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(54) Temporary operation of an electrical or electromagnetic device in a system including an electric motor

(57) A power source 40 feeds an electric motor 11, 12 via a switch 30. When the switch 30 is changed over from A to B, for example under thermostatic control, the supply of power to the motor is interrupted but the inertia of the motor generates current for temporary energization of a load 22 which is connected to the motor by switch 30. The load may be a solenoid valve, and electromechanical alarm sounder indicating the end of the motor operating cycle, or a pulse-operated bistable device. A solenoid valve may have an opening coil 21 and a closing coil 22. The coil 21 is energised from the source 40 during the starting of the motor when a starting device 13 connects an auxiliary winding 11 of the motor to source 40 for a predetermined period. Coil 22 is energised by the main winding 12 of the motor acting as a generator during deceleration.

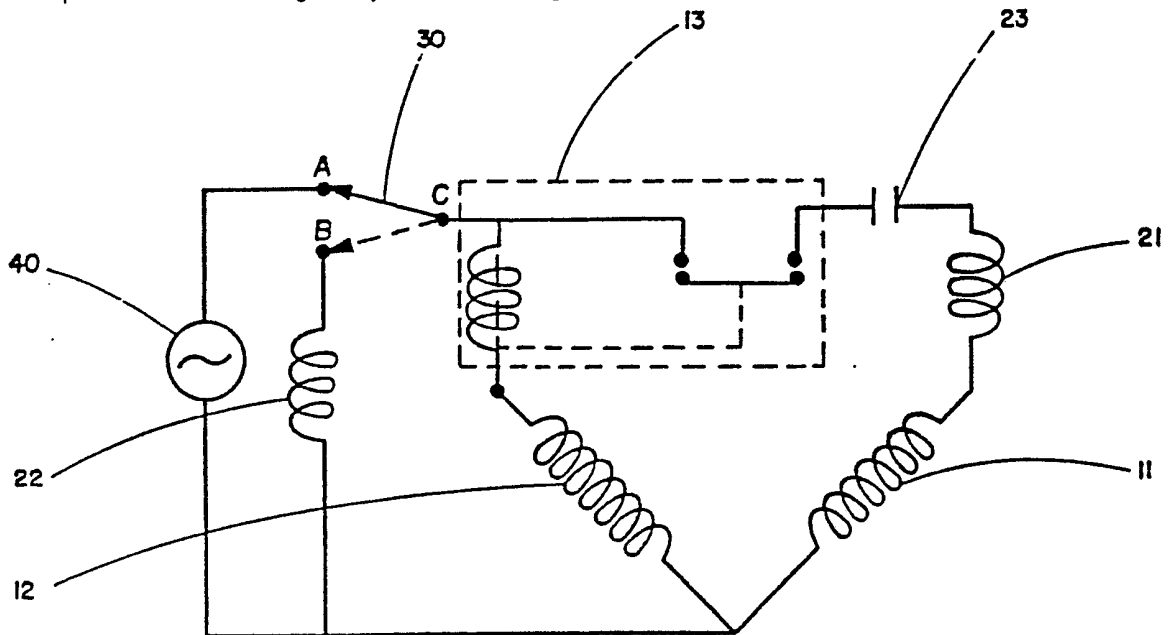


FIG. 2

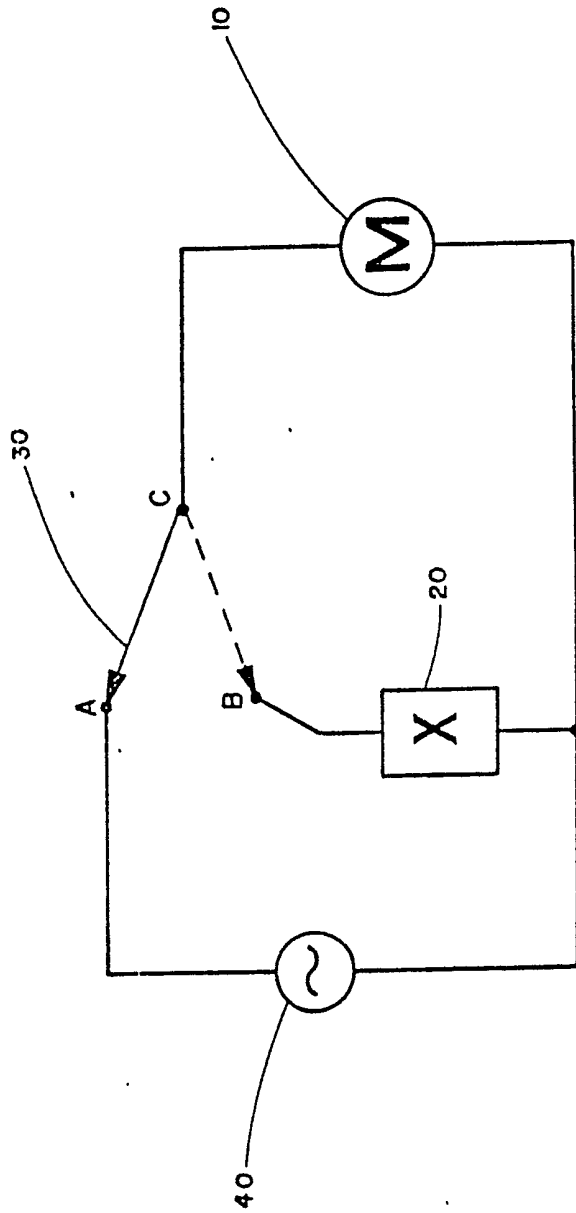


FIG. 1

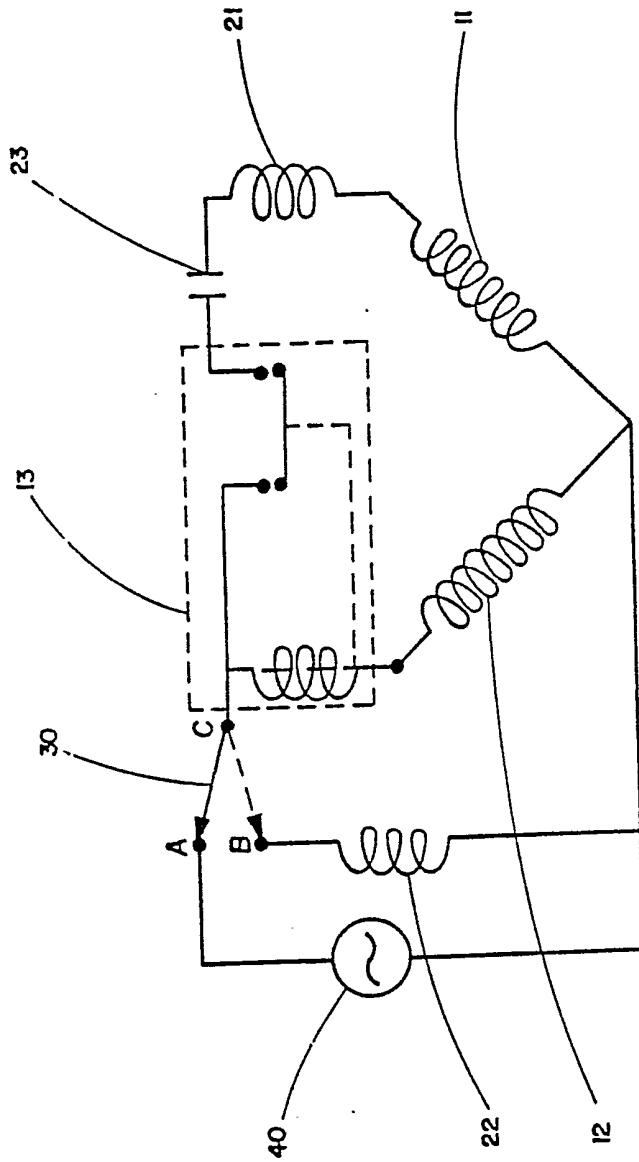


FIG. 2

TEMPORARY OPERATION OF AN ELECTRICAL OR  
ELECTROMAGNETIC DEVICE IN A SYSTEM INCLUDING  
AN ELECTRIC MOTOR

This invention refers to a system for driving electrical/ electromagnetic devices in an installation or equipment using the powering condition of an electrical motor for this installation or equipment.

Driving systems of this type can be used, for example, in solenoid valves, electromechanic type sound alarms, indicating the end of the motor operating cycle and keys in general of the bi-stable type, being driven by electrical pulses. Devices of this type are usually driven by electric current fed by an external feeding source, and consumes a certain amount of electric energy. It is an object of this invention to provide a system for driving an electrical/electromagnetic device making part of an installation or equipment the operation of which is independent, at least during some extent of its work cycle, from the external feeding source for the installation or equipment.

It is another object of this invention to provide a system for temporary driving of electrical/electromagnetic devices which does not cause consumption of electric energy from the external feeding source for the installation.

The objects abovementioned are substantially reached

from an installation or equipment including an electrical motor of the type which is constituted of a stator and a rotor; an electrical feeding source which can be selectively connected to said electrical motor; and an electrical/electromagnetic device which can be powered at least during some portion of its work cycle from the installation or equipment.

According to this invention, the electrical/electromagnetic device is connected in parallel to the electrical motor when it is switched off. When the motor is switched off, the network feeding current is interrupted and the rotor is decelerated until its stop. During this deceleration, the electrical motor acts as a generator, and causes an electrical current to flow through the electrical/electromagnetic device. Said electrical current can be used to drive the device for some time thereby avoiding energy consumption from the feeding network.

The invention will hereinafter be described with reference to the annexed drawings, in which:

Figure 1 is a schematic view of a basic installation employing the principle of this invention; and

Figure 2 is a schematic view with details of the electrical circuit for an installation which uses an electromagnetic device in the form of a solenoid valve being driven by the principle as already described.

As illustrated in figure 1, an installation or equipment

using the driving system in question, is constituted of an electrical motor 10, an electrical or electromagnetic device 20 and a change-over switch 30, with the installation being fed by an external source 40.

As illustrated in figure 2, the electrical/electromagnetic device 20 is constituted of a first coil 21 and a second coil 22 which function, in the illustrated example, respectively to open and close the solenoid valve. The second coil 22 or opening coil is connected to the motor electrical circuit, which comprises an auxiliary coil 11, a starting device 13, a main coil 12 and a voltage source 40.

The motor electrical circuit may also include a start capacitor 23 which is connected in series to the auxiliary coil 11.

The change-over switch 30 can be driven by a thermostat or any other installation used switching device.

The first coil 21 operates when the motor is started, the start device 13 allowing a temporary current flow through the coil 21 which is connected in series to the auxiliary coil 11 of the motor. This temporary current flow will occur due to the operation of the start device 13, which switches off the auxiliary coil 11 after a small period of time being elapsed.

The operation of the second coil 22 starts when the motor is turned off, when the change-over switch 30 moves from position A to position B, connecting in parallel the second coil 22 to the main coil 12 of the motor,

when said motor starts its deceleration movement. During this deceleration period, the motor acts as an electrical energy generator, and causes temporarily a current to flow through the second coil 22, this current being generated by the main coil 12 of the motor 10.

Concerning the illustrated circuit, it shall be noted that the current flowing through the first coil 21 of the electrical/electromagnetic device 20 is supplied by the source 40 while the current flowing through the second coil 22 is generated by the electrical motor itself 10 when it is turned off. Therefore, the operation of the second coil 22 does not cause any electrical energy consumption in the feeding network (herein represented by the external source 40), since this energy is generated by the electrical motor 10 rotor inertia.

Although some preferred applications of this invention are herein described, it will be understood that the principles thereof can be applied to several types of equipment and installations, having electrical circuits in the most diversified configurations including components and devices not showed in the annexed drawings.

CLAIMS:

1. A system for driving electrical/electromagnetic devices in an installation or equipment of the type including at least an electrical motor comprising a stator and a rotor; an electrical feeding source which can be selectively connected to said electrical motor and an electrical/electromagnetic device which can be powered, at least during some portion of its work cycle from the installation or equipment, characterized in that the electrical/electromagnetic device (20) is connected in parallel to said electrical motor (10) when the motor is disconnected from the electric feeding source (40).
2. A system according to claim 1, wherein said electrical motor comprises a main winding, a secondary winding and a starting device, characterized in that the electrical/electromagnetic device (20) comprises a first coil (21), which is connected in series to the auxiliary winding (11) and to the starting device (13) of the electrical motor (10), and a second coil (22) which is automatically and simultaneously powered when the electrical motor is disconnected from the electrical feeding source (40).
3. A system according to claim 2, characterized in that the second coil (22) for the electrical/electromagnetic device (20) is automatically and simultaneously connected in parallel to the main electrical motor (10) winding (12) when said electrical motor is disconnected from the electrical feeding source (40).
4. A system according to claim 1, 2 or 3 and including a change-over switch movable between a first position connecting the electrical motor to the feeding source and a second position disconnecting the electrical motor from the feeding source, characterized in that the electrical/electromagnetic device (20) is connected in parallel to the electrical motor (10) by the change-over switch (30), when the latter is in its second position.



5. An electrical system including an electric motor supplied by an electric power source and an electrical or electromagnetic device which is to be energized for short periods characterized by switching means which upon disconnection of the electric motor from the source connects the device to receive current from the decelerating motor.