheets-Sheet 1

Fig. 1.

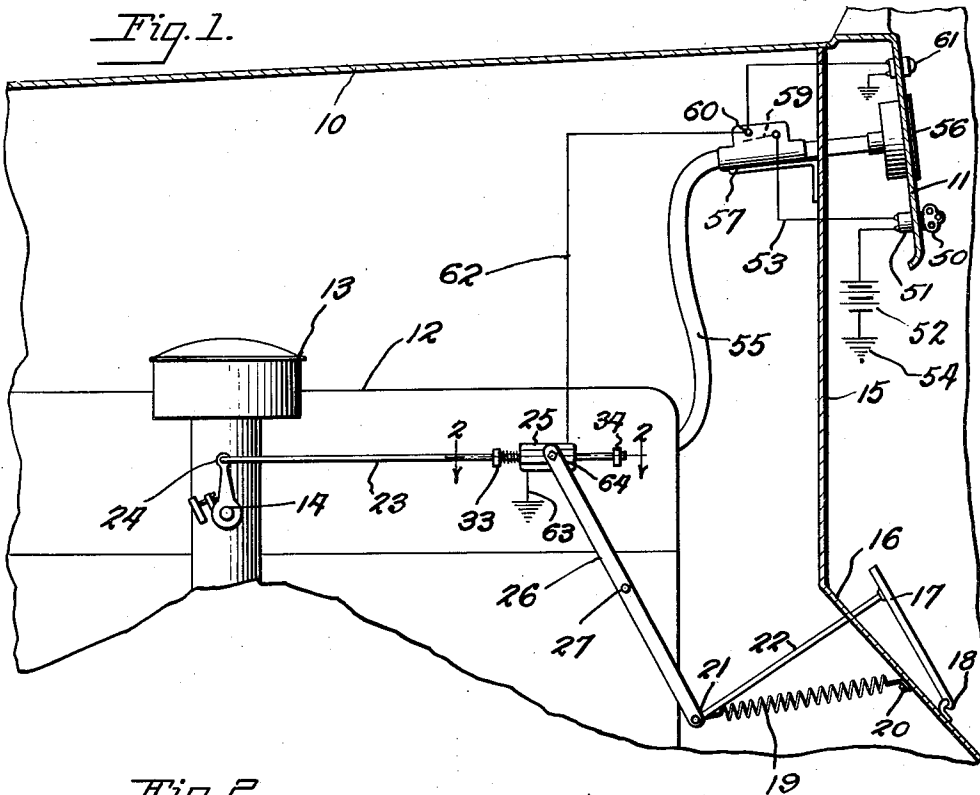


Fig. 2.

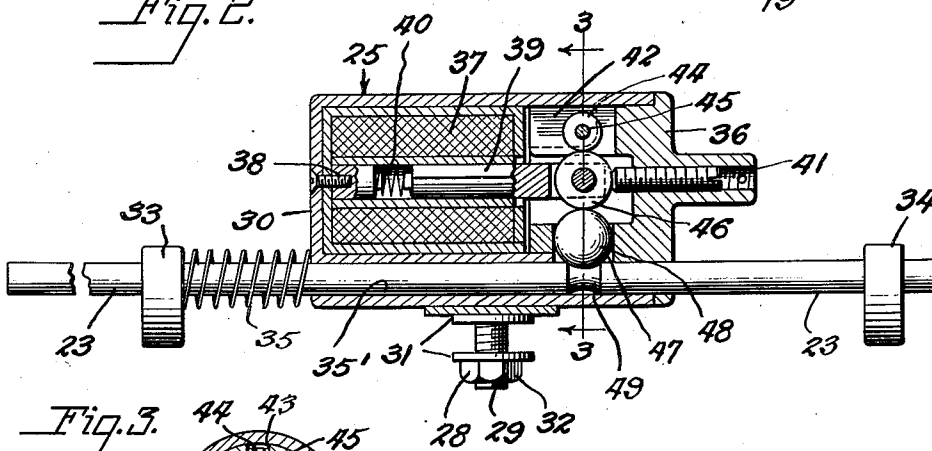
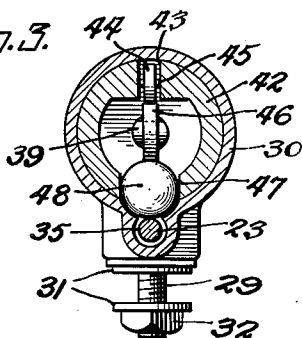


Fig. 3.



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Fig. 4.

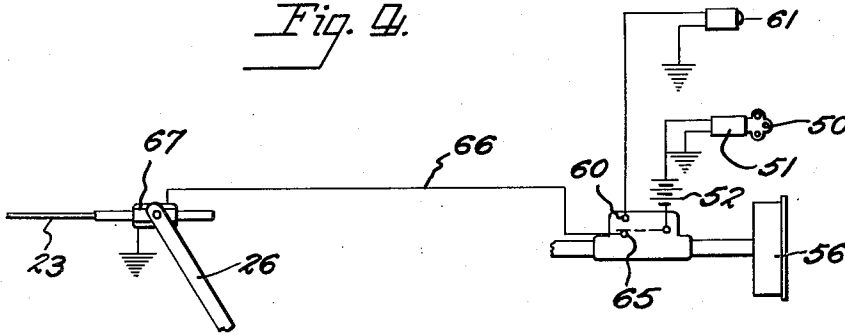


Fig. 5.

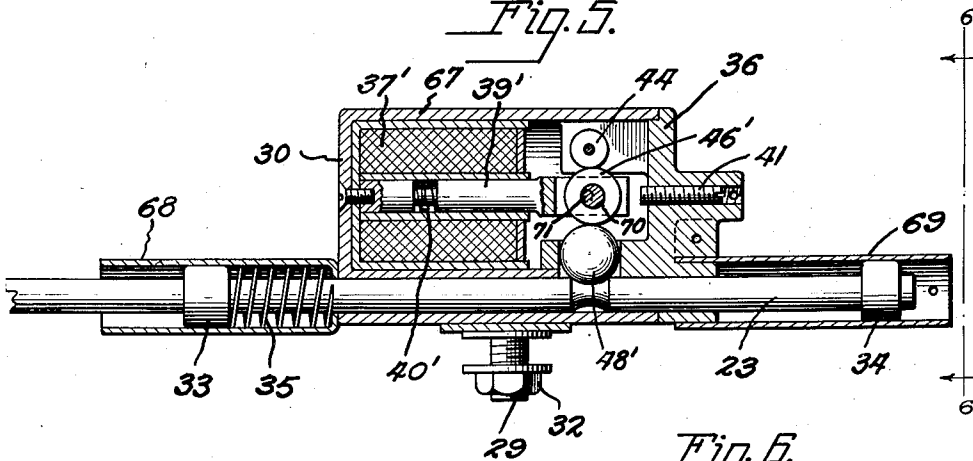


Fig. 6.

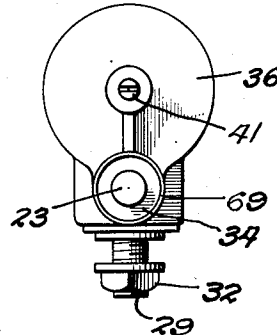
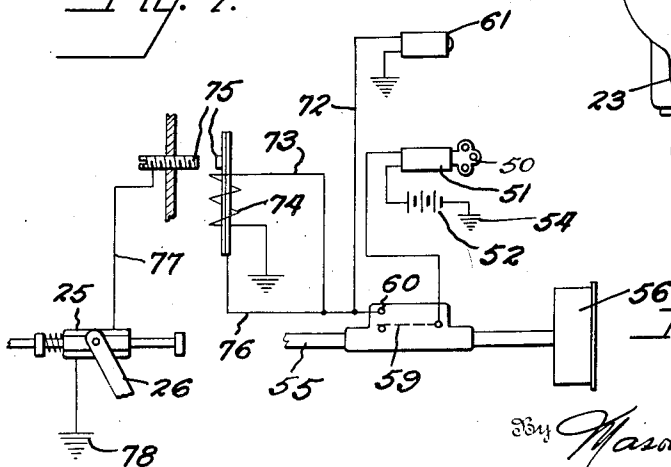


Fig. 7.



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MAGNETIC THROTTLE CONTROL

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5 Claims. (Cl. 137—139)

This invention relates to magnetic throttle controls and more particularly to such a control adapted for use in controlling internal combustion engines.

One object of this invention is to provide a means for effecting a fore-shortening of a carburetor control linkage.

Another object is to provide means for fore-shortening the linkage control of the injector type fuel systems.

A further object is to provide means for adjustably shortening or lengthening the linkage of a fuel supply.

Yet, a further object is to provide means for shortening or lengthening the fuel supply linkage during the operation of a motor vehicle at speeds in excess of predetermined speeds.

Yet, another object is to provide an electromagnetic throttle connection.

Other objects and advantages of this invention will appear from the following description taken in connection with the accompanying drawings.

In the drawings, wherein like reference characters indicate corresponding parts in the various figures:

Figure 1 illustrates a part of a vehicle engine control including features of this inventive concept.

Figure 2 is a horizontal cross-section through the magnetic throttle device, substantially on the line 2—2 of Figure 1.

Figure 3 is a vertical cross-section substantially on the line 3—3 of Figure 2.

Figure 4 is a variation of the system of Figure 1, showing the device arranged to be normally energized.

Figure 5 is a view similar to Figure 2, illustrating on an enlarged scale the arrangement in Figure 4.

Figure 6 is an end view substantially on the line 6—6 of Figure 5.

Figure 7 is a partial diagram, illustrating the addition in Figure 1 of a time-delay feature for controlling the operation of the throttle device.

Considering the drawings in greater detail, the invention is shown in a preferred embodiment as applied to a modern internal combustion engine, wherein the hood 10 and dashboard 11 represent well-known parts of a motor vehicle, with the internal combustion engine 12 housed therein and having a carburetor air-intake 13 controlled by the usual butterfly valve mechanism 14. The cowl panel 15 separates the interior of the vehicle from the engine compartment, and is continued downwardly to the sloping floor board

16 upon which is mounted foot accelerator or throttle control 17. This is pivoted to the floor board at 18, and is biased toward throttle closing position by means of a spring 19 fastened to the underside of the floor board at one end 20, and at its opposite end 21 to the rod connection 22 of the foot control. Rod 23 is connected to the butterfly valve lever at 24 and carries the magnetic throttle control 25 adjacent the opposite end thereof. This latter forms the inter-connecting means between the throttle lever 26, pivoted to the engine at 27, and the throttle rod 23, and serves to complete the linkage between the foot pedal 17 and the butterfly valve.

In the normal operation of the vehicle, the driver presses his foot against the foot accelerator pedal 17, which in turn moves the lever 26 in a clockwise direction about its pivot 27. The latter is pivoted to the magnetic throttle control by means of a secure connection 28 comprising a stud 29 fastened to the housing 30 of the magnetic throttle control with washers 31 at either side of the lever, and nut 32 holding the parts in assembled relation. The lever, through this stud connection, moves the magnetic throttle control to the right and thereby pulls the butterfly valve lever 24 in a clockwise direction to open the valve and supply more fuel to the engine.

The throttle rod 23 carries thereon two adjustable lock collars 33 and 34. A throttle rod spring 35 encircles the rod 23 and is interposed between the casing 30 and the collar 33.

The magnetic throttle control device is arranged to slide upon the throttle rod 23 by means of a passage 35' extending through the housing. The housing is hollow, being provided with a closing cap 36 for keeping the parts in proper working order. Within the housing is mounted at one end magnetic solenoid 37 having a fixed core 38 and a relatively movable core 39. The two cores are urged apart by the spring 40, and the relative movement of the core away from the coil is determined by means of the set-screw 41 which is adjustably fastened in the cap 36. A hollow shell 42 is interposed between the solenoid 37 and the cap 36. This shell is slotted at 43 and provided with a roller 44, which is carried upon the shaft 45 extending across the slot.

The outer end of the core 39 is provided with a roller 46. The cap 36 is provided with a transversely extending aperture 47, in which is normally mounted a steel ball 48 which serves to lock the magnetic throttle control and connecting rod 23 together. The rod 23 is grooved at 49 to receive the ball 48. With the parts in the

position shown in Figure 2, the roller 44 and the plunger roller 46 are aligned with the ball 48, thereby locking it in the position shown and providing a positive connection between the magnetic throttle and the rod 23. In view of this, any movement of the lever 26 is directly transmitted to the butterfly valve to regulate the supply of combustible mixture. The cap 36 and casing 30 are locked together by means of one or more set-screws which are not shown.

With the parts as thus far described, the accelerator pedal movement directly controls the speed of the vehicle. There is additionally provided, however, speed control means to positively limit or regulate the maximum speed at which the vehicle may be properly driven. In this case, the ignition key 50 controls the ignition switch 51, which in turn connects the battery 52 to a part of the control circuit 53, the opposite side of the battery being connected to the ground 54. Speedometer cable 55 extends to the speedometer 56 on the dash, and has interposed therein a speed-control switch 57 which is normally open when the vehicle is operating within its proper speed range. Excessive speed of the vehicle, however, causes the switch contact 59 to engage contact 60, thereby completing the circuit to the battery and energizing the signal light 61 on the dash, and circuit 62 going through the solenoid 37 and to ground at 63. With the vehicle moving at excessive speed, the energization of this circuit draws the armature 39 to the left in Figure 2, and thereby moves the armature pulley 46 out of alignment with the fixed pulley 44 and the ball 48. The latter, being now free to move transversely of the housing, slips out of the groove 49 and allows the spring 35 to move the throttle rod 23 to the left in Figures 1 and 2. This movement acts on the butterfly valve to reduce the speed of the vehicle, and in effect, lengthens the throttle rod by a distance corresponding to the space between the collar 34 and the portion 64 of the cap of the magnetic throttle control. The collar 34 is brought against the end of the magnetic throttle control, and the throttle rod in effect is lengthened. This requires greater pedal travel to again increase the speed of the vehicle.

With the parts properly arranged, the maximum speed that the vehicle can obtain with the magnetic throttle control working is determined by setting of the parts before the vehicle goes out on the road.

In Figure 1 the magnetic throttle control is normally deenergized. However, it can be utilized with a circuit wherein it is normally energized. This variation is shown more clearly in Figures 4 to 6 inclusive, wherein the operation of the ignition key closes the switch 51 and connects the battery 52 through the normally closed contact 65 and circuit 66 to a normally energized throttle control 67, and thence to ground. For this type of operation, the magnetic throttle is arranged so as to normally hold the armature 39' in the position shown in Figure 5 against the action of the spring 40'. When the solenoid 37' is de-energized by breaking the circuit contact at 65, due to excessive speed, the spring 40' moves the core 39' to the right, thereby releasing the ball and allowing the parts to move in the manner previously described. With the parts shown in Figure 5, tubular shells 68 and 69 are provided to shield the collars and rod. The plunger roller 46' has an opening 70 therein, larger in diameter than the bearing pin

71, allowing a greater movement of the ball 48' in proportion to the axial movement of the roller itself. As herein shown, an excess speed breaks the circuit of the magnetic throttle device at 65 and energizes the signal light 61 circuit and contact 60.

The systems of the prior figures have added thereto a time-delay feature to allow a vehicle to exceed its safe speed temporarily so as to preclude a cutting down of the motor speed at such times as the vehicle is passing another vehicle. In this arrangement, the speed switch 59, due to excessive speed, closes contact 60, energizes the signal light circuit 72, and simultaneously energizes the thermostat heating circuit 73. The latter circuit goes to ground through the heating coil 74, which latter causes the contacts 75 to close after a determinate period of time.

Closing of contacts 75 completes the circuit from conductors 76 to conductors 77 through the magnetic throttle control 25, to the ground at 78. It will be readily appreciated that if the contacts 75 are normally closed, the arrangement is then adapted for use in connection with the normally energized solenoid of Figure 5.

Although this device has been primarily described in connection with an internal combustion engine of well-known types used in motor vehicles, it will be readily understood that it is equally adapted for use in controlling the fuel injection control rods of Diesel engines as well.

Although a preferred embodiment of this invention is illustrated and described, variations within the true spirit and scope of the same are to be determined by the appended claims.

What I claim is:

1. A magnetic throttle control comprising a throttle valve, a throttle rod for operating said valve, a casing encompassing said throttle rod and relatively movable with respect thereto, a groove in said rod, a ball in said casing arranged to normally rest in said groove whereby to provide a direct interconnection between the casing and rod, manually actuable means for moving said casing to operate said valve, and electromagnetic means for rendering said ball ineffective to lock said casing and rod together.

2. A magnetic throttle control device comprising a throttle valve for controlling the flow of motive fluid to an engine, a manually movable housing, a channeled throttle rod connected to said valve and extending through said housing and relatively movable with respect thereto, a recess in said housing, a ball in said recess arranged to engage the slot in said rod, whereby to lock the housing and rod together and move the valve by manual control, means arranged to hold said ball and rod in inter-locking position, and magnetic means for rendering said ball and rod ineffective.

3. A magnetic throttle control device comprising a throttle valve, a manually actuable accelerator pedal, a housing connected to said pedal, a channeled throttle rod extending through and relatively movable with respect to said housing, said rod connected to said valve, a recess in said housing, a ball in said recess arranged to engage the slot in said rod, whereby to lock the housing and rod together, magnetic means arranged to hold said ball and rod in inter-locking position, means for rendering the connection between said ball and rod ineffective, and time-delay means arranged to control said last-named means.

4. A magnetic throttle control comprising a throttle valve controlling motive fluid supply to

an engine, a throttle rod for operating said valve, a casing encompassing said throttle rod and relatively movable with respect thereto, a groove in said rod, a ball in said casing arranged to normally rest in said groove whereby to provide a direct interconnection between the casing and rod, manually actuable means for moving said casing to operate said valve, electro-magnetic means for rendering said ball ineffective to lock said casing and rod together, a speed responsive means to control said electro-magnetic means, means for delaying the control of said electro-magnetic means by said speed responsive means comprising a normally open thermostatic switch in the circuit of said electro-magnetic means, and a circuit closed by said speed responsive means in-

cluding a rheostat in thermal operative relation to said thermostatic switch for closing said switch.

5. A magnetic throttle control device comprising a throttle valve, a manually actuable accelerator pedal, a housing, a channeled rod extending through and relatively movable with respect to said housing, a recess in said housing, a ball in said recess arranged to engage the slot in said rod, whereby to lock the housing and rod together, magnetic means arranged to hold said ball and rod in inter-locking position, and means for rendering the connection between said ball and rod ineffective, and said relatively movable and interlockable rod and housing forming the actuating connection between said valve and pedal.

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