

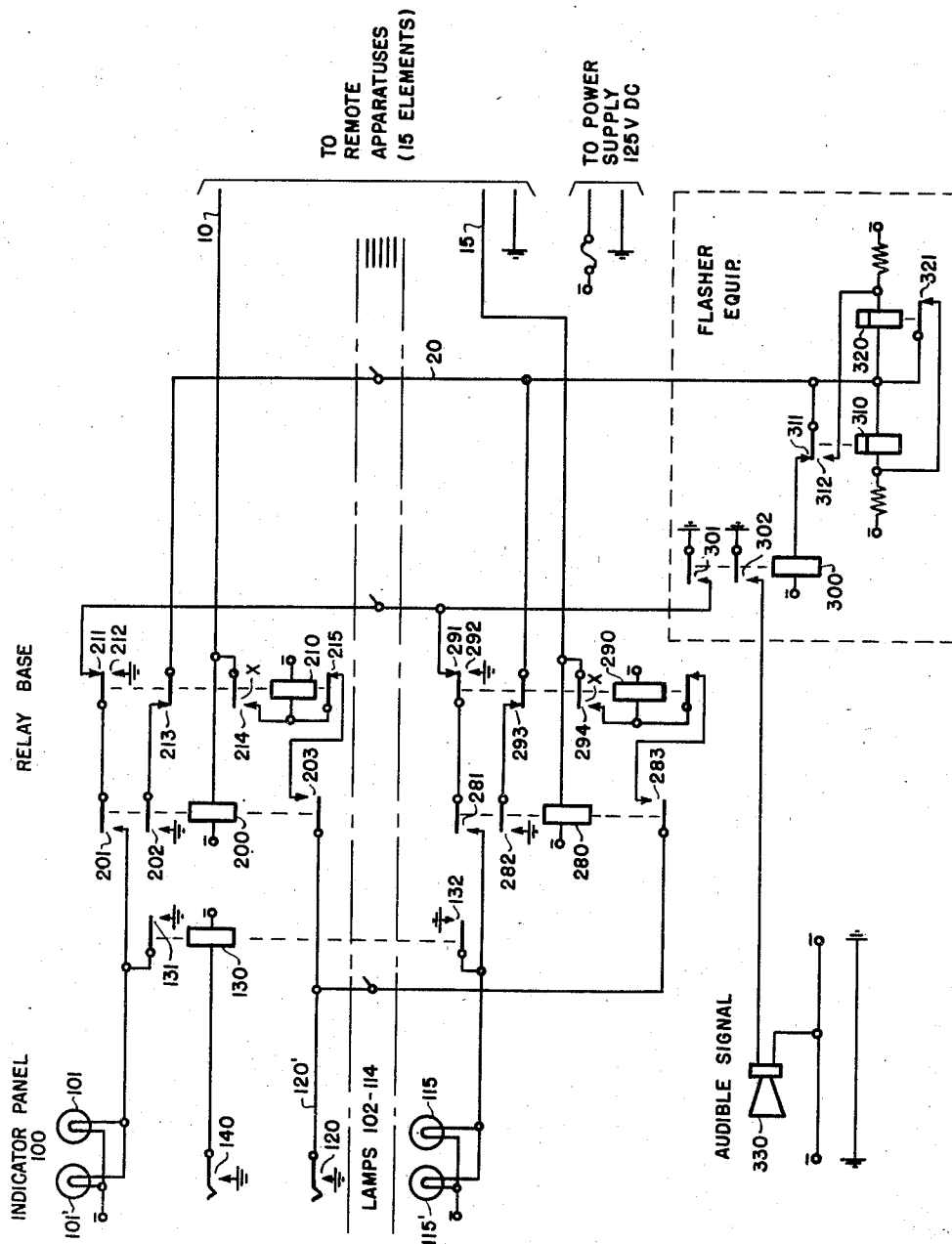
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ANNUNCIATOR SYSTEM

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ANNUNCIATOR SYSTEM

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This invention relates to annunciator apparatus and more particularly to an annunciator system especially applicable to power plants and the like, and has special reference to the provision of a system of this nature designed for indicating with rapidity and efficiency an abnormal state or condition in a remote plant apparatus such as a turbine or diesel engine, so that any defect in the same may be quickly detected and remedied.

In most power plants the common method for indicating the presence of a defect or any abnormal condition in any given piece of plant apparatus is either by a warning lamp or by the sounding of code alarms as from air whistles, electric sirens, bells or the like. The plant equipment comprises numerous apparatuses coordinated by relatively complex electrical system with the machinery distributively located over a relative large plant area. One of the serious problems with which the attendant is confronted in time of trouble is that of being quickly apprized as to the location of a given piece of a plurality of apparatuses that requires immediate attention. It should also reveal which abnormal condition has been detected but not yet remedied; and which piece of apparatus has been taken care of and restored to normal condition.

The principal object of the invention is to solve the problems above referred to and to provide a system of this character wherein the equipment is simple and inexpensive, thereby reducing the cost of installation and maintenance and rendering the system more reliable and economical from an operating standpoint.

A feature of the invention is to provide a novel method of controlling a number of lamps, each lamp corresponding to a remote plant apparatus for designating the existence of an abnormal condition on a corresponding remote plant apparatus.

Another feature of the invention is to provide a common audible signal for calling the attendant's attention to the presence of a visible flashing indication at one or more than one of the designating lamps as soon as the troubles come in.

Still another feature of the invention is to provide a common acknowledging means for shutting off the audible signal and changing the flashing operation of the lamps to steady operation until the abnormal condition is removed.

An additional feature of the invention is that any of the indications can be registered at any time whatsoever regardless of how many other indications are flashing or steadily lighted.

Still another feature of the invention is that the audible signal can be reoperated in case abnormal condition exists on any other apparatus soon after the occurrence of another defect or during the time that such latter defect is being attended to.

These and other features and aspects of the invention will be pointed out and described in detail with reference to the accompanying drawing explained hereafter.

The single sheet drawing shows the operating circuits

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for the annunciating system together with an interrupter arrangement in cooperation with a pulsing relay and an audible signal.

Referring now to the drawing, the equipment there illustrated consists of an indicator panel 100, on which, fifteen sets of lamps are mounted such as 101, 101' and 115, 115'. Those lamps which have not been shown are indicated by numbers. A common acknowledging key 120 is also conveniently mounted on the panel. The drawing further illustrates a relay base which consists of fifteen sets of control relays. Only two of the sets of relays are fully shown. Relays 200 and 210 are individually connected to a corresponding remote plant apparatus (not shown) for controlling lamps 101 and 101'. Relays 280 and 290 are likewise individually connected to a corresponding plant apparatus in a distant area for controlling lamps 115 and 115'. Relays 210 and 290 are connected in multiple to acknowledging key 120 under the control of relays 200 and 280 respectively.

In addition, the drawing shows an interrupter arrangement which consists of a pulsing relay 300, and two slow relays 310 and 320. Under the control of pulsing relay 300, contacts 301 are for flashing all the lamps; contacts 302 are for operating the common audible signal 330.

In considering the detail operation of the system, it will first be assumed that ground potential is applied to the conductor 10 in case trouble occurs in a first unit of the remote apparatus. Relay 200 is thereupon operated and closes contacts 201 to prepare a lamp circuit to lamps 101 and 101'. Relay 200, inclosing contacts 202, applies ground potential to the common start conductor 20 for operating relays 300 and 320. Relay 300 closes circuits at contacts 301 and 302 for the lamps 101 and 101' through contacts 201 and for the common audible signal 330. Relay 320, owing to its slow characteristics, is pulled up shortly after the operation of relay 300 and thus opens contacts 321 to allow relay 310 to operate. Relay 310, upon operation, opens contacts 311 to restore relay 300, and closes contacts 312 to short the winding of relay 320. Relay 320, upon release, closes contacts 321 to short the winding of relay 310. Relay 310, upon release, closes contacts 311 to again operate relay 300, and opens contacts 312 to again short the winding of relay 320. In this manner, relay 300 is pulsed to operate contacts 301 to flash lamps 101 and 101' over the prepared lamp circuit as indicated above. Relay 300, in the meantime, operates momentarily contacts 302 to produce short blasts from the audible signal 330.

When the attendant is called to attention by the audible signal and the flashing of lamps 101 and 101', the exact location of the defect will be revealed to him by the designating means, he will then momentarily operate the acknowledging key 120 and attend the necessary requirements. In doing so, he closes contacts 120 and completes a circuit through contacts 203 to energize relay 210. Relay 210, upon operation, closes contacts 214 to lock itself to the operating ground potential on lead 10 at the corresponding plant apparatus, and opens contacts 215 to prevent feeding back on common lead 120'.

Relay 210 remains in an operated position until the abnormal condition is removed. Relay 210, in opening contacts 211, disconnects the lamps 101 and 101' from the pulsing relay 300 and thus changes the flashing operation thereof to a steady operation via contacts 212; in opening contacts 213, removes the ground potential from relays 300, 310, and 320. Relay 300, upon release, opens contacts 302 and thus shuts off the audible signal. It also opens contacts 301, which, of course, is inconsequential, since the flashing lamp circuit is opened at contacts 211. When the abnormal condition is removed

from the corresponding plant apparatus, the ground potential at conductor 10 disappears and thus opens the locking circuit to relay 210. Relay 210, upon release, extinguishes lamps 101 and 101' and restores the circuits to normal.

It should be noted that during any of the above described stages of operation, any other indication may come in at any time and be registered as previously described regardless of how many other indications are flashing or steadily lighted.

Assume that the remote plant apparatus corresponding to lamps 115 and 115' suffers any defect soon after the occurrence of another defect or during the time that such latter defect is being attended to. Ground potential is applied through conductor 15 to operate relay 280. Relay 280, in closing contacts 281, prepares a lamp circuit to lamps 115 and 115'; in closing contacts 282, operates the pulsing relay 300 in the manner as previously described. Relay 300, again operates the audible signal 330 and flashes the lamps 115 and 115' via contacts 302 and 301 respectively. The attendant, again momentarily operates the acknowledging key 120 to shut off the audible signal and change the flashing operation of lamps 115 and 115' to steady operation via contacts 292, and 281 until the normal condition of the remote apparatus is restored. In order to render the system more reliable, a testing key 140 is provided for operating relay 130, which, upon operation, will close contacts 131 and 132 as illustrated to close circuits for all lamps in the system to check for burned out lamps.

The manner of using and operating the annunciator system will be in the main be fully apparent from the above detailed description and operation thereof. It will be further apparent from the foregoing that the system is especially applicable to the problems confronting the attendant in larger size plants so that all the generating units or diesel engines or many other pieces of apparatuses will be properly and efficiently protected by a signal detecting means so that the attendant, repairman or inspector may be quickly and intelligently directed to that particular signalling unit recording the defect and so that he may be rapidly and properly advised as to the location of the defect whether acknowledged, registered or remedied.

While the system has been shown in the preferred form it will be obvious that many changes and modifications may be made in the structure and general arrangement disclosed without departing from the spirit of the invention defined in the following claims.

What is claimed is:

1. An annunciator system for power plants or the like comprising lamps and an audible signal operative for indicating the existence of an abnormal condition in a remote plant apparatus, a first relay, a second relay and a pulsing relay; a first circuit completed for operating said first relay in case abnormal conditions exist in said remote apparatus, means operated by said first relay for operating said pulsing relay, means responsive to the operation of said first relay to prepare a circuit to said lamps, a first contact means responsive to the operation of said pulsing relay for flashing said lamps over said prepared circuit, a second contact means responsive to

the operation of said pulsing relay for operating said audible signal in a pulsating manner, a second circuit prepared responsive to the operation of said first relay, an attendant's acknowledging means momentarily operated to complete said second circuit to operate said second relay, a locking circuit for locking up said second relay to said first circuit only during the existence of said abnormal conditions in said remote plant apparatus, means operated by said second relay to restore said pulsing relay for disabling said first and second contact means in order to stop the flashing of said lamps and said audible signal, means responsive to the operation of said second relay for steadily lighting said lamps, said locking circuit opened to restore said second relay in response to the restoration of said remote apparatus to its normal condition for automatically extinguishing said lamps.

2. An annunciating system for power plants or the like comprising a plurality of sets of designating lamps, and a plurality of remote plant apparatuses, each set of lamps corresponding to a remote plant apparatus for designating the existence of an abnormal condition on a corresponding remote plant apparatus, a common audible signal, a first relay and a second relay individual to each set of designating lamps, an attendant's acknowledging means common to said apparatuses for controlling any one of said second relays, a common pulsing relay; a first circuit individual to each first relay completed for operating one of said first relays in case an abnormal condition exists on a corresponding one of said remote apparatuses, means operated by any one of said first relays for operating said pulsing relay, means responsive to the operation of any one of said first relays to prepare a lamp circuit to an individual set of designating lamps, a first contact means responsive to the operation of said pulsing relay for flashing any one set of said lamps over said prepared lamp circuit, a second contact means responsive to the operation of said pulsing relay for operating said audible signal in a pulsating manner, a second circuit individual to each second relay prepared responsive to the operation of any respective one of said first relays, means responsive to momentary operation of said attendant's acknowledging means for completing any one of said second circuits to operate a corresponding second relay, a locking circuit individual to each second relay for locking said second relay to said first circuit only during the existence of said abnormal condition on its remote plant apparatus, means operated by any one of said second relays for disabling said first and second contact means to stop said audible signal and change the flashing operation of one set of said lamps to steady operation, said locking circuit being opened to restore said individual second relay in response to the removal of said abnormal condition from said individual plant apparatus for opening said individual lamp circuit.

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