This invention relates to improvements in emergency exit lighting units, and more particularly to such units in which a normal lighting apparatus is provided in a cabinet or fixture, together with an emergency lighting unit adapted to function automatically when the normal lighting unit or system fails, and to a system of such units. In certain aspects the invention constitutes an improvement over my pending application, Serial No. 30,676, filed July 10, 1935, now Patent Number 2,697,236.

It is an object of this invention to provide emergency lighting units and a system of such units adapted primarily for use in places of public assembly, such as theatres, and in public buildings in which exit lights are employed, and such that the emergency lights will be brought into action automatically upon current failure, which may happen typically in the event of fire or other catastrophe, or failure of a power plant or other source of current. It is a further object of the invention to provide such units and such a system characterized by simplicity of construction and reliability of operation and such that the emergency lighting system will not be brought into play or affected by the normal lighting on and off of switches involved in the usual regulation of the normal lighting circuit or circuits.

Still further objects of the invention will be made apparent from the following full description.

With these and other objects in view, the invention consists in the features, combinations, details of construction and arrangements of parts which will first be described in connection with the accompanying drawings and then more particularly pointed out in the appended claims.

In the drawings, Figure 1 is a front elevation of a cabinet or fixture embodying the invention in a preferred form;

Figure 2 is a section taken on the line 2—2 of Figure 1 and on a larger scale;

Figure 3 is a front elevation similar to Figure 1 but with the front door or cover of the fixture opened to reveal the interior parts;

Figure 4 is a schematic circuit diagram of the device of Figures 1 to 3 and showing the mode of connection of one or more of these devices with the wiring circuits of a regular lighting system;

Figure 5 is a front elevation of a modification also embodying the invention;

Figure 6 is a front elevation of the device of Figure 5 with the front door or cover opened to reveal the interior; and

Figure 7 is a section taken on the line 7—7 of Figure 5.

Referring now to Figures 1 to 4, inclusive, the device comprises a fixture designated generally by the numeral 1 and including a cabinet made up of a top 2, a bottom 3, a back 4 and side walls 5. Positioned on this cabinet is a front door or cover member 6 removable secured thereto as by hinges 7 and provided with locking means such as staple 8 upon the cabinet body and hasp 9 upon the door 6. The fixture as a whole may be fastened to a wall in any usual manner, as by screws or bolts passing through its back 4.

The door 6 is provided with a cutout portion 10 (Figures 1 and 2) adapted to show an illuminated exit sign lighted from the interior and a second cutout 11, this being shown as circular in form and adapted to direct light from an emergency spotlight in a manner to be later described. In back of cutout 10 is secured a panel 12 of glass or other transparent material secured to the door as by clips 13 which includes clear or ground glass portions 14 forming the word "Exit" and is elsewhere colored red as at 15 in the usual manner. In back of cutout 11 and held by similar clips 13 is a plate 16 preferably of glass, having a clear portion 17 coinciding with cutout 11 to form a window and being elsewhere mirrored as at 18, for a purpose later to be described.

Within the cabinet 1 and attached to side walls 2, as shown, are a pair of light sockets 19 which hold a pair of lights 20 operated from the normal lighting circuit and designed to illuminate the exit sign already described. These lights are connected in parallel by wires 21 to a plug 22 attached to the top 2 of the casing 1 and are connected to external current supply wires 23 in the usual manner, as shown in the circuit diagram of Figure 4.

Included also in casing 1 is an emergency lighting unit comprising a bulb 24 in a socket 25 provided with a mirrored reflector 26 which is advantageously of parabolic form and such as to locate the filament of light 24 approximately at its focus. This socket 25 is mounted by means of a ball and socket or universal joint 27 on the back wall 4 of the casing and is adapted thereby to be moved in any direction. The normal position of this light and reflector is indicated in dotted lines in Figure 2 and is such as to direct light from bulb 24 through cutout 14 in an outward and generally downward direction. By these means the light 24 can be made to illuminate a path from six to twenty or more feet leading toward the fixture and the fixture will typically be placed in a 50
theatre or building so that this lighted path extends down an aisle or other passage and serves to light the way toward an exit.

In certain cases it may be desired to cast a light downward or to the side of the fixture, as where it is desired to illuminate a door, and in such event the cutout is positioned on a side wall or the bottom of the cabinet and socket 5 turned in the desired direction.

where is provided with a pair of batteries 28 connected in series and held in the casing 1 as by clips 29. The batteries 28 are connected in series with each other and with light 24 by wires 30 and are in turn in series with a snap switch 31 and a relay 32, the binding posts for the controlled circuit of this relay or circuit, which includes switch 31, batteries 28 and light 24, being designated by numerals 33. The control or maintaining circuit for relay 32 is connected to binding posts 34 and 35 or 36. As shown, the relay is connected for D. C. operation, the wires 31, which terminate in plug 38, being connected to binding posts 34 and 36. In this mode of connection a resistance unit of about 2,000 ohms is in series with the windings of the relay, which are also of about 2,000 ohms D. C. resistance, in a well known manner so that a direct current of 110 volts will deliver about 3 watts to the relay. Plug 38 is connected through wires forming a continuation of wires 37 to the main panel of the building, as shown in Figure 4, and to be later described more fully. When the device is employed for 110 volt, 60 cycle A. C. operation, binding post 35 will be used instead of binding post 36, cutting out the 2,000 ohm resistance, as the 60 cycle A. C. impedance of the relay windings themselves is designed for about 4,000 ohms.

Relay 32 is designed to open a circuit between binding posts 33 when its winding is energized and in consequence when wires 37 have current flowing through them the circuit for light 24 is open and this light is out of operation. This is the normal condition when current is being supplied to the main panel, and the regular lights 20 may be lighted so as to illuminate the exit sign.

If, however, due to accidental causes, the current at the main panel is interrupted, relay 32 will be de-energized, closing a circuit between binding posts 33 and supplying light 24 with current from batteries 28. Light 24 then may be lighted and lines 40, and 41 serve to illuminate the exit sign panel 14, 15, and to direct light through aperture 11 in the manner previously explained.

As indicated in Figure 2, and in phantom in Figure 3, an internal cover plate 50 held removably in grooves 40 is provided and this covers part of the wires 21 and 30 and also the relay 32 and switch 31. On the bottom of the casing is positioned a reflector surface 41, preferably mirrored and extending between batteries 28 in one direction and fed by the door 42. In the other direction. Mirrors 10 and 41 serve to reflect light from bulb 24 backwardly and upwardly and to assist this reflection of light by the reflector 26 is preferably designed so as to form a cone of light slightly greater in diameter than aperture 11 and striking an annular area of the wall 4, or its lower portion which is not covered by cover plate 30, and side walls 5 and cover plate 30 are preferably painted with white paint or otherwise provided with a diffuse reflecting surface. In consequence of this arrangement light from bulb 24 will be reflected by mirrors 10 and 41 and reflected and diffused by walls 4 and 5 and cover plate 41, so as to illuminate the exit sign in a sufficiently uniform manner. If it should be desired to place the emergency light 24 out of operation for any reason switch 31 may be opened.

Important features of the fixture of this invention are the provision of mirrored and diffuse reflecting surfaces as described, resulting in a strong and sufficiently uniform illumination of the exit light. In addition, the emergency lighting bulb 24 and the emergency lighting bulb 24 and the emergency lighting bulb 24, which results in great compactness and the elimination of surplus parts.

Apart from the various features of the cabinet or fixture of the invention, considered by itself, an important phase of the invention is that having to do with the manner of connecting such a fixture to the building circuits, and more particularly with the manner of connecting a number of such fixtures. As shown in the circuit diagram of Figure 4, the wires 23 supplying the normal lights for the wall fixture 1 are connected to main power lines 41, typically located at a main control panel in the building, the control means such as double pole single throw switch 43. The wires 31, which form a maintaining circuit for the relay 32, are connected at a point beyond the control means for the normal lighting system.

In consequence of this arrangement the emergency lighting system will be unaffected by operation of the control means (switch 43) of the normal lighting system, and will be brought into operation only by current failure in the main supply wires 42. Where a plurality of units is employed, the relay maintaining circuits of all will be connected in parallel to main supply wires 42, and the normal lighting system of all will be connected in parallel through appropriate control means to these supply wires. This mode of connection is sufficiently indicated by wires 21 which are to be understood, respectively, as the relay maintaining wires and the normal lighting system wires leading to a second cabinet similar to the cabinet 1. As will be readily understood, the showing of a single switch 43 as the control of these circuits will be evident from the diagram of a plurality of units is merely illustrative. A number of switches for controlling banks of units or single units may be employed, the important feature being the connection of the relay maintaining circuits to the power supply lines at a point or points beyond the control means normally used for regulating the normal lighting systems of the various units. The employment of the circuit arrangement of the present invention results in the emergency lighting systems being broken and fed by the door 42. In the other hand, should a main fuse blow or should current supply for the main panel of the building be interrupted due to power-house failure, the emergency lighting systems will be brought into operation.

As is apparent from the foregoing description, the relay 32 is constantly energized while the normal lighting system is in operation. This has the advantage over alternative modes of connection that the relay is operated not by the turning
on of a current but by the interruption of a current, which is a more reliable method, and has the further advantage that the slight heat generated in the relay by a constant consumption of about 5 3 watts of power serves to heat the interior of the cabinet slightly, maintaining the air therein in warm condition with low relative humidity, so that freezing or the formation of mist upon transparent surfaces is avoided and the electrical apparatus within the cabinet is maintained in good condition for long periods of time.

An alternative construction of the cabinet is disclosed in Figures 5 to 7. The lighting elements, batteries, relay and these, in this construction may be, and are shown as, generally identical with those of the embodiment of Figures 1 to 4 and are designated by the same numerals with the addition of a prime suffix. Their general mode of attachment and position is the same, the lights 20' and their sockets 13' being shown, however, as attached to back wall 4' instead of to side walls 5', this location being more advantageous due to the fact that the cabinet is elongated horizontally and shallower in the vertical direction. In this construction the front door 6' is provided with a single aperture 10' and a single glass plate 12' is held in back of this aperture by clips 13'. Plate 12' includes clear or ground glass portions 14' defining the word "Exit" as before and a red coated portion 15' in which, however, is located a clear glass portion 17', no separate aperture, such as 11 in Figure 1, being provided for this. As the exit sign and the clear glass portion 17' occupy practically the whole of the front door 6' in this embodiment, no mirror corresponding to mirror 18 of the embodiment of Figures 1 to 4 is provided, but a mirror 41', similar to the mirror 41, is employed and the walls 5', 4' and the cover 39' are of similar construction to corresponding parts of the embodiment of Figures 1 to 4 and are similarly rendered diffusely reflecting. The relay and switch therefor in the embodiment of Figure 7 and the connections between parts are not illustrated as they are largely obscured by cover plate 38' and are identical with corresponding parts and connections of the embodiment of Figures 1 to 4.

In some cases an exit light sign is formed of clear or translucent letters surrounded by an opaque plate. As will be readily appreciated, the transparent panel of the present invention may take such form in either embodiment shown without variation in other features of the invention.

What is claimed is:
1. An exit lighting fixture comprising a cabinet containing a light for normal operation and including a transparent front panel positioned for illumination by said light, said cabinet containing also an emergency light and batteries therefor and a relay adapted to close a circuit from said batteries to said light when de-energized and to open said last named circuit when energized, a clear window in said cabinet adapted to pass a beam of light from said emergency light, and lower reflecting surfaces within said cabinet and diffuse reflecting upper and side surfaces within said cabinet for illuminating said panel from said emergency light.
2. An exit lighting system comprising a cabinet containing a light for normal operation and an emergency light, means for turning on said emergency light upon failure of current supply to said first mentioned light, a transparent front panel in said cabinet positioned for illumination by said first named light, a clear window below said panel, means to direct light from said emergency light through and around said window in a downward direction, a mirrored surface inside said cabinet and surrounding said window and a mirrored surface on the bottom of said cabinet, and diffuse reflecting surfaces along the inner sides, back and top of said cabinet.

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