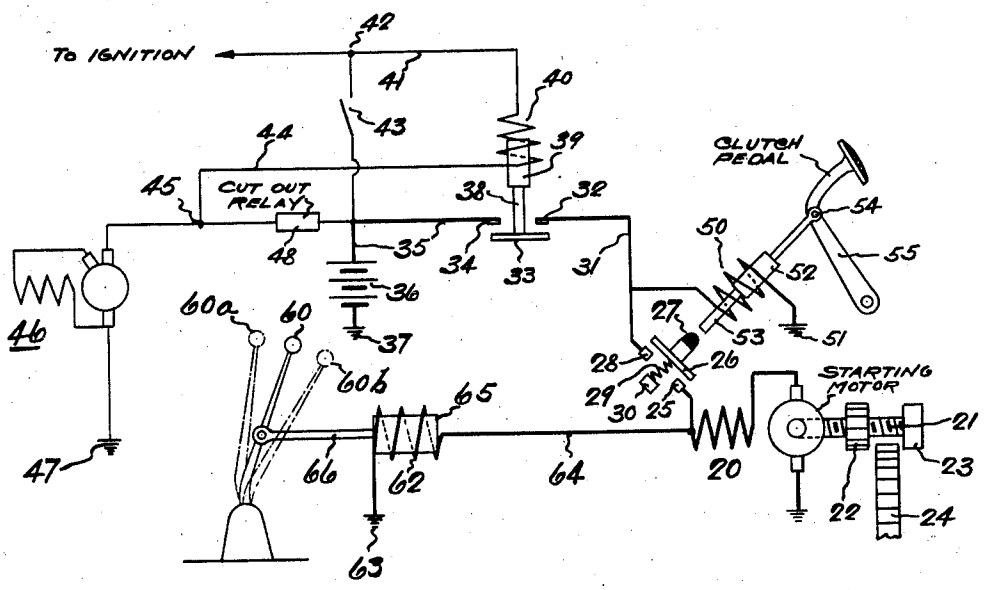
Oct. 30, 1934. C. H. DAVIS, JR 1,978,524

ENGINE STARTING APPARATUS

Filed Sept. 14, 1931



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Patented Oct. 30, 1934

1,978,524

UNITED STATES PATENT OFFICE

1,978,524

ENGINE STARTING APPARATUS

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Application September 14, 1931, Serial No. 562,654

46 Claims. (Cl. 290—37)

This invention relates to apparatus for starting internal combustion engines and more particularly for engines for propelling vehicles which have a clutch control pedal and a gear shift lever.

It is one of the objects of the invention to provide improved means for automatically moving the gear shift lever into neutral position and to automatically move the clutch pedal lever to clutch disengaging position in response to the operation of the starting of the engine.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawing wherein a preferred embodiment of one form of the present invention is clearly shown.

In the drawing:

The figure of the drawing is a wiring diagram illustrating a form of the present invention.

Referring to the drawing, 20 designates an electric motor which drives a shaft 21 directly engageable by a pinion 22 movable along a shaft in engagement with a stop attached to the shaft and into mesh with the fly wheel gear 24 of the engine to be started. It will be understood that the operation of the motor in a direction for cranking the engine will cause the pinion 22 to be automatically moved along the shaft 21 into engagement with the stop 23 whereupon the pinion 22 will turn with the shaft 21 to crank the engine through driving engagement of the pinion 22 with the gear 24. It will be understood that when the engine becomes self-operative, the pinion 22 is automatically demeshed from the engine gear 24.

The motor 20 is connected with a switch contact 25 engageable with a movable switch contact 26 having an operating button 27 and adapted to engage also a contact 28. The switch contact 26 is held in open position by a spring 29 resting against a stationary stop 30. The contact 28 is connected by wire 31 with a contact 32 adapted to be engaged by a movable contact 33 which also engages a stationary contact 34 connected by wire 35 with a battery 36 grounded at 37. The contact 33 is attached by a rod 38 to an armature 39 which cooperates with a magnet coil 40, one end of which is connected by wire 41 leading to terminal 42 connected with ignition apparatus, (not shown) and connectible with the battery wire 35 by a switch 43. The other end of the coil 40 is connected by a wire 44 with a terminal 45 of generator 46 which is grounded at 47. The generator terminal 45 is connected with the battery wire 35 by a cut-out or reverse current relay 48 which operates automatically to connect the generator 46 with the battery 36 when the generator voltage has attained a predetermined value. The relay 48 operates to disconnect the battery from the generator when the voltage of the latter falls below that of the battery.

The starting motor switch is automatically moved into closed position by electro-magnetic means comprising a winding 50 connected with wire 31 and grounded at 51 and comprising an armature 52 attached to a rod 53 which is adapted to actuate the switch button 27 and which is connected at 54 with the clutch pedal lever 55 of the vehicle.

The gear shift lever is shown in neutral position by the full lines at 60 and in gear meshing positions 60*a* and 60*b* indicated in dot-and-dash lines in the drawing. In order to insure that the gear shift lever 60 is in neutral position while cranking the engine, there is provided an electro-magnetic device comprising a coil 62 grounded at 63 and connected by a wire 64 with switch terminal 25. The winding 62 cooperates with an armature 65 attached by a link 66 to the lever 60. In case the gear shift lever 60 is in one of the gear meshing positions 60*a* or 60*b*, the armature 65 will be located in a decentered position with respect to the coil 62.

The operation of the device is as follows: When it is desired to start the engine, the operator moves the switch 43 thereby connecting the battery with the ignition apparatus and with the electro-magnetic winding 40 through the following circuit: switch 43, wire 41, winding 40, wire 44, terminal 45, generator 46, ground connections 47 and 37. When this occurs, the armature 39 will be attracted to move the contact 33 into engagement with the contacts 34 and 32. When this occurs, the magnet winding 50 will receive current through the following circuit: battery 36, wire 35, contacts 34, 33, 32, wire 31, coil 50, ground connections 51 and 37. The coil 50 being energized, the armature 52 will be attracted downwardly to cause the pedal 55 to move into clutch disengaging position and to close the switch comprising contacts 28, 26 and 25 whereupon the motor will receive current from the battery and the engine will be cranked. The closing of the motor switch also causes the coil 62 to receive current from the battery. When this occurs, the gear shift lever will be moved into neutral position provided it formerly occupied one of its gear meshing positions.

It is therefore apparent that the present invention provides for disconnecting the engine from the vehicle transmission and also for moving the gear shift lever into neutral position. This insures disconnecting the engine from the vehicle during the starting of the engine so that the vehicle will not be started by the starting motor and also insures that the engine will be disconnected from the vehicle at the time the engine becomes self-operative thereby preventing accidental starting of the vehicle.

When the engine becomes self-operative, the voltage of the generator 46 is such as to cause current to flow through the winding 40 in opposition to the current supplied by the battery 36. Under these conditions the magnetic influence of the winding 40 on the armature 39 will be weakened to such an extent that the contact 33 will drop away from engagement with the contacts 34 and 32 thereby disconnecting the battery from the engine starter, from the clutch pedal control and from the gear shift lever control. Therefore, while the engine is running, the clutch pedal and the gear shift lever may be operated in the usual manner without affecting the engine starter, and the engine started can not be operated.

This application is very similar to applicant's copending application, Serial No. 541,387, which contains claims which are directed to a specific modification of the invention covered by the claims.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. Engine starting apparatus comprising, in combination, a storage battery, an engine driven generator for charging the battery, a cut-out relay for controlling the connection of the battery and generator, a starting motor, a transmission clutch pedal, a transmission gear shift lever, electromagnetic devices for moving said pedal and lever into transmission disengaging position, a relay switch for closing a circuit to said starting motor and to said electromagnetic devices said relay switch having a winding connected at one end between the generator and cut-out relay, and a manually operable switch for connecting the other end of the relay switch winding directly with the battery.

2. Engine starting apparatus comprising, in combination, a storage battery, an engine driven generator for charging the battery, a cut-out relay for controlling the connection of the battery and generator, a starting motor, a transmission clutch pedal, electromagnetic means for moving the pedal into clutch disengaging position, a starting motor switch actuated by said last named means when moving the pedal into clutch disengaging position, a relay switch for closing a circuit to said electromagnetic means, said relay switch having a winding connected at one end between the generator and cut-out relay, and a manually operable switch for connecting the other end of the relay switch winding directly with the battery.

3. Engine starting apparatus comprising, in combination, a storage battery, an engine driven generator for charging the battery, a cut-out relay for controlling the connection of the battery and generator, a starting motor, a switch for closing a circuit to the starting motor, electromagnetic means for operating said switch, a relay switch for closing a circuit to said electromagnetic means, said relay switch being in series with the first-mentioned switch and having a winding connected at one end between the generator and cut-out relay, and a manually operable switch for connecting the other end of the relay switch winding directly with the battery.

4. Engine starting apparatus comprising, in combination, a storage battery an engine driven generator for charging the battery, a cut-out relay for controlling the connection of the battery and generator, a starting motor, two relay switches in series for connecting the battery and motor, one of said switches having an actuating coil in shunt with the motor and connected to a wire connecting the two switches, and the other of said switches having an actuating coil connected at one end between the generator and cut-out relay, and a manually operable switch for connecting the other end of said last named coil directly with the battery.

5. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a transmission gear shift lever and means for simultaneously moving said pedal and lever to disengaged position and rendering the starting motor effective.

6. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a transmission gear shift lever and means for simultaneously moving said pedal and lever to disengaged position and completing the circuit between said current source and the starting motor.

7. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a transmission gear shift lever, and automatic electrically operated means for simultaneously moving said pedal and gear shift lever to disengaged position and rendering the starting motor effective to start the engine.

8. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a transmission gear shift lever, an ignition switch and means controlled by operation of the ignition switch for simultaneously moving said pedal and gear shift lever to disengage position and rendering the starting motor effective to start the engine.

9. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a transmission gear shift lever, an ignition switch and means operative upon closing of the ignition swtch for smultaneously moving said pedal and gear shift lever to disengaged position and rendering the starting motor effective to start the engine.

10. In combination with the engine of an automotive vehicle, a starting motor therefor, a

current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a transmission gear shift lever, an ignition switch, and electromagnetic means controlled by the operation of the ignition switch for simultaneously moving said pedal and gear shift lever to disengaged position and rendering the starting motor effective to start the engine.

11. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a transmission gear shift lever, electromagnetic means for moving said pedal and gear shift lever to disengaged position and for rendering the starting motor effective, an ignition switch, and means whereby closing of the ignition switch causes said electromagnetic means to be energized.

12. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a transmission gear shift lever and means for simultaneously moving said pedal and lever to disengaged position, an ignition switch, means controlled by operation of the ignition switch for simultaneously moving said pedal and gear shift lever to disengaged position and for rendering said starting motor effective, and means operable when the engine is running under its own power to prevent operation of said last mentioned means, whereby the starting motor cannot be operated and the clutch and gear shift lever are operable in the usual way when the engine is running.

13. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a transmission gear shift lever and means for simultaneously moving said pedal and lever to disengaged position, an ignition switch, means controlled by operation of the ignition switch for simultaneously moving said pedal and gear shift lever to disengaged position and for rendering said starting motor effective, and means operable when the engine is operating at a predetermined speed to prevent operation of said last mentioned means.

14. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a transmission gear shift lever, electro-magnetic means for moving said pedal and gear shift lever to disengaged position and for rendering the starting motor effective, an ignition switch, means whereby closing of the ignition switch causes said electromagnetic means to be energized and means operable when the engine is running under its own power to de-energize said electromagnetic means.

15. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a transmission gear shift lever, electromagnetic means for moving said pedal and gear shift lever to disengaged position and for rendering the starting motor effective, an ignition switch, means whereby closing of the ignition switch causes said electromagnetic means to be energized, and means operable when the engine is operating at a predetermined speed to de-energize said magnetic means.

16. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a transmission gear shift lever, electro-magnetic means for moving said pedal and gear shift lever to disengaged position and for rendering the starting motor effective, an ignition switch, means whereby closing of the ignition switch causes said electromagnetic means to be energized, a generator operated by the engine and means whereby the generator causes said electromagnetic means to be de-energized.

17. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a transmission gear shift lever, electromagnetic means for moving said pedal and gear shift lever to disengaged position and for rendering the starting motor effective, an ignition switch, means whereby closing of the ignition switch causes said electromagnetic means to be energized, a generator operated by the engine and means whereby the generator breaks a circuit between said electromagnetic means and said current source to deenergize said electromagnetic means during operation of the engine.

18. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, an ignition switch and means controlled by said ignition switch for simultaneously moving the clutch pedal to disengaged position and rendering the starting motor effective to start the engine.

19. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, an ignition switch, and means operated upon closing of the ignition switch for simultaneously moving the clutch pedal to disengaged position and rendering the starting motor effective to start the engine.

20. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, an electromagnet for simultaneously moving the clutch pedal to disengaged position and rendering the starting motor effective to start the engine, an ignition switch and means controlled by said ignition switch for causing said electromagnet to be energized.

21. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation

with the vehicle, an electromagnet for simultaneously moving the clutch pedal to disengaged position and rendering the starting motor effective to start the engine, an ignition switch and means operative on closing of the ignition switch for causing said electromagnet to be energized.

22. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, an electromagnet for simultaneously moving the clutch pedal to disengaged position and rendering the starting motor effective to start the engine, an ignition switch, a magnetic switch for completing a circuit between the electromagnet and said current source, and means whereby said magnetic switch is controlled by the ignition switch.

23. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, an electromagnet for simultaneously moving the clutch pedal to disengaged position and rendering the starting motor effective to start the engine, an ignition switch, a magnetic switch for completing a circuit between the electromagnet and said current source, and means for closing said magnetic switch upon closing of the ignition switch.

24. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a main starting motor switch in a circuit between the starting motor and the current source, means for simultaneously closing said main switch and moving the clutch pedal to disengaged position, an ignition switch, and means whereby operation of the ignition switch controls operation of said last mentioned means.

25. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a main starting motor switch in a circuit between the starting motor and the current source, an electromagnet for simultaneously closing said main switch and moving said clutch pedal to disengaged position, and means controlled by the ignition switch for causing said electromagnet to be energized.

26. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a main starting motor switch in a circuit between the starting motor and the current source, an electromagnet for simultaneously closing said main switch and moving said clutch pedal to disengaged position, an ignition switch, and a magnetic switch controlled by said ignition switch and adapted to cause said electromagnet to be energized.

27. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a main starting motor switch in a circuit between the starting motor and the current source, an electromagnet for simultaneously closing said main switch and moving said clutch pedal to disengaged position, an ignition switch, a magnetic switch for causing said electromagnet to be energized and for also controlling the starting motor circuit, and means whereby the operation of the ignition switch controls said magnetic switch.

28. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a main starting motor switch in a circuit between the starting motor and the current source, an electromagnet for simultaneously closing said main switch and moving said clutch pedal to disengaged position, an ignition switch, a magnetic switch for causing said electromagnet to be energized and for also controlling the starting motor circuit, and means whereby closing of the ignition switch effects the closing of the magnetic switch.

29. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a main starting motor switch in a circuit between the starting motor and the current source, an electromagnet for simultaneously closing said main switch and moving said clutch pedal to disengaged position, an ignition switch, a magnetic switch in circuit with said electromagnet and with said starting motor and means for controlling the action of said magnetic switch by operation of the ignition switch and operation of the engine.

30. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply curent for operating said starting motor, a transmission gear shift level, a switch for closing a circuit between the starting motor and current source, means for simultaneously moving said gear shift lever to neutral position and closing said switch, an ignition switch and means whereby the operation of said last mentioned means is controlled by said ignition switch.

31. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a transmission gear shift lever, a switch for closing a circuit between the starting motor and current source, an electromagnet for simultaneously moving said gear shift lever to neutral position and closing said switch, an ignition switch and means whereby said ignition switch controls the action of said electromagnet.

32. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, an ignition switch, an electromagnet controlled by the ignition switch and adapted to move the clutch pedal to disengaged position and render the starting motor effective upon closing of the ignition switch, and means operative to prevent energization of the magnet when the engine is operating under its own power.

33. In combination with the engine of an automotive vehicle, a starting motor therefor, a

current source adapted to supply current for operating said starting motor, a gear shift lever for connecting the engine in driving relation with the vehicle, means for simultaneously moving the gear shift lever to disengaged position and rendering the starting motor effective to start the engine, and means operative when the engine is running under its own power to prevent operation of said last mentioned means.

34. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a gear shift lever for connecting the engine in driving relation with the vehicle, an ignition switch, an electromagnet controlled by the ignition switch and adapted to move the gear shift lever to disengaged position and render the starting motor effective upon closing of the ignition switch and means operative to prevent energization of the magnet when the engine is operating under its own power.

35. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a transmission gear shift lever, a switch for connecting the starting motor with said current source, an electromagnet for simultaneously moving said clutch pedal to disengaged position and closing said switch to render the starting motor effective, a second electromagnet for shifting the gear shift lever to neutral position, and a magnetic switch in circuit with both of said electromagnets and with the starting motor, whereby the closing of said magnetic switch effects closing of the starting motor circuit and the shifting of both said clutch pedals and gear shift lever to disengaged position.

36. In combination with the engine of an automotive vehicle, a starting motor therefor, a current source adapted to supply current for operating said starting motor, a clutch pedal for connecting the engine in driving relation with the vehicle, a transmission gear shift lever, a switch for connecting the starting motor with said current source, an electromagnet for simultaneously moving said clutch pedal to disengaged position and closing said switch to render the starting motor effective, a second electromagnet for shifting the gear shift lever to neutral position, a magnetic switch in circuit with both of said electromagnets and with the starting motor, whereby the closing of said magnetic switch effects closing of the starting motor and the shifting of both said clutch pedals and gear shift lever to disengaged position, an ignition switch and means whereby closing of the ignition switch effects closing of said magnetic switch.

37. In an automotive vehicle having an internal combustion engine, a clutch and transmission gearing for connecting the engine in driving relation with the vehicle, a clutch operating member and a gear shift lever for operating said transmission gearing, electrical control apparatus for controlling the operation of said vehicle and comprising, in combination, an electric starting motor and gearing associated therewith for cranking the engine, electromagnetic means for causing the automobile clutch to be disengaged, a current source and means for effecting connection of the starting motor and said electromagnetic means with the current source.

38. In an automotive vehicle having an internal combustion engine, a clutch and transmission gearing for connecting the engine in driving relation with the vehicle, a clutch operating member and a gear shift lever for operating said transmission gearing, electrical control apparatus for controlling the operation of said vehicle and comprising, in combination, an electric starting motor and gearing associated therewith for cranking the engine, electromagnetic means for causing the automobile gear shift lever to be moved into neutral position, a current source, and means for effecting connection of the starting motor and said electromagnetic means with the current source.

39. In an automotive vehicle having an internal combustion engine, a clutch and transmission gearing for connecting the engine in driving relation with the vehicle, a clutch operating member and a gear shift lever for operating said transmission gearing, electrical control apparatus for controlling the operation of said vehicle and comprising, in combination, an electric starting motor and gearing associated therewith for cranking the engine, electromagnetic means for causing the automobile clutch to be disengaged, electromagnetic means for causing the automobile gear shift lever to be moved into neutral position, a current source, and means for effecting connection of the starting motor and both of said electromagnetic means with the current source.

40. In an automotive vehicle having an internal combustion engine, a clutch and transmission gearing for connecting the engine in driving relation with the vehicle, a clutch operating member and a gear shift lever for operating said transmission gearing, electrical control apparatus for controlling the operation of said vehicle and comprising, in combination, engine starting apparatus operated by the electric motor, a current source, means for causing the engine clutch to be disengaged and comprising an electromagnetic device for moving the clutch operating pedal to clutch disengaging position, means for connecting said electromagnetic means with the current source, and means operated by said electromagnetic means for causing the electric motor to be connected with the current source.

41. In an automotive vehicle having an internal combustion engine and means for controlling the driving relation between the engine and the vehicle, control apparatus therefor comprising engine starting apparatus including an electric motor adapted to drive the engine, a current source, a switch located in a circuit including in series said electric motor and said current source, automatically operated means controlled by said switch for operating the first-mentioned means, and means operated by said automatically operated means to connect said electric motor with said current source when the first-mentioned means is operated to effect a non-driving relation between the engine and the vehicle.

42. In an automotive vehicle having an internal combustion engine and a clutch for connecting the engine in driving relation with the vehicle, control apparatus therefor comprising engine starting apparatus including an electric motor adapted to drive the engine, a current source, a switch controlling said starting apparatus and including switch control means, a clutch operating member, automatically operated means controlled by said switch control means for

operating said clutch operating member, and means operated by said automatically operated means to connect said electric motor with said current source when the clutch operating member is moved toward clutch disengaging position.

43. In an automotive vehicle having an internal combustion engine and a clutch for connecting the engine in driving relation with the vehicle, control apparatus therefor comprising engine starting apparatus including an electric motor adapted to drive the engine, a current source, an ignition switch including switch control means, a clutch operating member, automatically operated means controlled by said switch control means for operating said clutch operating member, and means operated by said automatically operated means to connect said electric motor with said current source when the clutch operating member is moved toward clutch disengaging position.

44. In an automotive vehicle having an internal combustion engine and a clutch for connecting the engine in driving relation with the vehicle, control apparatus therefor comprising engine starting apparatus, switch means controlling said starting apparatus, a clutch operating member, automatically operated means controlled by the first-mentioned means for operating said clutch operating member, and means operated by said automatically operated means to render said starting apparatus effective to start the engine when said clutch operating member is moved toward clutch disengaging position.

45. In an automotive vehicle having an internal combustion engine and a clutch for connecting the engine in driving relation with the vehicle, control apparatus therefor comprising engine starting apparatus, an ignition switch including switch control means, a clutch operating member, automatically operated means controlled by said switch control means for operating said clutch operating member, and means operated by said automatically operated means to render said starting apparatus effective to start the engine when said clutch operating member is moved toward clutch disengaging position.

46. In an automotive vehicle having an internal combustion engine and means for controlling the driving relation between the engine and the vehicle, control apparatus therefor comprising engine starting apparatus, an ignition switch including switch control means, and automatically operated means controlled by said switch control means for operating the first-mentioned means so as to effect a non-driving relation between the engine and the vehicle and for rendering said starting apparatus effective to start the engine.

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