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3,007,150

ELECTRIC LAMP ANNUNCIATOR INDICATING ASSEMBLY

Original Filed Oct. 22, 1956

2 Sheets-Sheet 1

Fig. 1

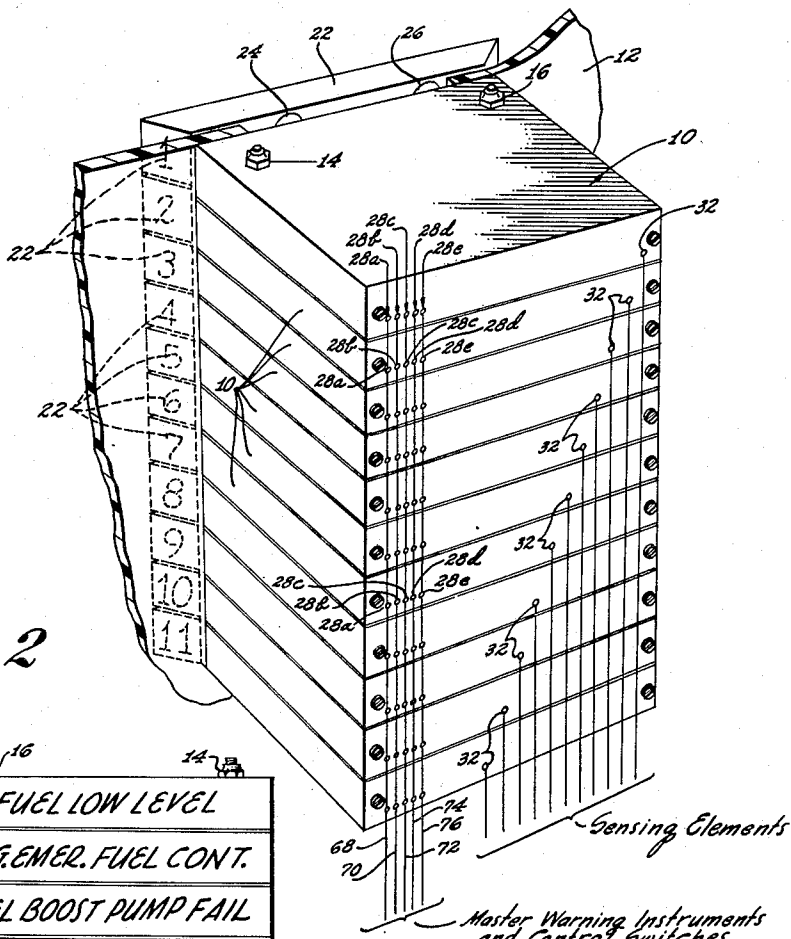


Fig. 2

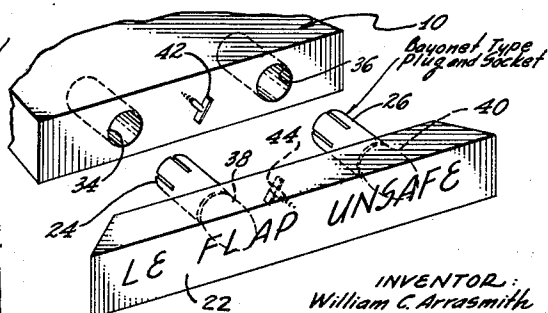
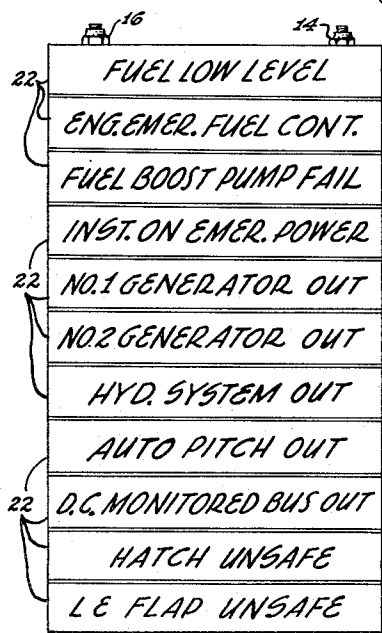


Fig. 3

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Fig. 4

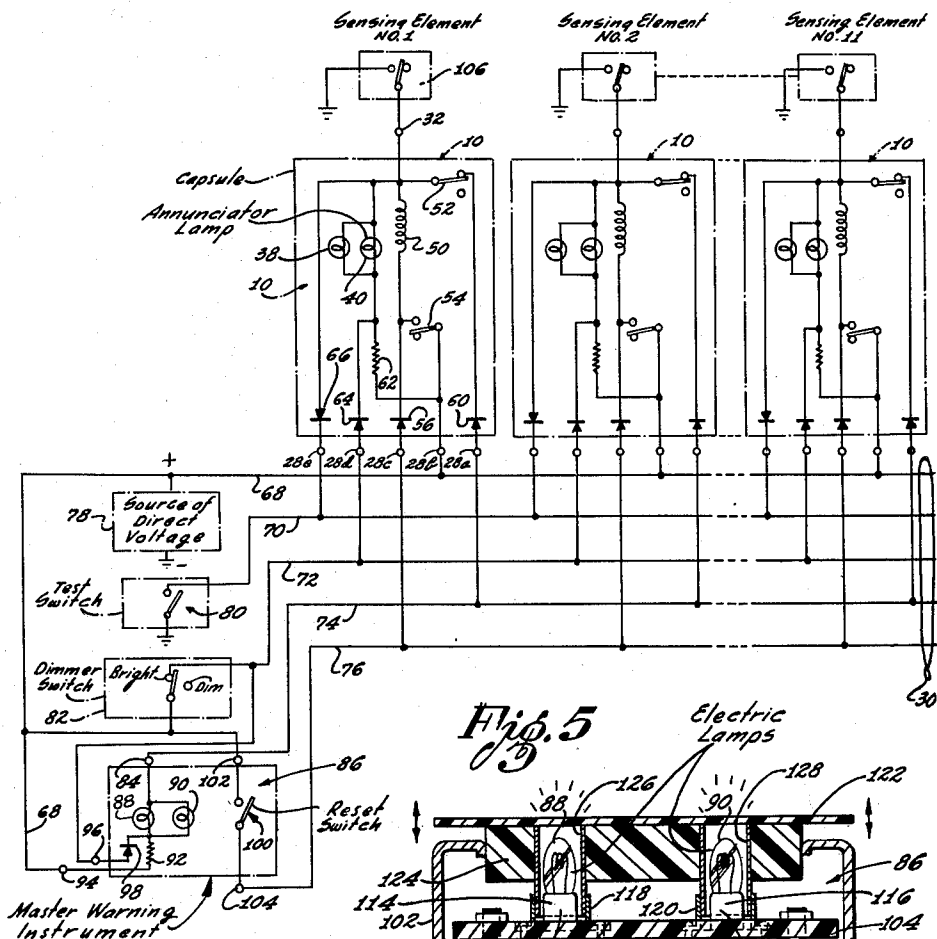


Fig. 5

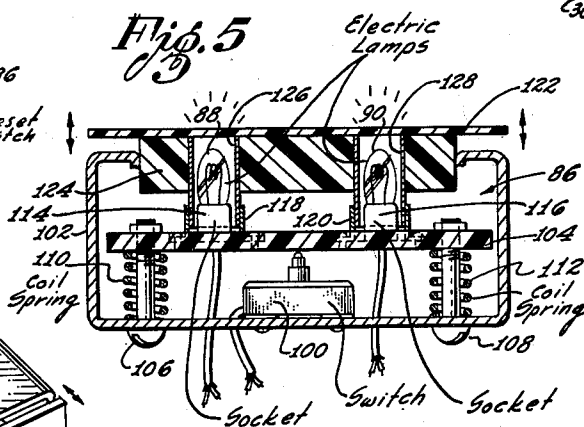
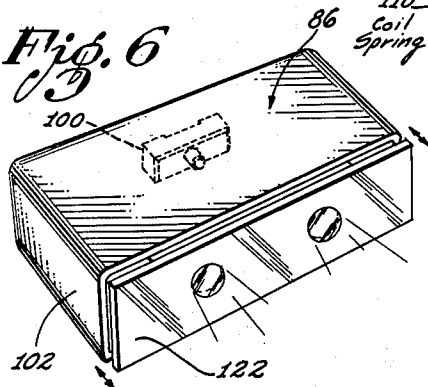


Fig. 6



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3,007,150 ELECTRIC LAMP ANNUNCIATOR INDICATING ASSEMBLY

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Original application Oct. 22, 1956, Ser. No. 617,618, now Patent No. 2,934,752, dated Apr. 26, 1960. Divided and this application Jan. 6, 1958, Ser. No. 707,311

10 Claims. (Cl. 340-381)

The present invention relates to electrical annunciator alarm systems and the like. This application is a division of copending application Ser. No. 617,618, filed October 22, 1956, and now United States Patent 2,934,752 of April 26, 1960, entitled "Warning System and Apparatus."

The invention is more particularly directed to an improved apparatus and system for indicating at a central panel the existence of hazardous or otherwise undesired conditions at any of a plurality of mutually spaced remote points.

The apparatus and system of the invention are especially applicable for use in aircraft and, for that reason, will be described in such an environment. However, it will be evident as the description proceeds that the invention is susceptible to other applications. In fact, the system to be described is generally useful whenever it is desired to indicate a remote hazardous condition at a central station.

Annunciator warning systems in general are well known. An efficient system of this type is disclosed and claimed, for example, in copending application Ser. No. 505,305, which was filed March 2, 1955 in the name of the present inventor, and which is assigned to the assignee of the present application, and which has now issued as United States Patent 2,887,677 on May 19, 1959.

Annunciator warning systems usually contain a series of annunciator lamps positioned on a central control board and individually connected to respective sensing elements. The sensing elements are located at various positions whose individual conditions are to be monitored at the central station. Each of these sensing elements is usually adapted to close a pair of electrical contacts whenever a hazardous condition arises at its particular position.

Each of the annunciator lamps is usually positioned behind a translucent panel bearing inscriptions identifying the particular hazardous condition represented by that lamp. Then, when a sensing element closes its contacts, the corresponding annunciator lamp is illuminated to light up the panel and cause the inscriptions on the panel to become visible. These inscriptions, for example, may read "Fuel Level Low," "Generator Out," "Hatch Unsafe," and so on.

It is also usual in annunciator warning systems to incorporate a master warning instrument. This latter instrument is actuated simultaneously with the actuation of an annunciator lamp when any of the sensing elements close to indicate that a hazardous condition has occurred. The master warning instrument may include a relatively bright lamp or a buzzer, and its purpose is to draw the operator's attention to the fact that a hazardous condition has arisen. The operator then determines from the annunciators the nature of this hazardous condition, as indicated by the inscriptions on the translucent annunciator panel that has become illuminated. An acknowledgement or re-set switch is usually provided in the master warning instrument which enables the operator to deenergize the lamp or buzzer after it has served its purpose.

Even after the master warning instrument has been deenergized by the operator actuating the re-set switch, the illuminated annunciator panel continues to be so illuminated until the faulty or hazardous condition has been

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corrected. Moreover, the deenergized master warning instrument is ready to be energized again, if and when another hazardous condition arises at another point and even though the first condition has not been cleared.

Also included in the apparatus and system of the general annunciator warning type are certain ancillary controls such as a manual dimming switch for dimming the annunciator panels and the master warning lamp when so desired. The systems usually also include certain test controls for determining whether their various components are operating properly.

As noted above, annunciator alarm systems find perhaps their greatest utility in aircraft. However, it is a well known fact that space is at a premium in modern aircraft. Therefore, it is essential that the physical size of the apparatus for the alarm system be reduced as much as possible. It is also important, however, that the components of the apparatus be readily accessible for servicing and for the replacement of lamps and other consumable parts.

The apparatus of the present invention is designed and constructed to utilize miniature diodes for isolating purposes in place of control relays, such relays having been considered essential in prior art equipment for use in annunciator alarm systems. By devising improved circuits, which will be described in detail and which incorporate such diodes, the apparatus of the invention is capable of performing all the required control and alarm functions described above. Moreover, the apparatus of the invention performs these functions at a material saving in necessary components and with a material reduction in space requirements, as compared with prior art units of this general type.

In accordance with the invention, and contrary to prior art practice, the control circuit associated with each sensing element of the system is incorporated in a small capsule and the associated annunciator panel and lamp (or pair of lamps) are adapted to plug into the front wall of the capsule. These capsules are designed and constructed in a manner to be described so that they can be conveniently stacked, one over the other, in a rigid assembled unit. This provides flexibility and enables different numbers of capsules corresponding to the number of points to be monitored conveniently to be used in different installations.

The electric wiring and circuits of the various capsules are simple and standardized. For example, in the embodiment of the invention to be described, the capsules are all connected in parallel across the leads of a 5-wire cable which extends to the various controls of the system. The only other connection to each of the capsules is a single lead from it to its associated sensing element.

The apparatus of the invention, moreover, is constructed so that each of the individual capsules may be easily removed and replaced as a unit should any capsule become defective. Also, the individual annunciator panels and lamps are movable as a unit to permit simple replacement of the annunciator lamps as they burn out. A unique indexing arrangement is used to assure that the panels will always be returned to their proper capsules. This, of course, is to prevent the inscriptions on a particular panel from erroneously designating which particular hazardous condition has actually occurred.

Other features and advantages of the invention will become apparent from the following description, particularly when taken in conjunction with the accompany drawings in which:

FIGURE 1 is a rear perspective view of a plurality of annunciator capsules and their associated panel-and-lamp units, these capsules being stacked and assembled in accordance with the present invention, this view also

indicating the electrical connections to the various capsules;

FIGURE 2 is a front view of the assembly of FIGURE 1 showing particularly a series of translucent panels individually associated with the capsules, the panels containing different inscriptions corresponding to respective hazardous conditions to be indicated by the illumination of their respective annunciator lamps;

FIGURE 3 is a perspective view of an annunciator capsule constructed in accordance with the invention and of its associated translucent panel portion, and this figure shows particularly a mechanical indexing unit which serves to assure that the translucent panel associated with the capsule will not inadvertently be mounted on another capsule which would result in an erroneous indication;

FIGURE 4 is a circuit diagram of the controls of the system and of the electrical connections in the annunciator capsules, and showing particularly an improved circuit permitting the use of diodes to effect the necessary inter-circuit isolation which was previously provided for by the use of relays and the like;

FIGURE 5 is a sectional view illustrating the mechanical details of the master warning instrument of the system and of the mechanical re-set switch also included in the unit; and

FIGURE 6 is a perspective view of the master warning instrument.

As stated previously, in the system of the invention and contrary to prior art practice, the control circuit for each annunciator lamp is individually housed in a capsule, and an associated translucent annunciator panel-and-lamp unit is plugged into the capsule. A stack of such capsules is indicated at 10 in FIGURE 1, and the capsules are mounted on the rear side of a panel 12 by appropriate mounting screws, not shown. The capsules are held in their stacked condition by a pair of screws 14 and 16 which extend through the stack.

A suitable opening in the panel 12 exposes the front edge of each of the capsules 10. A translucent panel 22 having a pair of annunciator indicator lamp plug-and-socket assemblies embedded in its interior is associated with each of the capsules 10. These translucent panels are conveniently numbered, as shown in FIGURE 1.

The plug-and-socket assemblies embedded in the translucent panel 22 are indicated in FIGURE 1 at 24 and 26. The annunciator lamps are supported in these assemblies in known manner, and the assemblies form respective bayonet type plugs. These plugs are received by appropriate apertures and by mating electrical sockets positioned in the front of the associated capsule 10. The bayonet type plug portions of the plug-and-socket assemblies serve not only to establish electrical contact to the lamps supported in the socket portions, but they also serve to support the translucent panel on its associated capsule.

As shown in FIGURE 2, the front face of each of the translucent panels 22 is appropriately inscribed to represent a particular hazardous condition. Whenever a pair of annunciator lamps is energized, the corresponding translucent panel glows to indicate the location of the hazardous condition that has arisen.

Each of the capsules 10 has, in the illustrated embodiment, a set of five electrical terminals 28a, 28b, 28c, 28d and 28e, mounted on its rear edge. These terminals are preferably located so that equivalent terminals of each capsule are disposed in vertical alignment when the capsules are stacked, as shown in FIGURE 1. This enables the terminals of all the stacked capsules to be conveniently connected in the illustrated manner across a five-wire cable 30. This cable provides all the connections to the controls of the system and to the master warning instrument.

Each of the capsules 10 has a further electrical terminal 32 mounted on its rear edge, and this latter terminal is connected by an individual connection to the

sensing element associated with that particular capsule, and which sensing element is located at one of the areas to be monitored.

It is evident that the apparatus shown in FIGURES 1 and 2 is most convenient to install. Moreover, the equipment is extremely flexible since it is merely necessary to stack a particular number of standardized capsules to adapt the assembly for any particular installation. When the desired number of capsules corresponding to the number of areas to be monitored is determined, they are stacked and held at a rigid unit by the screws 14 and 16. Then, it is merely necessary to run the cable 30 up the back of the capsule stack and to make the appropriate illustrated connections to the terminals 28a-28e. Also, a single lead is connected from each of the additional terminals 32 to the respective sensing elements at the various areas to be monitored.

The translucent panel assemblies 22 are individually plugged into their corresponding capsules from the front of the supporting panel 12 and through the opening in the supporting panel. The inscribed front faces of the translucent panels constitute a display which is illustrated in FIGURE 2.

It is evident, that from time to time it will be necessary to remove one or more of the translucent panels 22 as its lamps become burned out. It is also evident that it is most important for the removed panel to be returned to its proper capsule, otherwise, it will not tally with the area monitored by that particular capsule. This proper replacement of the translucent panels is facilitated by numbering them in the manner shown in FIGURE 1. However, in order to provide a foolproof system, indexing system is used. This indexing system renders it impossible to return a translucent panel to its wrong capsule.

The indexing system is more clearly shown in FIGURE 3. As clearly shown therein, each capsule 10 has a pair of electrical sockets 34 and 36 mounted adjacent its front edge. As previously described, these sockets receive the bayonet plug portions of the plug-and-socket assemblies 24 and 26 associated with the corresponding panel 22. As pointed out, the sockets 34 and 36 serve, not only to establish electrical contact to the annunciator lamps in the corresponding plug-and-socket assemblies 24 and 26, but also to support the corresponding translucent panel 22.

As is shown in FIGURE 3, a pair of annunciator lamps 38 and 40 are respectively supported in plug-and-socket assemblies 24 and 26, and these lamps extend into the interior of the translucent panel 22 to light up the panel when they are energized. Whenever it is desired to replace a lamp, the panel 22 is pulled outwardly to remove the assemblies 24 and 26 from the sockets 34 and 36. The defective lamp may then be replaced by a new one.

The actual constructional details of the electrical sockets 34 and 36, and of the plug-and-socket assemblies 24 and 26 are in themselves well known, and a detailed showing and description of these units is believed to be unnecessary.

To assure that a removed translucent panel 22 will be plugged back into its proper capsule 10, a spade screw 42 (or similar element) is screwed into the front edge of each capsule 10 and a corresponding spade screw 44 is screwed into the rear edge of its associated panel 22. These spade screws, as shown, have heads that are flattened in a plane traversed by their axis of rotation. The screws are so supported by each capsule 10 and by each panel 22 that associated ones are displaced slightly from one another when the translucent panels are plugged into place. The head of the spade screw 42 on a particular capsule 10 is given a selected inclination or angular orientation, and the head of the spade screw 44 on its corresponding translucent panel is given a mating inclination, or angular orientation.

In the stack of FIGURE 1, for example, each of the capsules 10 has a spade screw, or similar element, screwed to its front edge, such as the spade screw 42. The head of each such screw on the various capsules is given a slightly different inclination or angular orientation, and, in each instance, a spade screw (or similar element) is screwed into the facing edges of each of the associated translucent panels 22. The latter spade screws in each instance are mounted so that their heads will have a mating angular orientation with corresponding ones of the heads of the spade screws on the capsules. Then, the insertion of a translucent panel 22 in any one of the capsules other than its proper capsule is prevented because its spade screw will engage the spade screw on the front edge of the capsule. However, when a translucent panel 22 is inserted into its proper capsule, the heads of the spade screws 42 and 44 do not engage and the panel may be plugged into place. These spade screws also prevent a panel 22 from being inadvertently plugged upside down into its capsule.

The electric control system incorporated in each of the capsules 10 and connecting the capsules to the various controls of the system is shown in FIGURE 4. Since the circuits in the capsules are identical, one only will be described.

The terminals 28a, 28b, 28c, 28d and 28e of FIGURE 1 are shown in FIGURE 4, and the terminal 32 is also shown. Each capsule contains a single relay having an energizing winding 50 and having a pair of movable contact arms 52 and 54. When the winding 50 is energized, the arm 52 opens its upper contact and closes on its inactive lower contact. At the same time, when the winding 50 is energized, the arm 54 opens from its inactive lower contact and closes on its upper contact.

One terminal of the winding 50 is connected to the terminal 32 and the other terminal of this winding is connected to the cathode of a diode 56. The anode of this diode is connected to the terminal 28c.

The term "diode" will be used in a generic sense in the subsequent description to refer to any unilateral or asymmetrical conductive device. The diodes actually used in a constructed embodiment of the invention were asymmetrically conductive crystals of well known type.

The upper contact associated with the movable arm 54 is connected to the common junction of the diode 56 and the winding 50. The movable arm 54, itself, is connected to the terminal 28b. The movable arm 52 is connected to the common junction of the winding 50 and the terminal 32. The upper contact associated with this arm is connected to the cathode of a diode 60. The anode of this diode is connected to the terminal 28a.

The two annunciator lamps 38 and 40 which, as previously described, are mounted in the translucent panel portion of the unit, are connected in parallel, as shown in FIGURE 4. These parallel connected lamps are connected through their sockets to the common junction of the winding 50 and the terminal 32 and to one terminal of a resistor 62. The other terminal of the resistor 62 is connected to the terminal 28b.

A diode 64 has its cathode connected to the common junction of the lamps 38, 40 and the resistor 62, and the anode of this diode is connected to the terminal 28d. A diode 66 has its cathode connected to the terminal 28e, and the anode of this diode is connected to the terminal 32.

The elements and circuitry described above constitute the internal connections and the components of each of the capsules 10. In the illustrated embodiment of the invention, therefore, each capsule contains only a relay (which is of the miniature type and well known to the art) a resistor and four diodes.

The five leads of the cable 30 of FIGURE 1 are represented by the leads 68, 70, 72, 74 and 76 respectively, in FIGURE 4. It will be seen that each of these leads

is connected to a corresponding one of the terminals 28a-28e of each of the capsules 10.

The lead 68 is connected to the positive terminal of a source 78 of direct voltage, the negative terminal of this source being grounded. The lead 70 is connected to the fixed contact of a test switch 80. This switch may be in the form of a single-pole-single-throw manually operated push button switch. The movable arm of the switch is normally biased out of engagement with the fixed contact, and the movable arm is grounded.

The lead 72 is connected to the fixed contact of a dimmer switch 82. This latter switch may also be in the form of a single-pole-single-throw manually operated push button switch. The movable arm of the switch 82 is connected to the positive terminal of the source 78. The movable arm of the switch 82 is normally biased into engagement with its fixed contact and when the movable arm is depressed, the connection from the positive source to the lead 72 is broken.

The lead 74 is connected to a terminal 84 of a master warning instrument 86 which will be described. The terminal 84 is connected to one side of a pair of parallel connected master warning lamps 88 and 90. A resistor 92 connects the other side of these parallel connected lamps to a terminal 94 of the unit. A further terminal 96 is connected to the anode of a diode 98, and the cathode of this diode is connected to the common junction of the lamps 88, 90 and the resistor 92. The terminal 96 is connected externally to the lead 72.

The unit 86 also includes an "acknowledge" or reset switch 100. The mechanical details of this switch will be described. The switch is normally spring-biased to an open condition and its is a single-pole-single-throw type. The fixed contact of the switch 100 is connected to a terminal 102 of the unit 86 which, in turn, is connected to the positive terminal of the source 78. The movable arm of the switch 100 is connected to a terminal 104 of the instrument 86, and this terminal is connected externally to the lead 76. The terminal 94 of the instrument is connected externally to the positive terminal of the source 78.

The terminal 32 is connected to the movable arm of a switch 106 incorporated in a sensing element at the area to be monitored. This switch is actuated in known manner to close in response to the occurrence of a certain condition. The switch includes a fixed contact which is grounded, and the movable arm of the switch closes with that fixed contact upon the occurrence of a certain condition as, for example, the rise of pressure or temperature above a selected threshold, a drop in oil pressure, the mechanical shifting of an element, etc.

Sensing elements, in themselves, are well known to the art. It is believed, therefore, that a detailed description of such an element is not necessary to the completeness of the present specification.

Assume now that the hazardous condition monitored by the sensing element No. 1 has occurred, thereby causing the movable arm of the switch 106 in that element to close on its grounded fixed contact. The closure of the switch 106 places a ground on the terminal 32 of the capsule 10. This completes a circuit from the negative terminal of the source 78 through the annunciator lamps 38 and 40, through the diode 64, and through the switch 82 to the positive terminal of the source 78. The annunciator lamps 38 and 40, therefore, glow brightly to light up the inscriptions on their associated translucent panel 22.

The closure of the switch 106 in the sensing element No. 1 also completes a circuit from the negative terminal of the source 78 through the terminal 32, through the movable arm 52 of the relay and its upper contact, down through the diode 60, through the master warning lamps 88 and 90, through the diode 98, and through the dimmer switch 82 to the positive terminal of the source 78. The lamps 88 and 90 of the master warning instrument, therefore, also glow brightly.

It should be pointed out that the master warning instrument is usually located in such a position that it may readily catch the eye of the operator to appraise him of the fact that something is wrong. The operator then turns to the annunciator panels to determine the locality of the fault of hazardous condition.

When the operator's attention has been attracted by the glowing lamps in the master warning instrument, the instrument has served its purpose. Now, the master warning lamps can be deenergized and placed in readiness to indicate another monitored hazardous condition that might arise. This deenergizing of the master warning lamps is accomplished by closing the reset switch 100.

When the reset switch 100 is closed, the lead 76 connects the terminal 28c of the capsule to the positive terminal of the source 78. This causes the relay winding 50 to be energized to move the arm 54 to its upper contact. The arm 54 now establishes a circuit which holds the winding 50 energized so long as the fault at the No. 1 sensing element causes the switch 106 to remain closed. At the same time, the energizing of the relay winding 50 causes the arm 52 to move from its upper contact to break the connection to the lamps 88 and 90 in the master warning instrument. The master warning lamps, therefore, are deenergized. However, the annunciator lamps 38 and 40 remain energized and their corresponding inscribed translucent panel continues to glow as long as the fault continues.

The dimmer switch 82 serves as a means for dimming the annunciator lamps and the master warning lamps when so desired. When the dimmer switch is depressed, the circuit through the diode 64 from the annunciator lamps is broken, and an auxiliary circuit through the resistor 62 and through the terminal 28b to the positive terminal of the source 78 is established. The annunciator lamps, therefore, continue to glow but with reduced luminance because the resistor 62 has effectively been placed in their energizing circuit. Likewise, the actuation of the dimmer switch 82 breaks the circuit from the master warning lamps 88 and 90 through the diode 98, and causes these lamps to be energized through the terminal 94 and through the resistor 92. The master warning lamps, therefore, also continue to glow but also with reduced brilliance.

The test switch 80 is effectively connected through the diode 66 in shunt across the sensing elements. Whenever this test switch is actuated, it simulates the closure of all the sensing elements so that appropriate tests can be made to assure that the system is in proper working order.

The diode 60 in each of the capsule circuits functions as an inter-circuit isolation means to prevent the closure of one of the sensing elements, and the resulting energizing of the lamps 88 and 90 in the master warning instrument, from energizing the annunciator lamps associated with deactivated sensing elements. That is, this diode 60 enables a common master warning circuit to be connected to a plurality of independent annunciator circuits without causing interaction between the latter circuits.

The diode 64, in like manner, functions as an isolation means and permits a common dimmer circuit to be connected to the plurality of independent annunciator circuits without producing interaction between the annunciator circuits when the dimmer switch is open.

In like manner, the isolation diode 56 in each of the capsules permits a single reset switch 100 to be used to control all the capsule units without producing interaction between the independent annunciator lamp circuits when this switch is open. The isolation diode 66 in like manner prevents interaction between the annunciator circuits due to the single circuit to the test switch 80.

Therefore, the disclosed circuits which utilize isolation diodes and a single relay are capable of providing all the controls and indications of the more complicated and space consuming prior art systems. Unlike the prior art circuits of this general type, the desired isolation is obtained by means of simple diodes rather than by relays.

These diodes use less space than the relays, and they are a material factor contributing to the resulting minimum space requirements of the improved apparatus of the present invention.

One embodiment of the master warning instrument 36 is shown in FIGURES 5 and 6, and as shown in these figures, the instrument may be conveniently housed in a casing 102. The switch 100 is mounted on the back wall of the casing and, as previously indicated, may be a single-pole-single-throw push button type. A strip 104 which may, for example, be composed of a suitable plastic is resiliently supported in the casing by means of a pair of screws 106 and 108. These screws extend forwardly from the back of the casing and through a strip 104 at the opposite ends of the strip.

A pair of coil springs 110 and 112 are respectively supported by the screws 106 and 108, and these springs serve resiliently to hold the strip 104 in spaced relation with the back of the casing 102. The strip 104 extends across the actuating button of the switch 100, and the arrangement is such that whenever the strip is depressed against the bias of the springs 110 and 112, it moves against the actuating button and the switch 100 is actuated.

The master warning lamps 88 and 90 are supported in appropriate sockets 114 and 116 on the strip 104. A pair of open cylindrical members 118 and 120 is mounted on the strip 104 in respective coaxial relation with the sockets 114 and 116.

The instrument has a cover composed of a translucent panel 122 having a plastic body portion 124 which is adapted to be inserted through an opening in the front of the casing 102. A pair of cylindrical members 126 and 128 is embedded in the body portion 124 of the cover in respective axial alignment with the cylindrical members 118 and 120. When the panel portion 122 and the body portion 124 of the cover are inserted in the opening in the casing 102, the cylindrical members 126 and 128 are adapted to engage the members 118 and 120 respectively in close fit. The lamps, therefore, extend into the cylindrical members 126 and 128, and these cylindrical members are open ended so that the lamps may glow through the panel 122 which is composed of suitable translucent material.

In normal operation, and when the master warning instrument is energized, the lamps 88 and 90 glow brilliantly through the front panel 122. When it is desired to deenergize these lamps, it is merely necessary to move the front panel inwardly so that the strip 104 actuates the switch 100. This actuation of the switch causes the master warning lamps to be deenergized in the described manner. The force from the panel 122 is transmitted to the strip 104 by the frictional engagement of the cylindrical members 126, 128 and the cylindrical members 118 and 120.

As previously pointed out, the master warning instrument is mounted in a position where it can readily attract the attention of the operator. When his attention has been so attracted, the operator need merely move his hand against the panel 122 of the instrument and press it inwardly to deenergize the lamps 88 and 90.

The invention provides, therefore, an improved and simplified annunciator apparatus and system. In accordance with the invention, the circuits associated with the individual annunciator lamps are simplified and miniaturized in such a manner that they can be conveniently encapsulated. The individual capsules can be filled with a suitable plastic to pot the components and circuitry therein.

Further in accordance with the invention the translucent annunciator panels are constructed to plug into their associated capsules instead of being formed as a separate and remote unit.

A simple and improved indexing system is provided to assure that each annunciator will be plugged into its

proper capsule. This indexing system also assures that the translucent annunciator panels will be plugged in right-side-up.

The apparatus of the invention is extremely simple to install and to connect. Moreover, it is extremely flexible, and as many standardized capsules and associated annunciator panels can be used as there are locations to be monitored.

I claim:

1. An electric lamp annunciator indicating assembly including: a capsule member containing electrical components and circuitry for producing an energizing current in response to the happening of a monitored condition, a removable lamp housing member having an indicating face, releasable plug and socket means respectively mounted on said capsule member and on said removable lamp housing member and having a configuration to removably support said removable lamp housing member on said capsule member, an electric socket means mounted in one of said members and adapted to be connected to circuitry in said capsule member for holding at least one electric annunciator lamp in position to glow through the indicating face of said removable lamp housing member when said removable lamp housing member is held in place on the capsule member by said plug and socket means and upon the happening of the monitored condition.

2. The electric lamp annunciator indicating assembly defined in claim 1 and which includes a first indexing member mounted on the front edge of said capsule member having a flat portion extending essentially perpendicularly to the plane of said front edge and at a predetermined angular orientation, and a second indexing member mounted on said removable lamp housing member having a flat portion extending essentially perpendicularly to the plane of the rear face of said housing member at an angular orientation such that the flat planar portion of said second indexing member is spaced and essentially parallel to the flat portion of said first indexing member when said lamp housing member is in place on said front edge of said capsule member.

3. An electric lamp annunciator indicating assembly including: a capsule member having a front edge and containing electrical components and circuitry for producing an energizing current in response to the happening of a monitored condition, a removable lamp housing member having an indicating face, first electric socket means supported in said removable lamp housing member for holding at least one electric annunciator lamp in a position to glow through the indicating face of said removable member, and releasable electric plug and socket means respectively mounted on said front edge of said capsule member and on said removable lamp housing member and connected to circuitry in said capsule member and to said first electric socket means and having a configuration to removably support the removable lamp housing member on said front edge of said capsule member and to establish electric contact to said first electric socket means from the electric circuitry in said capsule member.

4. An electric lamp annunciator indicating assembly including: a capsule member having a front edge and containing electric components and circuitry for producing an energizing current in response to the happening of a monitored condition, first electric socket means mounted on the front edge of said capsule member and connected to the circuitry therein, a removable translucent lamp housing member having a front face with a particular inscription formed thereon and having a rear face, further electric socket means supported in said translucent lamp housing member for holding at least one electric annunciator lamp in a position to glow through the front face thereof, and electric plug means electrically connected to said further electric socket means in said translucent member and protruding from the rear face of said trans-

lucent member, said electric plug means having a configuration to be engaged by said first electric socket means on said capsule member so as to removably support said translucent lamp housing member on said capsule member and to establish electric contact to said further electric socket means from the electric circuitry in said capsule member.

5. An electric lamp annunciator indicating assembly including: a capsule-like housing having a front edge and containing electric components and circuitry for producing an energizing current in response to the happening of a monitored condition, a first pair of electric sockets mounted in spaced relationship on said front edge of said capsule-like housing and connected to the circuitry therein, an elongated translucent lamp housing having a front face with particular inscriptions formed thereon and having a rear face, a second pair of electric sockets supported in said translucent lamp housing in spaced relationship for holding a pair of electric annunciator lamps in the translucent lamp housing in a position to glow through said front face thereof, and a pair of electric plugs respectively connected to respective ones of said second pair of sockets in said translucent lamp housing and protruding out from the rear face of said translucent lamp housing, said pair of electric plugs each having a configuration and positioned to be respectively engaged by respective ones of said first pair of electric sockets on said front edge of said capsule-like housing so as to removably hold said translucent lamp housing on said front edge of said capsule-like housing and to establish electric contact from said electric circuitry in said capsule-like housing to said second pair of electric sockets in said translucent lamp housing.

6. An electric lamp annunciator indicating assembly including: a capsule-like housing having a front edge and containing electric components and circuitry for producing an energizing current in response to the happening of a monitored condition, first electric socket means mounted on said front edge of said housing and connected to the circuitry therein, a removable translucent lamp housing having a front face with a particular inscription formed thereon and having a rear face, second electric socket means supported in said translucent lamp housing for holding at least one electric annunciator lamp in said translucent lamp housing in a position to glow through the front face thereof, electric plug means connected to said second electric socket means in said translucent lamp housing and protruding out from the rear face of said translucent lamp housing, said plug means having a configuration to be engaged by said first electric socket means on said front edge of said capsule-like housing to establish electric contact from the electric circuitry in said capsule-like housing to said second electric socket means in said translucent lamp housing, a first indexing member supported on said front edge of said capsule-like housing having a flat planar portion extending essentially perpendicularly to the plane of said front edge of said capsule-like housing at a predetermined angular orientation, and a second indexing member supported on the rear face of said translucent lamp housing having a flat planar portion extending essentially perpendicularly to the rear face of said translucent lamp housing member at an angular orientation such that the flat planar portion of said second indexing member is spaced and essentially parallel to the flat planar portion of said first indexing member when said translucent member is in place on said front edge of said capsule-like housing by the engagement of said first electric socket means with said plug means.

7. An electric lamp annunciator indicating assembly including: a first housing member containing electrical components including an electric switch and further including circuitry for producing an energizing current in response to the happening of a monitored condition, a movable strip member mounted in said housing and mov-

able in said first housing between a first position and a second position with respect thereto, said electric switch being positioned in said first housing to be engaged by said movable member and actuated thereby when said movable strip member is moved from said first position to said second position, a lamp housing member having an indicating face, axially aligned coupling members mounted on said movable strip member and on said lamp housing member and having a configuration for mutual engagement so as to support said lamp housing member on said movable strip member for movement thereof with said movable strip member between said first and second positions of said movable strip member, and at least one electric socket mounted in one of said members for connection to the circuitry in said first housing member for holding an electric annunciator lamp in position to glow through the indicating face of said further member upon the happening of the monitored condition.

8. The annunciator assembly defined in claim 7 and which includes resilient means mounted in said first housing member for biasing said movable member to said first position with respect to said first housing member.

9. An indicating assembly including: a capsule-like housing containing electric circuitry, a translucent lamp housing member having an indicating face with indicia thereon, a first electric socket supported in said lamp housing member for holding an electric lamp therein in a position to glow through the indicating face thereof, and a releasable electric plug and socket combination respectively mounted on said capsule-like housing and on said lamp housing member for removably supporting said lamp housing member on said capsule-like housing and connected to the circuitry in said capsule-like housing and to

said first electric socket for establishing electric contact from said circuitry to said first electric socket.

10. The assembly defined in claim 9 and which includes a first indexing member mounted on said capsule-like housing having a flat planar portion extending essentially perpendicularly to the plane of said front edge of said capsule-like housing at a predetermined angular orientation and a second indexing member mounted on said translucent lamp housing member having a flat planar portion extending essentially perpendicularly to the rear face of said translucent lamp housing member at an angular orientation such that the flat planar portion of said second indexing member is spaced and essentially parallel to the flat planar portion of said first indexing member when said translucent member is in place on said front edge of said capsule-like housing, said first and second indexing members having a particular mating relationship so as to prevent other similar lamp housing members from being plugged into engagement with said plug and socket combination.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,007,150

October 31, 1961

William C. Arrasmith

It is hereby certified that error appears in the above numbered patent requiring correction and that the said Letters Patent should read as corrected below.

Column 10, line 35, after "housing" insert -- having --.

Signed and sealed this 10th day of April 1962.

(SEAL)

Attest:

ERNEST W. SWIDER

Attesting Officer

DAVID L. LADD

Commissioner of Patents