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PILOT LIGHT FOR ELECTRICAL DEVICE

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Fig. 1.

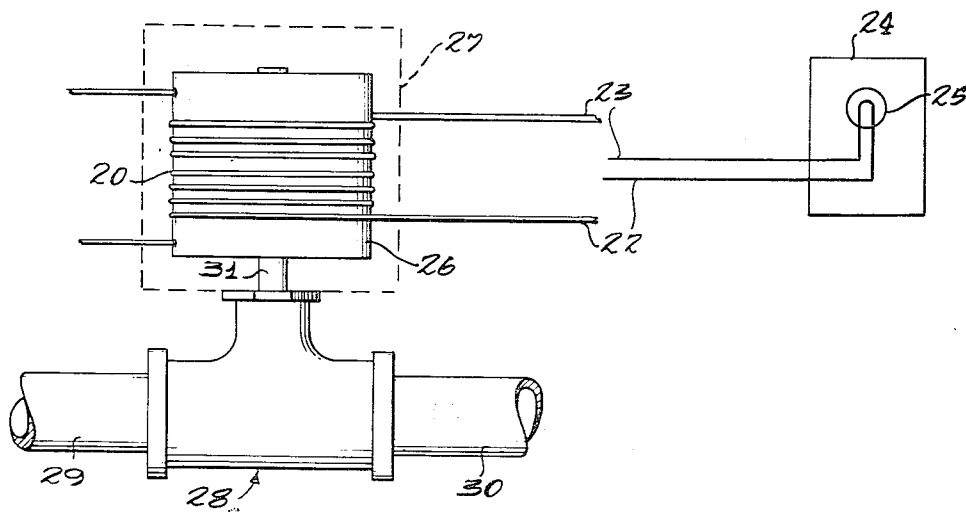
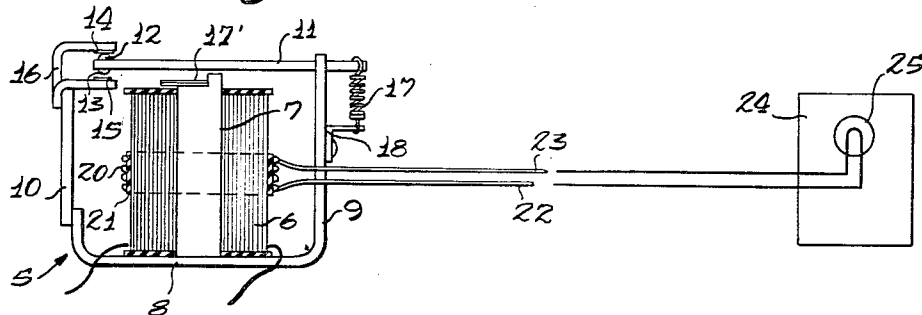


Fig. 2.

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1

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PILOT LIGHT FOR ELECTRICAL DEVICE

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1 Claim. (Cl. 340—252)

The invention relates to an improved method of an apparatus for monitoring electrically operated apparatus and more particularly for monitoring apparatus operated by alternating current.

The invention is particularly concerned with electric operating and control systems in which the operating or control functions are executed by relays, solenoids or comparable devices operating on alternating current. In many such systems, supervision must be exercised from a station remote from the apparatus. To make that practicable, it is customary to provide a signal panel at the supervisory station with suitable signals, usually visual, for indicating the operated or idle condition of the devices involved.

A common type of signal comprises an incandescent lamp operatively associated with the devices to be monitored by means of an independent pilot circuit including a source of current and switch contacts opened or closed mechanically upon energization or deenergization of the associated device. It has also been proposed to utilize specially constructed relay or solenoid coils having a separate winding for operating the signal device.

One object of the invention is to provide an improved method of and apparatus for monitoring electrical devices which eliminates the need for special coils or for signal actuating switch contacts with a consequent reduction in the initial cost as well as in maintenance cost, which can be easily and cheaply incorporated in electrical systems, including those previously manufactured and installed without monitoring, and which affords efficient, dependable and trouble-free operation.

Another object is to provide an improved monitoring or pilot system for electrical apparatus utilizing the improved method.

Other objects and advantages of the invention will become apparent from the preferred embodiments illustrated in the accompanying drawing, in which

Figure 1 is a partly diagrammatic view showing the application of the improved monitoring system to an alternating current relay.

Figure 2 is a partly diagrammatic view showing the application of the monitoring system to an alternating current valve operating solenoid.

While a preferred form of the invention has been shown in the drawings and will be described hereinafter by way of illustration, it is to be understood that this is not intended to limit the invention to the particular form shown but on the contrary, the intention is to cover all modifications and alternative constructions falling within the spirit and scope of the invention as expressed in the appended claims.

Referring to Fig. 1 of the drawing, there is shown a conventional alternating current relay 5 comprising a coil 6 of copper or other suitable wire wound on a soft iron pole core 7 which projects at opposite ends of the coil. The core 7 is mechanically secured and magnetically coupled at one end to the intermediate portion 8 of a

2

U-shaped yoke which has legs 9 and 10 extending generally parallel to the core.

One leg of the yoke, in this instance the leg 9, pivotally supports an armature 11 which extends over the adjacent end of the core 7 and at its free end carries contact points 12 and 13 cooperating with stationary contact points 14 and 15 supported by a bracket 16 on the other leg 10 of the yoke. A tension spring 17 connected between a bracket 18 on leg 9 of the yoke and the overhanging end of the armature 11 tends to swing the latter away from the core 7 and close the contact 12 against the contact 14.

Upon energization of the coil 6 from a source of alternating current, armature 11 is attracted toward the core 7, thus opening contacts 12—14 and closing contact 13 against contact 15. In this way the relay is enabled to control one or more electrical circuits, which of course may be employed for any desired purpose. To prevent chattering of the armature 11, the upper end of the pole core 7 is recessed at one side and fitted with a shading coil 17.

In accordance with the invention, relays such as that above described, may be equipped for remote visual monitoring in a very simple and inexpensive manner without requiring a change of coils or any structural changes in the relay assembly. For that purpose, a plurality of turns on insulated wire 20 are wound around the relay coil in inductive relation to the coil 6 preferably with a strip of insulating material 21 interposed between the coil and the wire. The two ends of the wire 20 or suitable leads 22 and 23 therefrom, are extended to a signal panel 24 provided at the monitoring station which may be located at any desired distance from the relay. Leads 22 and 23 are connected to the two terminals of an incandescent lamp 25 which may be mounted on the panel 24 in any preferred manner. With this arrangement, energization of the coil 6 by alternating current induces current in the wire 20 and lights the lamp 25 to visually indicate the energized condition of the relay. When the current supplied to the coil 6 is interrupted, lamp 25 is extinguished to indicate that condition.

The number of turns of the wire 20 required for any particular installation will vary in accordance with a number of factors, including among others the characteristics of the relay, its operating voltage, the distance of the signal lamp from the relay, and the character of the lamp. It has been found that an ordinary 6-volt flash light bulb serves very well as a signal lamp and has the advantage of being cheap and readily available. Such lamps glow sufficiently bright for signaling purposes when supplied with current substantially below the 6-volt rating and the operating life of the lamp is materially increased. Accordingly, efficient and dependable monitoring may be obtained by using enough turns of the wire 20 to produce a current of from two to four volts in the monitoring circuit. It will be appreciated, of course, that other types of lamps may be used, if desired, and operated in other voltage ranges.

Provision may be made in a similar manner for monitoring other electrical devices operating on alternating current. Thus, for monitoring a valve actuating mechanism of the type shown in Fig. 2, a suitable number of turns of the wire 20 are wound around the solenoid coil 26 which constitutes the operating element of the mechanism. As in the previously described system, the ends of the wire 20 are connected by leads 22 and 23 with the signal lamp 25 on the monitoring panel 24.

In the particular mechanism illustrated, the coil 26 is suitably supported within a housing 27 mounted on the casing of a valve 28 interposed between two conduits 29

3

and 30. By shifting its movable armature 31, the solenoid is operative to open or close the valve 28 when energized or deenergized.

Current induced in the wire 20, when coil 26 is energized lights the signal lamp 25 and the lamp is extinguished when the coil is deenergized. Thus the lamp 25 provides a visual signal at the remote point showing the open or closed condition of the valve.

It will be apparent from the foregoing that the invention provides a novel method of equipping alternating current electrical devices for remote monitoring. The apparatus required for carrying out the method is simple and inexpensive and can be easily and cheaply applied to either existing or newly built electrical apparatus. Additionally, the monitoring system so constructed is efficient, dependable and trouble-free in operation.

4

I claim as my invention:

A monitoring system for an electrical device having an alternating current operated coil comprising, in combination, a low voltage electric lamp located at a point remote from the device, an insulated conductor having a plurality of turns wound around the outside of the coil, and conductive leads connecting the ends of said conductor with the terminals of said lamp.

References Cited in the file of this patent

UNITED STATES PATENTS

2,299,358	Suomala	Oct. 20, 1942
2,335,382	Bonanno	Nov. 30, 1943
2,528,898	McIlvaine	Nov. 7, 1950