

April 27, 1965

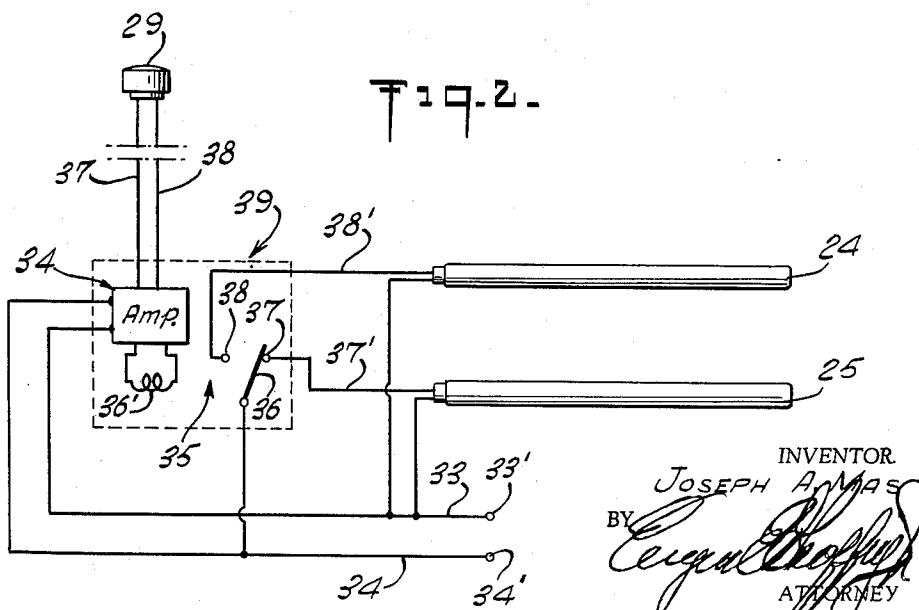
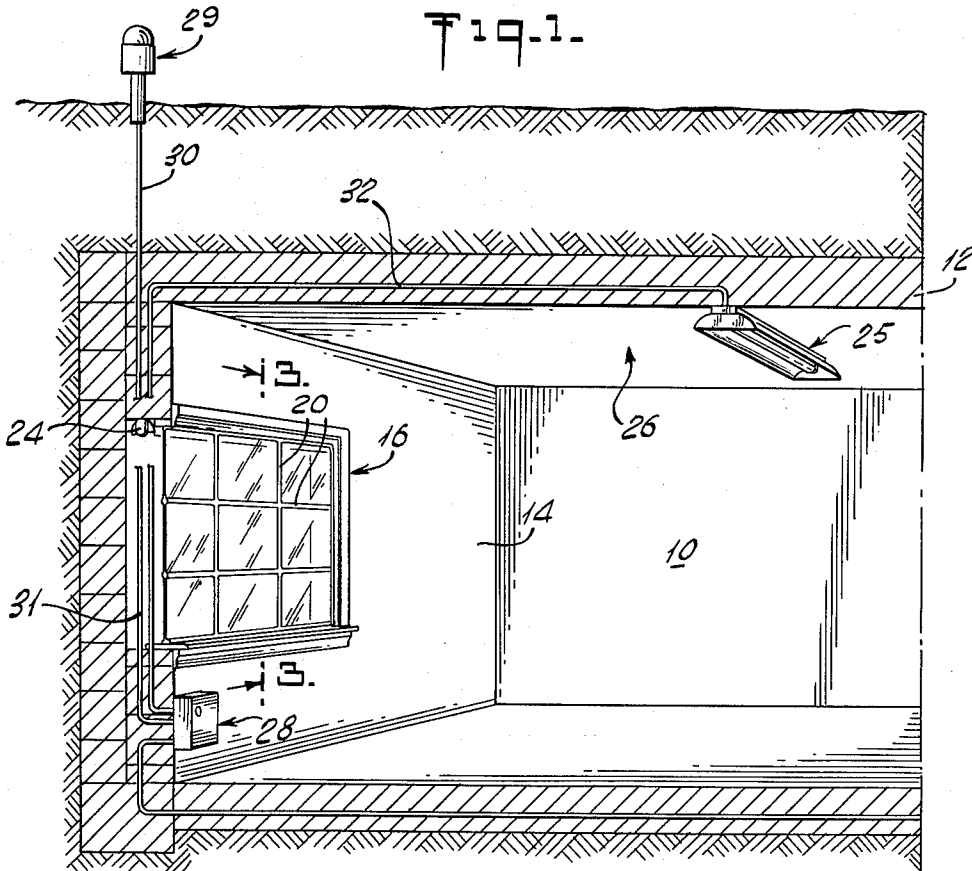
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3,180,978

LIGHTING SYSTEMS FOR DWELLINGS

Filed July 20, 1962

2 Sheets-Sheet 1



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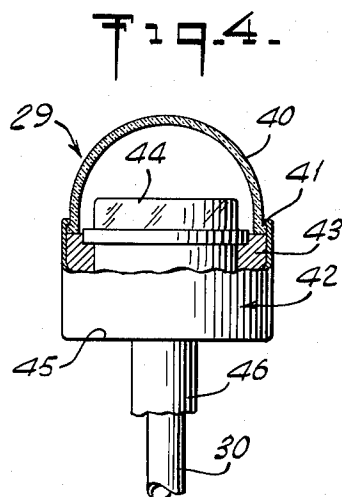
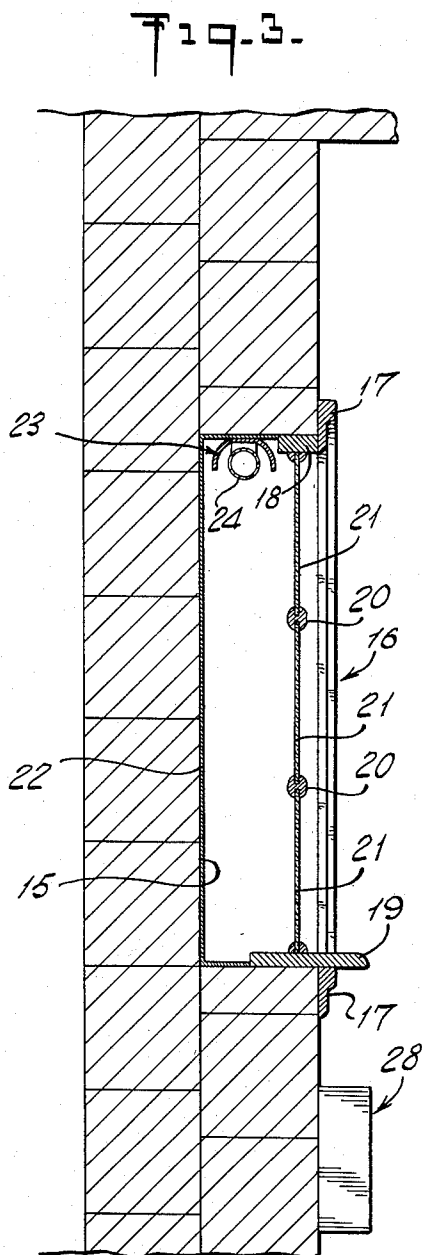
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# LIGHTING SYSTEMS FOR DWELLINGS

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2 Sheets-Sheet 2



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## LIGHTING SYSTEMS FOR DWELLINGS

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2 Claims. (Cl. 240-9)

This invention relates to artificial illumination of spaces and more specifically embraces novel, decorative and practical teachings in the art of artificial illumination of spaces such as rooms, dwellings, apartments, shops and other enclosed places which do not have windows or other openings through which adequate natural daylight can flow to brighten the interior. Furthermore this invention provides a new approach to the lighting of rooms through combinations of novel windows and other fixtures, wherein the process of illumination may be correlated with the actual cycle of natural daylight.

For practical reasons interior spaces frequently have to be designed with a considerable shortage of window area, such as may be the case in large buildings, where inner rooms, cellar spaces and the like must be utilized for business or other purposes requiring the presence of people. In other instances windows or similar openings must be omitted completely as in the case of structures below or even above the ground surface, for reasons connected with specific functions or purposes of those structures, as may be evident in protective enclosures, shelters and structures of industrial or military importance.

In the foregoing and other instances, shortage or absolute lack of windows in enclosed spaces may create serious drawbacks in their usefulness in commerce or any other undertaking wherein the presence of people is mandatory, inasmuch as the ease and resultant efficiency of people active therein may be adversely affected by the absence of windows which afford normal illumination and constitute the very point of contact with the outside world.

In addition, windowless enclosures have the undeniable disadvantage of assuming the atmosphere of a vault in appearance as well as in the immediate impression conveyed regardless of design and quality of any decor placed therein. These and related factors involving the effects of enclosed spaces upon people active therein attain considerable importance under circumstances involving duress, psychological stress and actual involuntary confinement to such spaces as may occur, when prolonged living in shelters or similar protective enclosures may be inevitable.

This invention has as one of its objectives the provision of an improved combination of a light transmitting room panel or window, and associated room lighting means and controls therefor. The light transmitting panel may assume any shape, size or form, and may be mounted against or installed into wall or ceiling spaces of enclosures having no actual opening through said wall or ceiling.

Another objective of this invention is the provision of an improved window and control therefor wherein said window includes translucent panes or panels and is lighted from behind in such a manner as not to reveal the source of light and to display the effect of actual daylight diffused through said panels and flowing into the interior of an enclosure.

A further objective of this invention resides in providing an improved combination of a window, which when lighted, affords the appearance of daylight illumination, and separate sources of artificial light, and a controlling device, whereby light emitted by said window alternates with light produced by said separate sources in correla-

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tion with the actual ambient daylight and night cycle.

Another advantage of this invention resides in the decorative values obtained in providing a window which may be mounted or otherwise installed on any wall or ceiling in combination with other decor to enhance appearance while emitting a soft evenly distributed light operated in synchronism with normal day and night cycles.

The above and other objectives and advantages will become more apparent from the following detailed description and accompanying drawings forming part of this application.

When lighted the window unit emits a soft light diffused through the panes, conveying the appearance of actual daylight entering through said window. While this window, conveniently placed within an enclosure, will provide a more livable and inviting atmosphere, it also serves to indicate the actual surrounding daylight cycle. This additional function constitutes a factor of major importance in enclosures used for refuge, such as a fall-out shelter, wherein prolonged uninterrupted and involuntary confinement may be inevitable.

The components of this invention, when installed in an enclosure, are operated in response to a light sensitive transducer exposed to actual daylight and associated control means.

In the drawings:

FIG. 1 is a perspective cross-sectional view of an underground shelter, showing one embodiment of the invention installed therein.

FIG. 2 is a circuit diagram of the control means for the embodiment shown in FIG. 1.

FIG. 3 is a cross-sectional view of FIG. 1, taken along the line 3-3 thereof.

FIG. 4 is an enlarged illustration of a suggested housing for a light sensitive device.

Broadly, this invention concerns the provision of a window unit having a light source and at least one separate light fixture in combination with a light responsive device for correlating illumination of the window with the time of daylight and lighting of separate fixtures during hours of darkness. The window may be constructed of wood, metal or any other suitable material comprising a frame, retaining members, one or more light transmitting panes of glass, plastic or other material. The panes are preferably translucent, and one side is enclosed in a box-like backcover which houses a light source. The window unit may be installed on any flat surface within an enclosure lacking actual windows.

Referring now to the drawings and specifically to FIG. 1, a perspective cross-sectional view of an underground enclosure is shown. The enclosure is generally denoted by the numeral 10 and is in rectangular form with the vertical walls constructed of cinder blocks 11, while the ceiling 12 and floor 13 are of concrete. When the structure is to be used as a fallout shelter, it is positioned underground and provided with a single entrance not shown. One wall 14 of the enclosure is provided with a recess 15 for reception of the window unit 16.

An enlarged cross-sectional view of the window unit 16 is shown in FIG. 3 and comprises an outer sash 17 and a frame 18 of which the sill 19 constitutes a part. A plurality of vertical and horizontal members 20, secured to the casing, divides the window in rectangular areas of equal size, each of which are closed by window panes 21. It is evident, however, that the window could be formed of a single pane. The panes 21 are preferably translucent, such as glass that has been sand-blasted on one side or the like. The backside of the window is closed by a housing 22 and includes a light fixture 23 carrying fluorescent tube 24. This light fixture illuminates the window unit 16

from behind, giving the impression of daylight falling on said window.

In the drawings the window unit 16 is mounted in a recess provided for the purpose. It is quite evident, however, that the depth of housing 22 may be varied considerably in order to form a shallow structure for installation on a flat surface.

In addition to the light source 24, a second fixture 25 is secured to the ceiling 26 of the shelter, and provides an alternate source of light. This fixture may of course be installed or placed at any suitable position within said shelter.

The light fixtures 24 and 25 may be energized by any convenient source of power, as for instance, a supply cable 27. In the instant embodiment of the invention, this cable 27 is connected to the control box 28 for selectively applying energy to one or the other of the light fixtures. Operation of the controlling means in box 28 is effected by the light sensitive transducer 29 located outside of the shelter. This transducer is connected to the box 28 by the cable 30 and the impulses from the transducer actuate a relay alternately to selectively energize the light sources 24 or 25 which are connected to box 28 by cables 31 and 32. To simulate normal room lighting the light source 24 is illuminated during the daylight conditions while the source 25 is illuminated during the night hours. It is understood, of course, that any number of light fixtures could be used to supplement or replace the light source 25, which would essentially perform the same function of illuminating the interior of the shelter 10 during hours of darkness.

A suggested electrical circuit for performing the essential functions described above is shown in FIG. 2. The circuit may be energized by any internal or external source of power connected to terminals 33' and 34'. Terminal 33' is connected through lead 33 to one terminal of light sources 24 and 25 and one terminal of an amplifier 34. Terminal 34' is connected through lead 34 to the movable contactor 36 of the relay 35 and to the other power terminal of the amplifier. The fixed contacts 37 and 38 of relay 35 are connected to the lamps 25 and 24 respectively by means of leads 37' and 38'. In this way energization of the relay coil 36' will cause one lamp to be illuminated while de-energization of the coil will illuminate the other lamp. The light sensitive transducer 29 is connected to the amplifier 34 by leads 37 and 38 and the signal is amplified and fed to the relay coil 36'.

The amplifier 34 and relay 35 and switch 36 are preferably housed in the protective box 28 which can be bolted or otherwise secured within the shelter. In FIG. 2, the outline of the box is indicated by the dotted line 39 surrounding said devices.

While the illustrations show fluorescent light sources, it is quite evident that any other lighting means may be used to achieve the desired ends.

FIG. 4 represents a suggested housing for the light sensitive transducer 29 designed to offer maximum protection for said device against the elements. It comprises a transparent semi-spherical cover 40 seated between a flange 41 of the cylindrical housing 42 and a seal 43. The transducer 44 is resiliently supported in the housing 42, and the bottom 45 of the housing is attached to the supporting pipe 46 through which cable 30 passes.

The circuit and control illustrated and described here-

in provides a novel and improved structure for selectively lighting two or more light sources in synchronism with actual outside lighting conditions. It is quite evident that similar arrangements could be made with related means well known to the art. However, the novel combination of the new and improved window unit with alternate light sources and controlling devices provides shelters and similar enclosures with an authentic and inviting atmosphere comparable only to enclosures having adequate window areas.

While only one embodiment of the invention has been illustrated and described, it is understood that modifications, alterations, and changes may be made without departing from the true scope and spirit thereof as defined by the appended claims.

What is claimed is:

1. A lighting system for an enclosure substantially completely shielded from natural light and having side wall and ceiling surfaces, comprising a window mounted in one of said surfaces and having light-transmitting elements therein, said window being shielded on the outer side from natural light, a first light source on the outer side of said light-transmitting window, a second light source within said enclosure, an external light sensitive transducer responsive to natural light, a source of power, relay means connected to said power source and to said light sources for applying said power selectively to said light sources and connections between said transducer and said relay means, said transducer operating said relay to apply power to the first said light source during natural daylight and to said second light source during the natural night hours.

2. A lighting system for a light shielded enclosure having wall, ceiling and floor surfaces, comprising a window frame carried by one of said wall surfaces, said frame retaining at least one light-transmitting pane and being light shielded on the outer side, a first light source disposed on the outer side of said window and which upon illumination transmits light through said light-transmitting pane to simulate daylight, a second light source within said enclosure, a light sensitive transducer positioned outside of said enclosure and exposed to natural light, a relay and amplifying means connected to said transducer, a power source, connections between said relay, said power source and both of said light sources, said relay being operable in response to signals produced by said transducer to selectively energize said light sources, the first said light source being energized during periods of natural daylight sensed by said transducer and the second said light source being energized during periods of night, the selective operation of said light sources simulating the effect of the normal transition of time by the provision of alternate periods of light and darkness at said window.

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