Aug. 22, 1967 C. J. MENDENHALL 3,337,756

SYSTEM FOR SHORT-TERM SUPPLY OF CURRENT FOLLOWING INTERRUPTION THEREOF

Filed Aug. 11, 1964

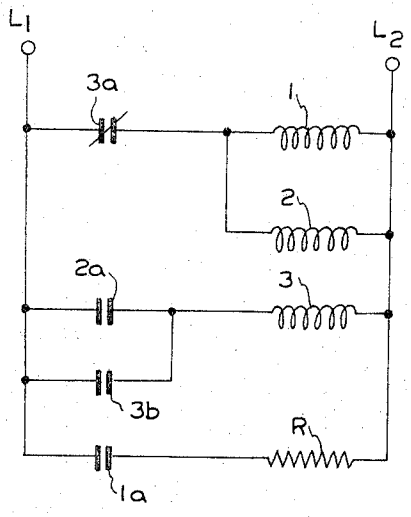


FIG.1

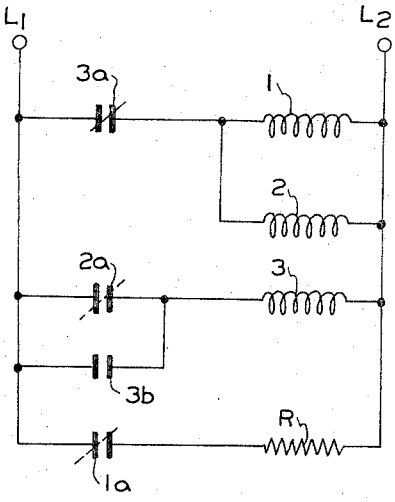


FIG.3

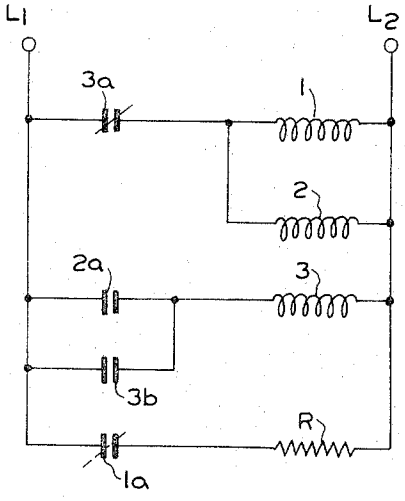


FIG.2

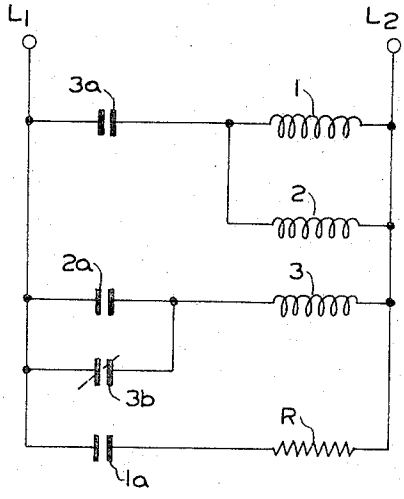


FIG 4

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United States Patent Office 3,337,756 Patented Aug. 22, 1967

3,337,756

SYSTEM FOR SHORT-TERM SUPPLY OF CURRENT FOLLOWING INTERRUPTION THEREOF

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Filed Aug. 11, 1964, Ser. No. 388,786
3 Claims. (Cl. 307—141.4)

ABSTRACT OF THE DISCLOSURE

A time relay system for automatically supplying electric current for a relatively brief, predetermined time period, following interruption of said current whereby, for example, current may be temporarily supplied for a short "start" period to a magnetic motor starter, to automatically restart an electric motor whose operation had ceased due to said current interruption.

This invention deals generally with a circuit for supplying current to a given resistance for a brief, predetermined period following interruption of said current, and has particular application to restarting large electric motors following a power failure.

A number of occasions arise which require a brief, temporary supply of current following a power failure. Specifically, in situations wherein complex combustion systems are utilized for high-temperature heat treatment as in the case of firing ceramic kilns or porcelain enameling furnaces, heavy duty motors are utilized to power blowers for supplying a large volume of air to oil or gas burners.

Through various conventional interlinking systems, a reduction in air pressure due to stoppage of a blower motor causes the fuel supply to be shut off as a safety measure. Conversely, by simply restarting the motor powering an air blower, the system of combustion may be immediately reinstated, particularly if the temperature of the combustion zone has not dropped materially.

Heretofore then, a temporary current interruption for any reason resulted in blower motor stoppage, with consequential interruption of combustion. Upon current being reinstated, individual blower motors had to be restarted by activating a magnetic motor starter for a brief period by any conventional method, usually through the device of a manually operable push-button switch or the like.

This system had the disadvantage, however, of necessitating an individual, or individuals, to manually establish briefl electrical contact in the magnetic motor starter to thereby restart the blower motors following a power failure.

It is therefore the object of this invention to supply a self-activating system for supplying current for a predetermined period, to a magnetic motor starter following temporary power failure.

It is also an object of this invention to automatically restart heavy duty motors following a power failure.

It is yet another object of this invention to provide means for automatically re-supplying current for a brief, predetermined period, to any end-use resistance device following a power failure.

In the attached drawing, FIGS. 1 through 4 are sequential circuit diagrams of my novel system.

In the attached drawing line conductors L_1 and L_2 represent an interruptible current source.

In the attached drawing, coils **1**, **2** and **3** are coils of conventional relays and respectively, when energized, activate contacts **1***a*, **2***a*, with coil **3** activating the two contacts **3***a* and **3***b*.

The relay represented by coil **2** and contact **2***a* is a conventional time-delay relay, which preferably has a time delay of approximately five-seconds lapse from the time coil **2** is energized to the time normally open contact **2***a* closes.

Contacts **3***a* and **3***b* are activated by coil **3**, contact **3***a* being normally closed, **3***b* being normally open, energization of coil **3** opening contact **3***a* and closing contact **3***b*.

R may be any end-use resistance to which it is desirable to supply current for a temporary period following power failure, and in my illustrative embodiment this would be a conventional magnetic motor starter for restarting electric motors used for powering air blowers for combustion systems. As herein shown, resistance R is connected in series with relay contact **1***a* and across line conductors L_1 and L_2.

FIG. 1 represents the condition of the system either prior to power being initially supplied through L_1–L_2, or immediately following a power failure. During this interval the relay contact **3***a* reverts to its normally closed condition.

Proceeding to the description of the operation of my novel system, immediately upon power being supplied to the system from current source L_1 and L_2, it will be seen that through normally closed contact **3***a*, in series with coils **1** and **2**, the latter being connected in parallel with each other, are immediately energized. All three components, contact **3***a* and coils **1** and **2** are in parallel with the series connected end-use resistance R and normally open contact **1***a*.

Coil **1** having been energized, it thereby immediately closes contact **1***a* as shown in FIG. 2; coil **2** being a coil of a five-second time-delay relay, this simultaneously begins timing out; thus, while coil **2** times out, current is supplied R through now closed contact **1***a*.

FIG. 3 represents the condition of the system immediately after time-delay relay **2** times out, thereby closing its normally open contact **2***a*. It will be seen that from the time current is initially supplied to line conductors L_1 and L_2 power is continuously supplied to the end-use resistance for the time it takes relay **2** to time out.

FIG. 4 illustrates the condition of the system immediately following timing out of time-delay relay **2** with consequential closing of normally open contact **2***a*, whereby the coil of relay **3** is energized to close its normally open contact **3***b* and open normally closed contact **3***a*.

The last sequence has the effect of "locking in" relay **3** through its own normally open contact, now closed, and cutting out relay **1** and time-delay relay **2** from the system through now open contact **3***a*. Since relay coil **1** is thereby de-energized, normally open contact **1***a* reverts to its normal open condition thereby disrupting the current to end-use resistance R, which in this embodiment is a magnetic motor starter.

Thereafter, upon a current failure, the coil **3** of relay **3** is de-energized thereby permitting normally open contact **3***b* to open so as to permit normally closed contact **3***a* to close thus returning the system to the condition as shown in FIG. 1. The system thus stands ready to once again supply current temporarily to end-use resistance R for a period of five seconds following resumption of current from current source L_1–L_2.

While I have shown the foregoing system using relays of the conventional type, it is also to be understood that this invention embraces any variations thereof which would perform substantially the same function in substantially the same way.

Having thus described my invention in detail, I claim:

1. A system for supplying current to an end-use resistance for a predetermined period of time following current interruption comprising, in combination, an end-

use resistance connected across a source of current, a first relay having an energizing coil across said source and a normally open contact in series with said end-use resistance, a second relay having an energizing coil across said source and a normally open contact and a normally closed contact, said normally closed contact being connected in series with the energizing coil of said first relay, a time-delay relay having an energizing coil connected across the energizing coil of said first relay, a normally open contact of said time-delay relay being connected in series with the energizing coil of said second relay, said normally open contact of said second relay being connected across the normally open contact of said time-delay relay, said coils of said first and second relays in parallel with respect to each other, the energizing coil of said first relay being instantaneously energized upon the application of said current source thereto effective to close the narmally open contact of said first relay and supply current from said source to said end-use resistance, the energizing coil of said time-delay relay being energized with the coil of said first relay and operable after a predetermined energized period to close the normally open contact of said time-delay relay and energize the

coil of said second relay, the normally open contact of said second relay being closed upon the energization of its associated coil effective to lock in said coil across said source of current, and the energization of said second relay coil being operable to open the normally closed contact of said second relay effective to disconnect the coils of said first relay and said time-delay relay from said source.

2. The system of claim 1 wherein said time-delay relay has a timeout period of from about 1 to about 30 seconds.

3. The system of claim 1 wherein the end-use resistance is a magnetic motor starter.

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