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REMOTE CONTROL UNIT FOR GASOLINE AND OTHER ENGINES

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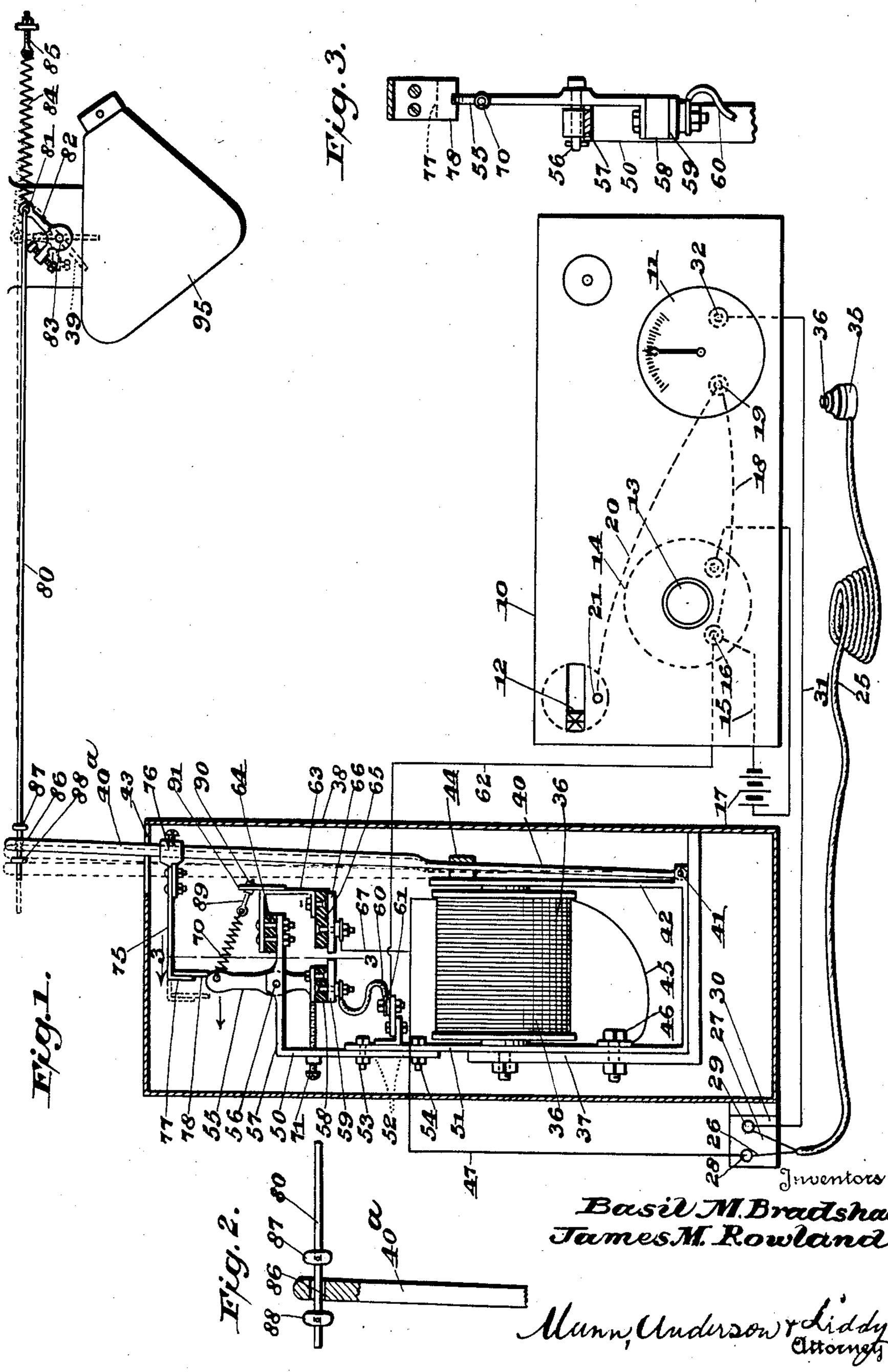

Fig. 1.

Fig. 3.

Fig. 2.

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REMOTE CONTROL UNIT FOR GASOLINE AND OTHER ENGINES

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8 Claims. (Cl. 290—40)

This invention relates to a manual control for automatically controlled internal combustion engines. Where internal combustion engines are employed for operating dynamos to produce current for use in electric welding a governor is used in combination with the engine for maintaining an effective maximum speed of the engine, or for a maximum number of revolutions per minute. However, it is necessary to frequently stop the arc welding, but it is not always convenient for the operator to lay down his tools and stop the engine or actuate controls of the engine which would reduce the speed in order to prevent excessive wear on the engine or dynamo.

It is an object of the present invention to provide a manual control of an internal combustion engine which is used for driving a dynamo whereby it is only necessary for the operator to move a button conveniently located or to operate a switch which will cause the engine to idle during those periods where the operator must eliminate the arc welding temporarily for various reasons.

Another object of the invention is the provision of a remote control for an internal combustion engine in which the operation of a switch conveniently located at the work may be moved to either closed or open position which will cause a magnetic means to operate a butterfly valve of the engine or other fuel control, whereby the engine will be brought to an idling condition when it is necessary to stop work temporarily during a welding process.

A further object of the invention is the provision of a remote control for an internal combustion engine which operates a dynamo to supply current for an arc welder in which a switch may be conveniently placed where desired so that the operator may actuate the switch to either cause idling of the internal combustion engine, or to cause said engine to operate at a maximum speed, said engine being under the control of a governor, said switch controlling the current to a magnetic means which causes a rod to be moved for either closing or opening a fuel control of the engine so that the engine will operate either at its maximum governor-controlled speed or at idling speed.

A still further object of the invention is the provision of a remote control unit which is adapted to be mounted on an internal combustion engine and operated by a switch at the end of a control cord, the switch being movable to a convenient position adjacent the work, or to a bench where the work is being done, the engine being adapted to drive an electric generator for supplying current for arc welding, the operation of the switch causing the unit to control a fuel supply to the engine or to control the usual butterfly valve for lowering the R. P. M.'s of the engine to a speed where the engine will idle properly, said switch also when operated will cause the engine to operate at its maximum governor-controlled speed so that when the welder is cutting and fitting the parts to be welded, or when any other delay occurs the speed of the engine can be reduced to idling to prevent unnecessary wear or tear on the welding unit with a consequent saving of gas and oil.

This invention will be best understood from a consideration of the following detailed description, in view of the accompanying drawing forming a part of the specification; nevertheless, it is to be understood that the invention is not confined to the disclosure, being susceptible of such changes and modifications as define no material departure from the salient features of the invention as expressed in the appended claims.

In the drawing:

Figure 1 is a more or less diagrammatic showing of the unit for controlling an internal combustion engine, with parts in section.

Figure 2 is a fragmentary vertical section of stops applied to a butterfly control rod in connection with an armture.

Figure 3 is a vertical section taken along the lines 3—3 of Figure 1.

Referring more particularly to the drawing, 10 designates a housing or board upon which is mounted an ammeter 11, a switch 12 and a starter button 13 which controls a switch to a starting motor indicated diagrammatically at 14.

A wire 15 connects a terminal 16 of the starting motor with a battery 17. A wire 18 is connected between the binding post 16 of the starting motor and a binding post 19 of the ammeter 11. A wire 20 connects the binding post 19 of the ammeter with a binding post 21 of the switch 12. This switch is grounded in the usual manner.

An extension cord 25 contains two wires 26 and 27 and the first mentioned wire is connected with a binding post 28, while the wire 27 is connected with a binding post 29 carried by an insulating block 30. A wire 31 connects binding post 29 with a binding post 32 of the ammeter 11.

A switch generally indicated by the numeral 35 has an operating member 36 which is adapted to close or open the switch and the wires 26 and 27 are connected with the switch 35 by means of the extension cord 25.

An electromagnet 36 is supported by a bracket 37 in a housing 38 and this housing may be at-

tached to the base of an internal combustion engine, or it may be connected by brackets in any suitable manner to the engine block. The position of the housing, however, will be such that it will be conveniently located adjacent to the butterfly valve 39 which controls the flow of fuel to an internal combustion engine not shown.

An armature 40 is pivoted at 41 on an end of the front arm 42 of the bracket or support 37 for the electromagnet 36. The member 40 extends upwardly in line with the core of the magnet 36 and projects through an opening 43 in the top of the housing 38. A guard 44 connected to the arm 42 acts as a support for the armature, embraces the armature 40 and limits the movement of said armature toward the right in Figure 1 so that when current is passed through the magnet the armature will be oscillated toward the left in said Figure 1.

A wire 45 from the coil of the magnet 36 is grounded at 46 on the support 37. A wire 47 is attached to the binding post 28 and forms the positive connection with the coil 36.

An adjustably mounted bracket 50 is carried by an arm 51 which extends upwardly from the support 37. The bracket is provided with slots 52 which receive bolts 53 carried by the arm 51. When the nuts 54 are loosened the bracket 50 may be raised or lowered as desired. The tension of the bolts will secure the bracket in position.

A lever 55 is pivotally mounted at 56 on the horizontal extension 57 of the bracket 50. An insulating block 58 is secured to the lower end of said lever which carries a switch point 59. This switch point is connected by means of a flexible cord 60 to a binding post 61 and this binding post is connected by means of the wire 62 with the binding post 16 of the starter 14.

A bracket 63 is secured to the extension 57 of the bracket 50 and is insulated therefrom by means of the block 64. The lower end of the bracket 63 has an insulating block 65 secured thereto to which is attached the switch point 66. A wire 67 connects the positive wire 47 with the switch point 66. Thus it will be seen that when the switch point 59 is moved into contact with the switch point 66 a circuit is closed as will be presently explained.

A spring 70 is connected between the bracket 63 and the upper end of the lever 55. An adjustable bolt 71 carried by the bracket 50 is adapted to engage the block 58 and limit the movement of said block toward the left in Figure 1.

An arm 75 is rigidly secured at 76 to the upper end of the armature 40 and is provided with an extension 77 at its free end which carries an insulating block or plate 78. This plate is adapted to engage the upper end of the lever 55 and rock the same as will be presently explained.

A throttle control rod 80 is connected at 81 with a lever 82 which rocks a shaft 83 upon which the butterfly or throttle valve 39 is secured. A spring 84 is connected with the free end of the lever 82 and with an adjustable bolt 85. By adjusting the bolt 85 the tension of the spring can be increased or decreased as desired. The upper free end 40a of the armature 40 is provided with an opening 86 to receive one end of the rod 80 upon oppositie sides of stops 87 and 88. These stops are rigidly secured to the rod 80 and are spaced upon opposite sides of the upper free end of the armature 40.

The spring 70 is connected to an adjustable bolt 89 which is mounted in a nut 90 carried by an arm 91 secured to the U-shaped bracket 63. Thus, it will be seen that the adjustment of the bolt 89 will increase or decrease the tension of the spring 70.

The governer, generally designated by the numeral 95 is adapted to control the butterfly valve 39 in the usual manner for maintaining a predetermined speed of the internal combustion engine.

The operation of my device is as follows: It is assumed that the switch 12 has been moved to closed position so that the internal combustion engine is operating and the operator has been using the welder at a point remote from the internal combustion engine and the housing 38. At this time the extension cord 25 will permit the switch 35 to be moved to a position where the welder is operating. When the welder desires to start the operation he will press the switch button 36 so that current will flow through the ammeter, through wire 47 and negative grounded wire 45 and thus through the coil 36. The device is so constructed that approximately 7 amperes of current passes through the coil 36. This current partly magnetizes the iron core of the electromagnet and pulls the armature 40 toward the left in Figure 1 against the valve stop rod 88. As the armature 40 moves to the left in Figure 1 the fibre block 78 will cause the upper end of the lever 55 to move in the direction indicated by the arrow whereby the lower end will be moved in the opposite direction so that the point 59 will engage the point 66 and close the circuit through the wires 67, 47 and 62. The D. C. current direct from the battery flashes through the coil of the electromagnet and fully magnetizes the iron core so that the armature 40 is moved further to the left in Figure 1 and will pull the rod 80 to the left since the upper end 40a of the armature is pressing against the stop 88. When this happens the butterfly valve 39 is moved to the vertical position so that the engine will operate at full capacity.

However, the full angular movement of the armature 40 to the left in Figure 1 will cause the block 78 to slip over the upper end of the cam surface of the upper end of the lever 55 and the spring 70 will return the lever 55 to its normal vertical position thereby breaking the circuit to the electromagnet 36 by way of the wires 47 and 62 and leave the electromagnet partly magnetized with the seven ampere current through the control cord 25.

This, however, is sufficient magnetism to hold the fulcrum rod in the closed position so that the throttle valve 39 will be maintained in its full open position and the engine will continue in its full governed operating speed.

In order to cause the engine to idle the switch button 36 is moved to its open position which breaks the circuit through the wires 26 and 27 to the coil 36. Therefore, the spring 84 will pull on the lever 82 and move the throttle valve 39 to the angular dotted line position in Figure 1 and thus cut down the amount of fuel passing to the engine. All of the parts are now in position as shown in Figure 1 for idling.

When it is desired to again start the engine to full speed, the switch button 36 is properly operated and the parts will then again assume the position as described above.

We claim:

1. A remote control for internal combustion engines including a fuel control valve, a battery and a generator comprising a magnet in circuit with the generator, a remotely located switch

for controlling said circuit, an armature partially operated by the magnet when the generating circuit is closed, valve actuating means operated by the armature to open the fuel valve, a second switch, a circuit including the second switch, magnet and battery, means connected with the armature for temporarily closing the last mentioned switch and circuit so that the magnet will fully operate the armature and cause the valve actuating means to open fully the fuel control valve.

2. A remote control for internal combustion engines including a fuel control valve, a battery and a generator comprising a magnet in circuit with the generator, a remotely located switch for controlling said circuit, an armature partially operated by the magnet when the generating circuit is closed, valve actuating means operated by the armature to open the fuel valve, a second switch, a circuit including the second switch, magnet and battery, means connected with the armature for temporarily closing the last mentioned switch and circuit so that the magnet will fully operate the armature and cause the valve actuating means to open fully the fuel control valve, means included in the last mentioned means for releasing the second switch to open position, the armature remaining in the fully operated position when the second switch is opened.

3. A remote control for internal combustion engines including a fuel valve, a battery and a generator comprising a magnet in circuit with the generator, a remotely located switch for controlling said circuit, a hinged armature, a fuel valve actuating means provided with a stop adapted to be engaged by the armature when the generator circuit is closed, a battery circuit including the magnet, a switch controlling the battery circuit and operated by the armature to closed position when said armature engages the stop whereby the armature will be moved to its limit of movement by energization by the battery circuit and the fuel control valve will likewise be moved to full open position, means for causing opening of the second switch when the armature is moved to its limit of movement, the armature being retained in its limit of movement by the current from the generator circuit.

4. A remote control for internal combustion engines including a fuel valve, a battery and a generator comprising a magnet in circuit with the generator, a remotely located switch for controlling said circuit, a hinged armature, a fuel valve actuating means provided with a stop adapted to be engaged by the armature when the generator circuit is closed, a battery circuit including the magnet, a switch in the battery circuit, oscillatable means operated by the armature and closing the second switch when the armature has engaged the stop whereby current from the battery will cause the magnet to move the armature to its limit of movement and also the operating means for the fuel control valve, while at the same time the oscillatable means will be released, means for returning the oscillatable means to operate the second switch to open the battery circuit.

5. A remote control for internal combustion engines including a fuel valve, a battery and a generator comprising a magnet in circuit with the generator, a remotely located switch for controlling said circuit, a hinged armature, a fuel valve actuating means provided with a stop adapted to be engaged by the armature when the generator circuit is closed, a battery circuit including the magnet, a switch controlling the battery circuit, a movable lever for closing the switch, resilient means for moving the lever to open the switch, an arm connected with the armature and adapted to oscillate the lever to close the switch when said armature engages the stop whereby the battery circuit will energize the magnet and move the armature to its limit of movement and cause the fuel valve to open when the arm will release the lever so that the spring will open the switch, the generator circuit maintaining the magnet energized for holding the armature in contact with the core of the magnet and the fuel valve in open position.

6. A remote control for internal combustion engines including a fuel valve, a battery and a generator comprising a magnet in circuit with the generator, a remotely located switch for controlling said circuit, a hinged armature, a fuel valve actuating means provided with a stop adapted to be engaged by the armature when the generator circuit is closed, a battery circuit including the magnet, a switch controlling the battery circuit, an oscillatable lever for closing the second switch, means projecting from the armature to engage a free end of the lever to close the switch, whereby the magnet will be energized by the battery circuit and the armature will be moved into engagement with the core of the magnet, said armature at this time operating the fuel valve actuating means and fully opening said fuel valve, the means projecting from the armature moving beyond the free end of the lever and releasing said lever, and resilient means for returning the lever to normal position and opening the second switch, the generator circuit at this time retaining the armature and likewise the fuel valve in their limits of movement.

7. A remote control for internal combustion engines including a fuel valve, a battery and a generator comprising a magnet in circuit with the generator, a remotely located switch for controlling said circuit, a hinged armature, a fuel valve actuating means provided with a stop adapted to be engaged by the armature when the generator circuit is closed, a battery circuit including the magnet, a switch controlling the battery circuit, an oscillatable lever for closing the second switch, means projecting from the armature to engage a free end of the lever to close the switch, whereby the magnet will be energized by the battery circuit and the armature will be moved into engagement with the core of the magnet, said armature at this time operating the fuel valve actuating means and fully opening said fuel valve, the means projecting from the armature moving beyond the free end of the lever and releasing said lever, and resilient means for returning the lever to normal position and opening the second switch, the generator circuit at this time retaining the armature and likewise the fuel valve in their limits of movement, means engageable with the lever and cooperating with the resilient means for retaining the lever in a predetermined position when the second switch is open.

8. A remote control for internal combustion engines including a fuel valve, a battery and a generator comprising a magnet in circuit with the generator, a remotely located switch for controlling said circuit, a hinged armature, a fuel valve actuating means provided with a stop adapted to be engaged by the armature when the generator circuit is closed, a battery circuit including the magnet, a switch controlling the battery circuit, an oscillatable lever for closing the second switch, means projecting from the armature to engage a

free end of the lever to close the switch, whereby the magnet will be energized by the battery circuit and the armature will be moved into engagement with the core of the magnet, said armature at this time operating the fuel valve actuating means and fully opening said fuel valve, the means projecting from the armature moving beyond the free end of the lever and releasing said lever, said resilient means for returning the lever to normal position and opening the second switch, the generator circuit at this time retaining the armature and likewise the fuel valve in their limits of movement, adjustable means engageable with the opposite end of the lever and with the resilient means for retaining the lever in an inoperable position when the second mentioned switch is opened.

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