

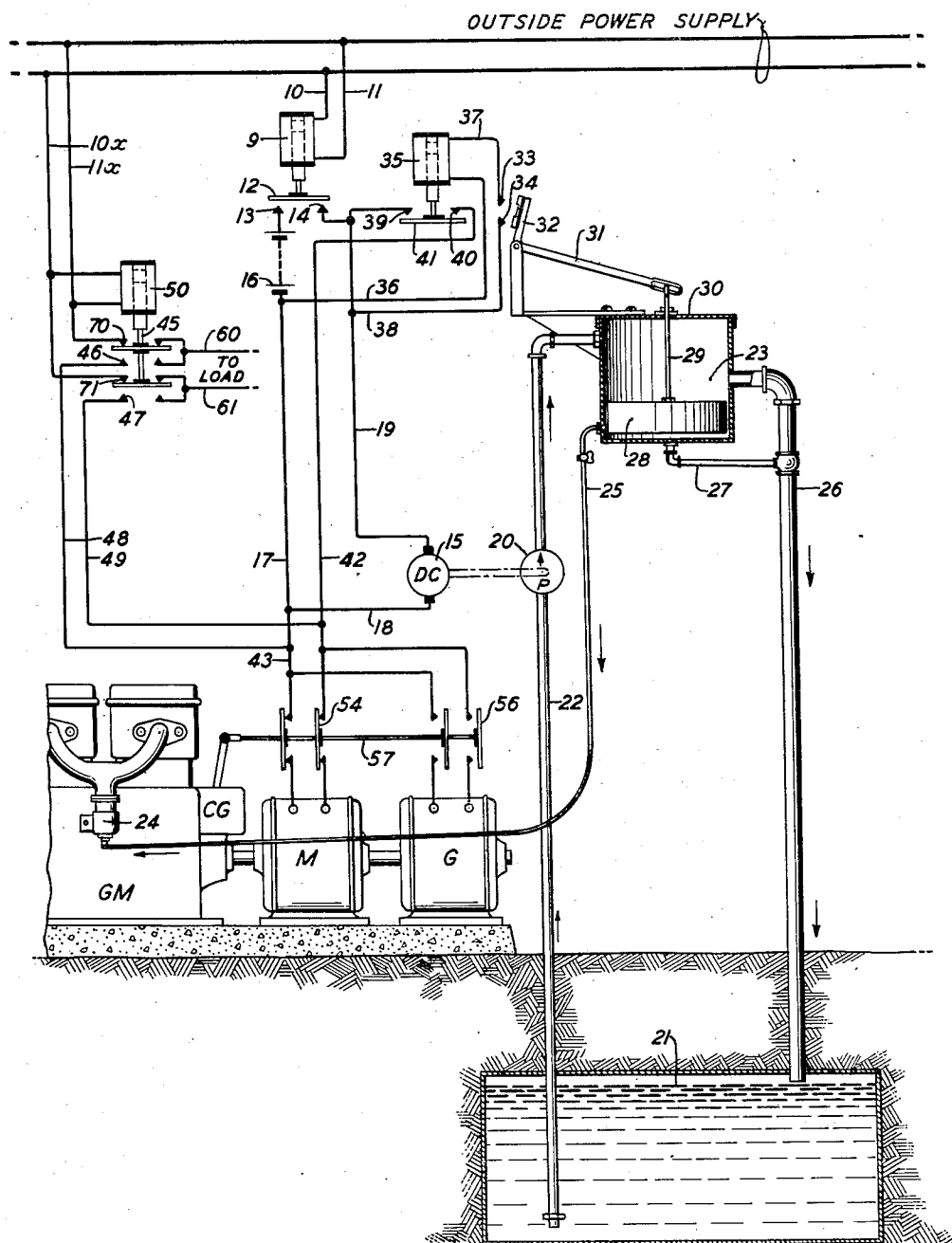
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CONTROL CIRCUIT

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CONTROL CIRCUIT

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3 Claims. (Cl. 290—30)

This invention relates to automatically controlled systems for internal combustion engines and more specifically to a control system for insuring a gasoline supply to an internal combustion engine.

In small telephone exchanges, for example, it is necessary to provide a current generator set to carry the load upon the failure of an outside power supply, the generator set generally comprising an electric motor and a generator operatively connected to an internal combustion engine. However, in telephone exchanges, it is not permissible to maintain a supply of gasoline for the internal combustion engine and it is the object of this invention to provide an arrangement for starting the gasoline engine by first electrically driving a gasoline pump to draw gasoline from a tank placed outside of the building for filling a small auxiliary reservoir from which the carburetor of the engine is fed by gravity, the extra supply of fuel returning to the main tank by overflow pipes connecting the main tank and the auxiliary reservoir, thus effectively avoiding fire risks incident to the use of an internal combustion engine.

More specifically, a control system is provided whereby the failure of the outside power supply line is effective to cause the closing of a local circuit for energizing an electric motor, the operation of which actuates a pump for filling a small auxiliary fuel container from a main gasoline tank which is sunk in the ground outside of the premises in which the apparatus is located, the gasoline being fed to the carburetor of the engine from the auxiliary container by gravity with means for controlling the operation of the generator set when the gasoline reaches a certain level in the auxiliary container, and a system of overflow pipes connect the auxiliary container with the main gasoline tank in a manner that no gasoline is kept in the auxiliary container and carburetor after the operation of the engine when the outside power supply is restored to normal operating condition.

Other features and advantages of the invention will appear from the following description and by the claims appended thereto, reference being had to the accompanying drawing in which 9 and 50 indicate electromagnets connected to the outside power supply line by wires 10 and 11, and 10_x and 11_x, electromagnet 9 having an armature 12 for engaging the contacts 13 and 14 upon the deenergization of magnet 9 upon the failure of the power supply.

The engagement of contacts 13 and 14 by

armature 12 causes the operation of a direct current motor 15 through a circuit including the contact 13 connected to one pole of battery 16, the wire 17 connected to the other side of the battery, the wire 18 connected to the field winding of motor 15, the other side of the motor winding being connected by wire 19 to contact 14.

A pump 20 which is connected to a fuel tank 21 by a pipe 22 is operatively connected to the armature shaft of motor 15 and operates upon the starting of motor 15 for pumping the fuel from the tank 21 which is sunk in the ground outside of the building into an auxiliary container 23 placed above the carburetor 24 of the internal combustion engine to permit the fuel to flow therein by gravity through a connecting tubing 25.

A main fuel overflow pipe 26 of comparatively large cross-sectional area connects the auxiliary container 23 to the main tank 21 and serves to control the fuel level in the container 23 and another pipe 27 connects the bottom of the container 23 to the main overflow pipe 26 in order to assure the complete draining of this container upon the stopping of pump 20, as will be hereinafter described in detail.

A float 28 in the container 23 is provided with a rod 29 which extends to the outer side of the container cover 30 for connection with a lever member 31 carrying a contact device 32 provided for bridging the contacts 33 and 34 upon a movement of the float 28 in the auxiliary container 23, the engagement of contacts 33 and 34 being effective to energize a magnet 35 through a circuit including one pole of battery 16, the conductor 36, the winding of magnet 35, the conductor 37, contacts 33 and 34 engaged by the bridging piece 34, conductor 38, contacts 13 and 14 bridged by the armature 12 of magnet 9 to the other pole of battery 16.

The operation of magnet 35 is effective to close the energizing circuit of motor M of the generator set from one pole of battery 16, contacts 13 and 14 bridged by armature 12 of magnet 9, contacts 39 and 40 bridged by armature 41 of magnet 35, conductor 42 connected to the field winding of motor M, through switch 54, conductors 43 and 17 to the other pole of battery 16, thus starting the gasoline engine for driving the generator G for supplying current to the load connected to wires 60 and 61 when the magnet 50 is deenergized and when the double-throw switch 45 engages the contacts 46 and 47 of conductors 48 and 49 and the closure of switch 56, the operation of which opens switch 54 through their con-

nection with the rod 57, the operation of switches 54 and 56 being effected automatically by a centrifugal governor CG actuated by the engine GM.

Upon the reestablishment of the outside power supply magnet 9 energizes for breaking the contacts 13 and 14 through the movement of its armature 12 and thereby opening the circuit of motor 15 for stopping the fuel pump 20. Upon the complete draining of the auxiliary container 23 through pipe 27 and the consequent stopping of the gasoline engine GM the circuits of motor M and generator G are opened through the deenergization of magnet 35 upon the disengagement of the bridging piece 32 with contacts 33 and 34 when the float 28 is returned to the bottom of the auxiliary container 23, the switches 54 and 56 being moved simultaneously in the position shown through this connection with the rod 57 as above described and the double-throw switch 45 is moved in engaged relation with contacts 70 and 71 of conductors 10_x and 11_x connected to the outside power supply, thus preparing the local circuit for a subsequent operation upon the failure of the outside power supply.

25 What is claimed is:

1. In a system for automatically starting an internal combustion engine having an electric motor for starting it, the combination with a power supply circuit, of a magnet energized in said circuit, a normally open local circuit closed by said magnet upon the failure of the supply circuit, an electric source in said local circuit, an electric motor energized upon the closure of said local circuit, a fuel pump actuated by said motor, a cup filled by the operation of said pump, a float in said cup and a switch closed upon the move-

ment of said float for controlling the operation of said motor for starting the engine.

2. In a system for automatically starting an internal combustion engine having an electric motor for starting it, the combination with a power supply circuit, of a magnet energized in said circuit, a normally open local circuit closed by the release of said magnet upon the failure of the power supply circuit, a current supply and an electric motor connected in said local circuit, a pump actuated by said motor, a fuel cup placed in an elevated position with respect to the carbureter of the engine and filled by the operation of said pump, a main gasoline tank, an overflow and a drain pipe connecting said cup to said tank and a pipe connecting the carbureter with said cup whereby the carbureter is fed by gravity and a switch closed upon the movement of said float for controlling the operation of said motor for starting the engine.

3. In a system for automatically starting an internal combustion engine having an electric starter, the combination with a supply circuit, a normally energized magnet in said circuit, a local circuit closed by the deenergization of said magnet, a current supply and an electric motor connected in said local circuit, a fuel pump actuated by said motor, a fuel cup connected to said pump, a float in said cup, a contact closed by the rise of said float upon the filling of said cup by said pump, a magnet in said local circuit energized upon the closure of the last mentioned contact, for energizing said starter for starting the engine.

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