

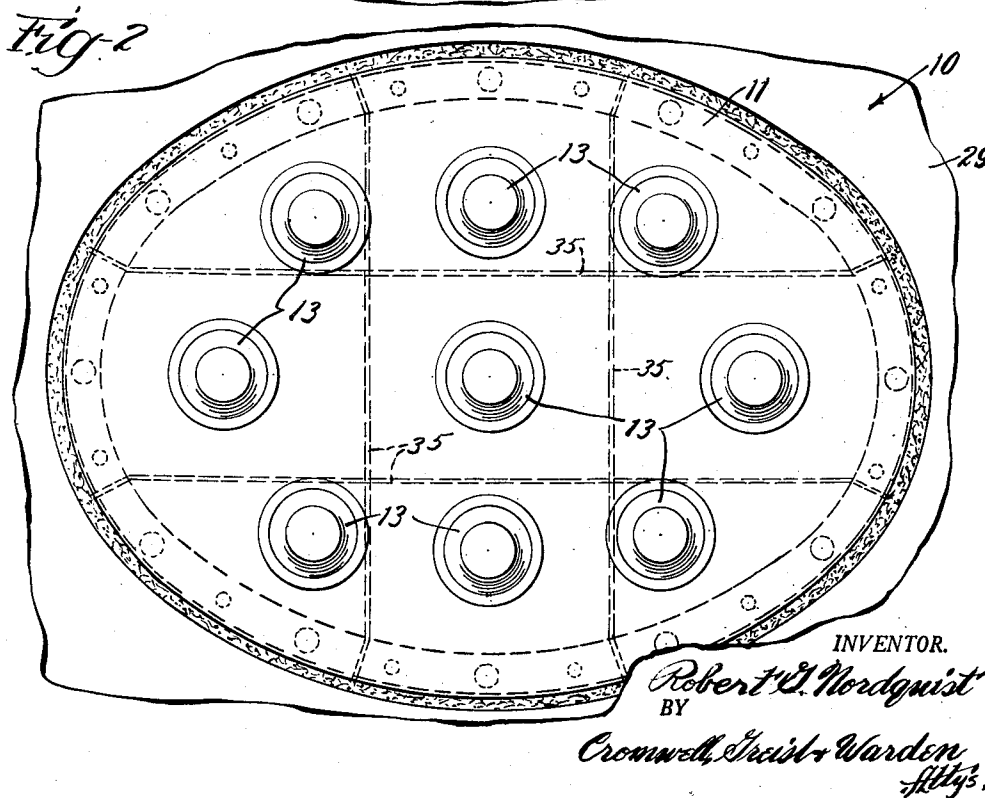
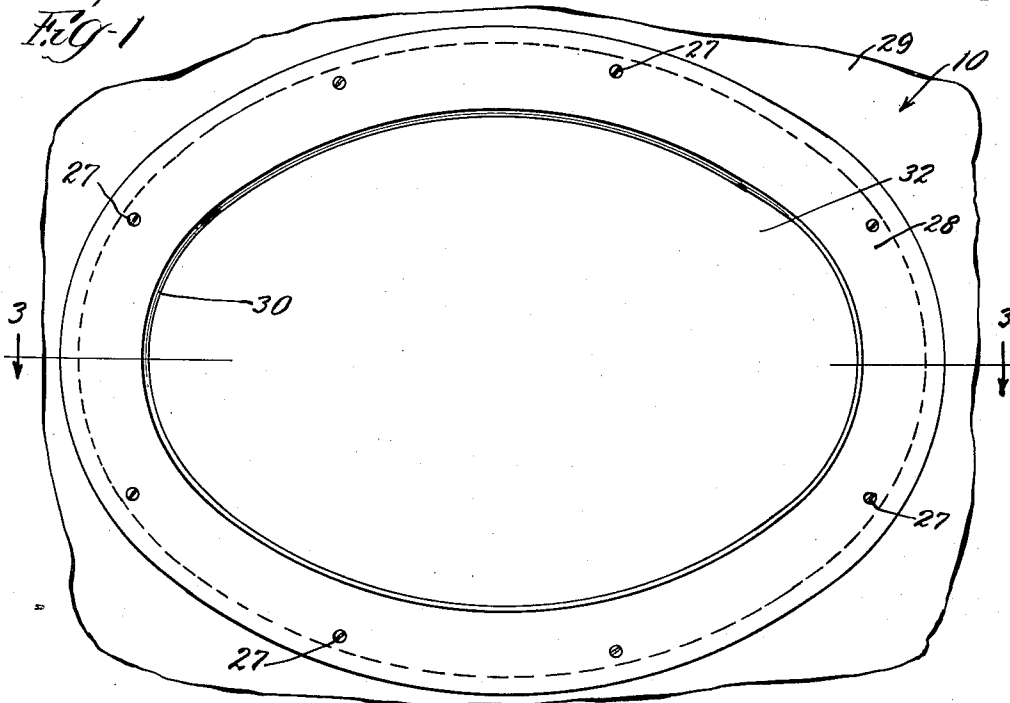
Nov. 18, 1958

R. G. NORDQUIST
LIGHTING FIXTURE

2,861,173

Filed June 11, 1956

3 Sheets-Sheet 1



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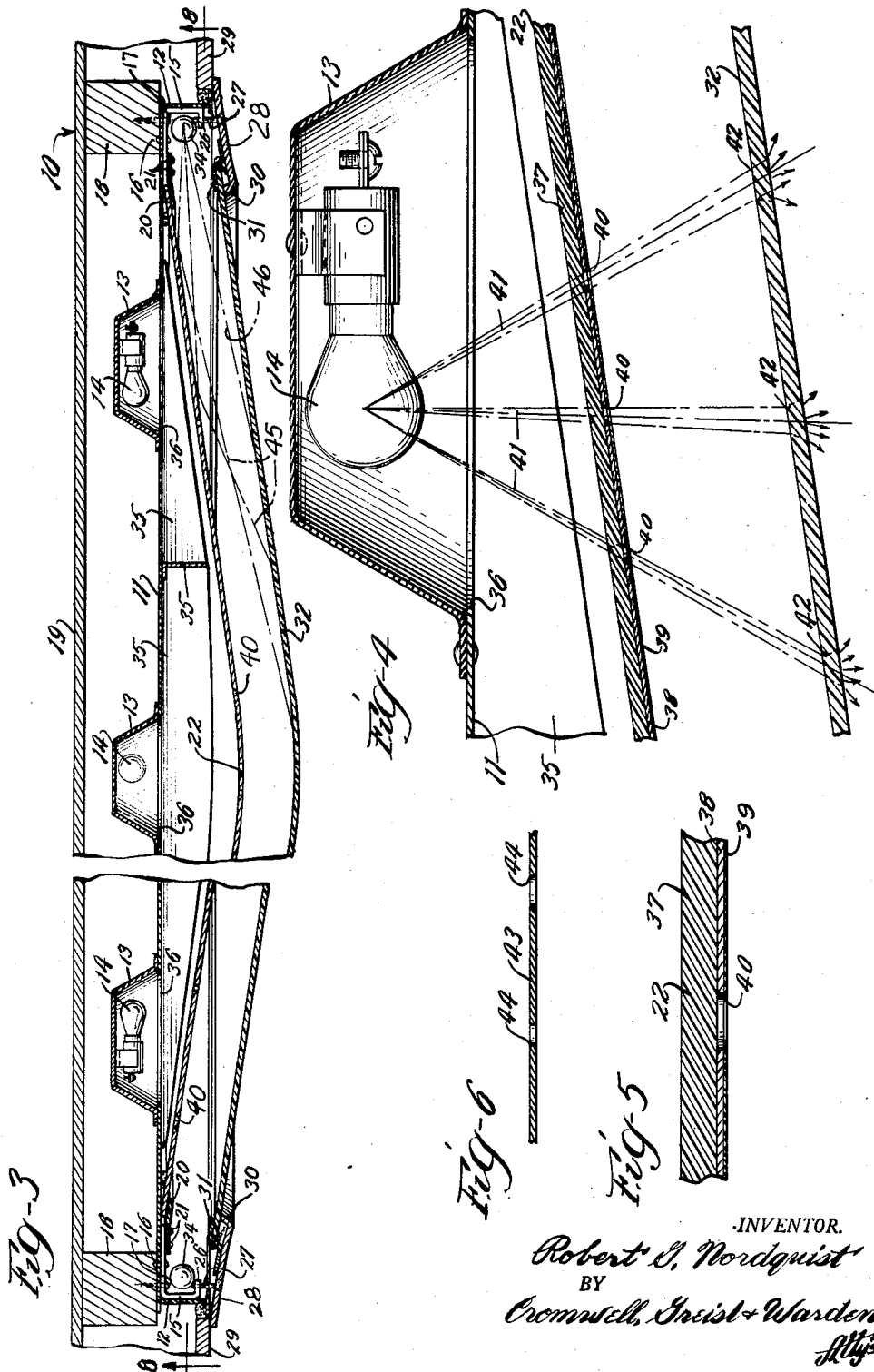
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Fig-7

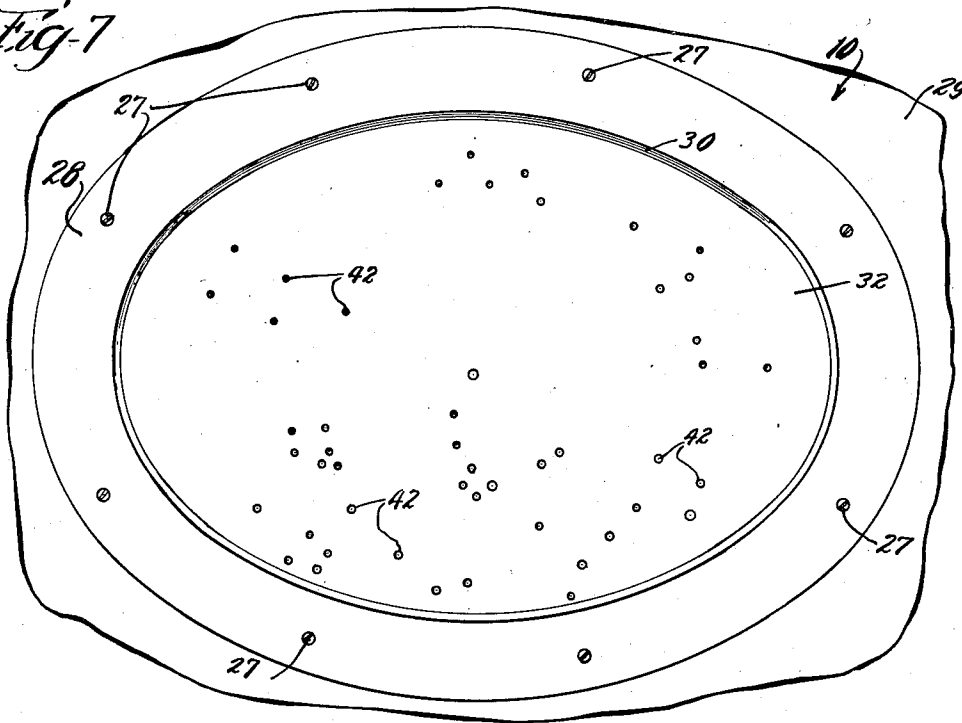
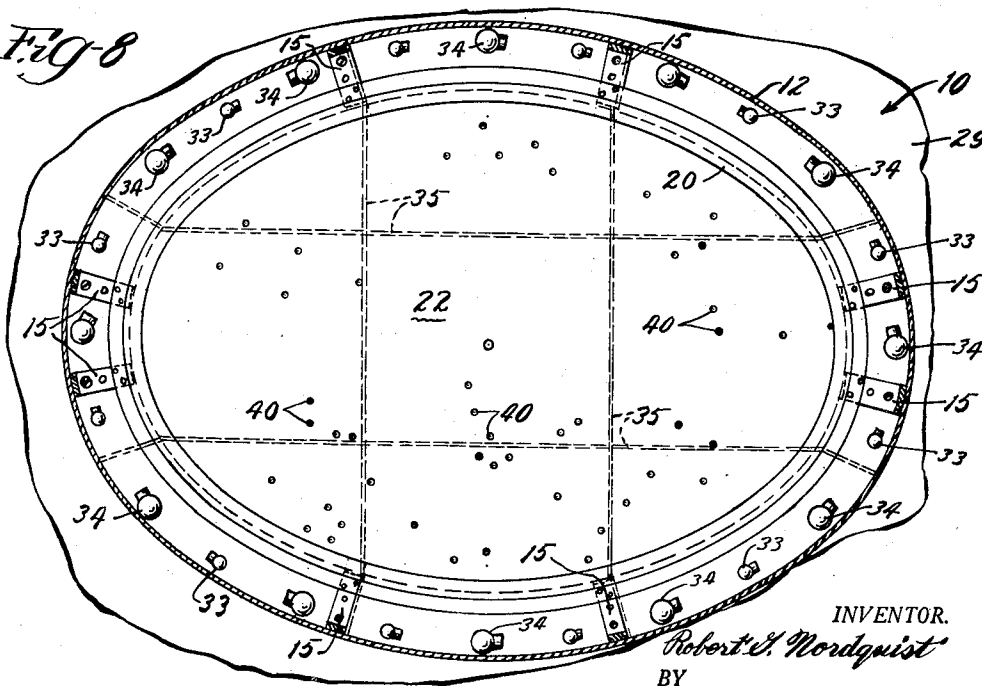


Fig-8



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2,861,173

LIGHTING FIXTURE

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7 Claims. (Cl. 240—9)

The present invention relates generally to a lighting fixture which is not only capable of providing interior illumination but is further capable of projecting observable isolated sources of light on a screen forming a part thereof, these isolated sources being readily adapted to simulate a panorama of heavenly bodies provided with a changeable sky background all of which is comfortably observable. More specifically, the present invention is directed to a lighting fixture particularly adapted to simulate the various constellations in the sky which are reproduced in their normal environment, the fixture being further adapted to simulate the effect of observance of the various constellations upon the rising or setting of the sun, which fitting is comfortably observable while at the same time serving as a source of illumination.

It is an object of the present invention to provide a lighting fixture capable of providing illumination while at the same time projecting observable isolated sources of light on a screen forming a part thereof, the isolated sources being readily adapted for use in a decorative, functional and informative manner.

Another object in line with the foregoing is to provide a lighting fixture of the type described which is of uncomplicated construction, of low cost manufacture and maintenance and capable of reliably simulating various constellations in their natural setting for comfortable observance even while using the fixture as a source of illumination.

Other objects not specifically set forth will become apparent from the following detailed description made in conjunction with the drawings wherein:

Fig. 1 is a fragmentary bottom plan view of the fixture of the present invention in its mounted condition;

Fig. 2 is a fragmentary top plan view of the fixture in its mounted condition;

Fig. 3 is an enlarged fragmentary vertical section taken generally along line 3—3 of Fig. 1;

Fig. 4 is an enlarged fragmentary vertical section of a portion of the fixture;

Fig. 5 is an enlarged fragmentary vertical section of a portion of one form of screen adapted for use with the fixture;

Fig. 6 is an enlarged fragmentary vertical section of another form of screen adapted for use with the fixture;

Fig. 7 is a fragmentary bottom plan view of the mounted fixture similar to Fig. 1 but illustrating one function of the fixture when the same is placed into operation; and

Fig. 8 is a fragmentary section taken generally along line 8—8 of Fig. 3.

The lighting fixture of the present invention is formed primarily from a pair of specially designed spaced screens or shades which cooperate with a plurality of light sources to provide observable patterns of concentrated or intense illumination outwardly of the fixture, the patterns preferably simulating various constellations and their positioning in the sky, the light sources being uti-

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lized in a particular manner to be adapted for reproducing the effect of the sun on a celestial observance when the same rises or sets. The fixture is particularly designed for use in passenger-carrying vehicles where it may be mounted in the ceiling to provide a general illumination when desired while being additionally capable of providing a panoramic, simulated view of the sky and various constellations, which view may be comfortably observed by the passengers for decorative effect and provide a source of interest for the passengers to reduce the tedium of a trip. It should be understood that although the fixture is particularly adapted for use in passenger-carrying vehicles or aircraft, it is believed obvious that the fixture may be readily used in stationary structures while realizing the same advantages from such use.

Referring to the drawings, a lighting fixture 10 is illustrated as having a housing formed from a top plate 11 which has attached thereto a circumferentially continuous, downwardly depending side wall 12. As particularly shown in Fig. 3, the top plate 11 is provided with a plurality of light source housings 13 aligned with apertures in the plate 11 and extending upwardly from the top surface thereof. The housings 13 are cone-shaped and are provided with top walls from which lighting fixtures carrying lamps 14 depend. As illustrated, the fixture 10 including the top plate 11 is elliptical or oval in shape; however, it should be understood that the fixture may take any desired shape, such as circular, rectangular, diamond-shaped, abstract, etc.

The top housing plate 11 has attached to the under surface thereof a plurality of circumferentially spaced mounting brackets 15 by means of rivets 16, the brackets 15 being substantially J-shaped in cross section. Each of the mounting brackets 15 carries a screw 17 which extends upwardly through the top horizontal leg portion thereof, through the plate 11, spacer blocks 18 and into a structural member 19, which may be ribs or framing members, to mount the fixture with respect thereto. The brackets 15 and blocks 18 will vary in vertical height throughout the circumference of the fixture 10 to properly position the same in conformance with the shape of the elements of the fixture as well as the location of the same, as for example in the top portion of an aircraft passenger cabin, so as to allow the fixture to be readily and comfortably viewed by the passengers.

The mounting brackets 15 carry a screen mounting clamping ring 20 suitably attached to their upper horizontally extending portions by screws 21. The ring 20 clamps the edge of a substantially cone-shaped screen 22 against the bottom surface of the top plate 11. The ring 20 overhangs the outer peripheral portion of the inner screen 22 and cooperates to fixedly mount the same with respect to the plate 11.

The lower portion of each of the mounting brackets 15 is provided with an intumed flange 26 which carries a plurality of circumferentially spaced screws 27 which in turn fasten an oval outer rim member 28 thereto. The outer periphery of the rim 28 overlaps the edge of the inner surface of an inner ceiling 29 and the innermost edge of the rim 28 is provided with a continuous intumed flange 30. The inner surface of the rim 28 carries a plurality of circumferentially spaced brackets 31 which clamp edge portions of an outer screen 32 against the upturned edge of the flange 30. In this manner the outer screen 32 forms a part of the outer surface of the housing of the fixture 10 and is fixedly held in spaced relation with respect to the inner screen 22. The outer screen 32 is of the same cone-like shape as the inner screen 22 and, as particularly shown in Fig. 3, both of these screens are aligned in parallel relation.

The inner vertical surface of the wall 12 is provided with a plurality of spaced light sources suitably carried thereby in a known manner. As the particular structural details of the light sources do not constitute a part of the present invention, these sources are illustrated schematically and it should be understood that they are carried by the wall 12 in any suitable manner such as is illustrated, for example, in connection with the light sources 14. As particularly illustrated in Figs. 2 and 8, the peripherally positioned light sources are composed of alternate blue light sources 33 and white light sources 34. The blue light sources 33 are illustrated as being smaller than the white light sources 34 for the purpose of specifically differentiating between the two to better illustrate the relative positioning of the same.

The inner surface of the top wall 11 carries a plurality of horizontally spaced vertical baffle members 35 which intersect one another at right angles. The particular arrangement of the baffle members 35 is more clearly shown in Figs. 2 and 8, and it will be noted that the light sources 14 are isolated from one another by reason of the baffles 35. Referring particularly to Fig. 4, each of the housings 13 for the light sources 14 is aligned with an aperture 36 in the top plate 11 and the light rays from the sources 14 contact the inner screen 22. As illustrated in Figs. 4 and 5, one form of inner screen 22 is shown as including a transparent or clear portion 37 which is provided on the outer surface thereof with a first coating 38 of opaque material and a second coating 39, which is the outermost coating, of reflective material. At spaced intervals the combined coatings 38 and 39 are provided with apertures 40 which allow small beams of light 41 to pass through the inner screen 22 into contact with the outer screen 32 as illustrated in Fig. 4. As illustrated in Fig. 8, the apertures 40 are small and appear as spots on the inner screen 22. As a result, only small beams of light 41 are allowed to pass through the inner screen 22 into contact with the outer screen 32 thereby providing the outer screen 32 with a plurality of spaced and completely independent spots 42 of light projected thereon. The outer screen 32 is formed from a light-diffusing material, such as cloudy plastic, and the spots of light contacting the screen 32 are diffused by the material thereof, as illustrated by the small arrows in Fig. 4, and can be viewed from any angle with respect to the fixture 10.

The light sources 14 are preferably formed from clear lamps having filaments which are compact to present as near as possible a non-diffused point source of illumination. The concentration of light emitted from such a source will define beams of light 41 which are highly concentrated thereby providing the outer screen 32 with a plurality of sharply defined and brilliant spots 42. The inner screen 22 of Figs. 4 and 5 may be formed from glass or plastic material and the opaque coating 38 may be black paint or any other suitable non-transparent material. The coating 39 is preferably white paint of high gloss to provide an outer, highly reflective, specular surface for a purpose to be described.

While the inner screen 22 has been referred to as being formed from plastic material or glass, it may also be in the form of a metal sheet 43, as illustrated in Fig. 6, having a plurality of spaced punched holes 44 therein to allow the rays of light 41 to pass therethrough. In the event that a metallic screen 43 is utilized, the outer surface of the same, namely, the surface opposite the diffusing screen 32, is preferably highly polished or painted with a white gloss paint to provide a specular or near-specular finish. A metallic inner screen 43 may be formed, for example, from "Alzac" which is a trade name for a highly polished aluminum sheet manufactured by the Aluminum Company of America, Pittsburgh, Pennsylvania.

The diffusing screen 32 is preferably formed from cloudy plastic material which is translucent or opalescent thereby providing a diffusing type of light transmitting

medium to allow the spots of light 42 to be viewed from any direction. The spots of light 42 are positioned on the outer screen 32 as controlled by the location of the apertures 40 in the inner screen 22 so as to represent the various stars and planets which are normally observable in the sky and make up various well known constellations. The manner in which these spots 42 are originated results in a sharply defined series of spaced light spots which are distinctly defined and comfortably viewed. The surfaces of the top plate 11, light source housings 13 and baffle members 35 are preferably dulled, as by being painted a dull black, to eliminate counter-reflection within the housing thereby providing sharp definition of the points of light 42. The spots 42 are defined by the apertures 40 may be of any desired shape and will vary in diameter depending on the particular star or planet any one spot represents.

To provide proper background, including a simulation of a blue sky color, the perimeter light sources 33 and 34 supply illumination which is evenly distributed between the opposed surfaces of the screens 22 and 32 so as to provide a uniform glow of variable intensity as background for the simulated stars 42 or for use independently of the same. As particularly illustrated in Fig. 3, the inner screen 22 and the outer screen 33 are spaced from one another so as to allow reflection of light by the bottom surface of the inner screen 22 toward the center of the outer screen 32. This cooperative functioning between the screens 22 and 32 is schematically illustrated in Fig. 3 on the right hand side as viewed by the lines of reflection designated by the numerals 45. Light rays from the sources 33 and 34 contact the reflective coating 39 of the inner screen 22 and are reflected thereby toward the center of the outer screen 32. Additional light rays, designated by the numerals 46, pass directly through the screen 32 near the edges thereof to provide the outer peripheral portion of the fixture 10 with illumination.

Regardless of the type of inner screen 22 utilized, as long as the surface of the same opposite the outer screen 32 is specular or near-specular either by reason of the use of reflective paint or a highly polished metallic finish, light rays from the sources 33 and 34 will be reflected by the inner screen 22 toward the center of the outer screen 32 and the screen 32 will be uniformly illuminated without the presence of portions of varying intensity except, of course, for the specific star spots 42 previously described. To bring this about, the angularity of the screens 22 and 32 with respect to the light sources 33 and 34 is controlled so as to maintain the angle of incidence with respect to the inner screen 22 at a minimum while maintaining the angle of incidence with respect to the outer screen 32 at a maximum. As illustrated in Fig. 3, the light sources 33 and 34 are located outwardly of the edges of the spaced screens 22 and 32 and are substantially intermediate the same.

As previously described, the lights 33 are preferably blue lights while the lights 34 are white lights. To simulate a sky background for the star spots 42, the blue lights are utilized. To further simulate the effect of the rising or setting of the sun, the wiring system associated with the light sources 34 is provided with a voltage regulator which controls the voltage passing through the light sources 34 to an extent that an orange glow may be created similar to the effect created by the rising or the setting of the sun. As a result, the fixture 10 may truly re-create the effect of a rising or setting sun on a blue sky and the stars will fade or appear. This arrangement provides for a true representation of a natural phenomenon thereby being capable of creating a striking effect.

In the event that the fixture 10 is to be used for lighting purposes to illuminate the interior of an enclosed area, the light sources 34 may be used at their greatest intensity and the areas surrounding the fixture 10 will be properly and safely illuminated. As a source of illumination the fixture will appear as shown in Fig. 1.

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As a source of interest the fixture will appear as in Fig. 7 with the star spots 42 visible.

The over-all shape of the fixture 10 may vary considerably and the size of the fixture is not limited by the particular arrangement described. The perimeter light sources 33 and 34 are capable of providing a uniform glow over the entire outer screen 32 and upon increasing the diameter of the same it is merely necessary to increase the spacing between the screen 22 and 32 thereby increasing the angles of reflection. The screens 22 and 32 may be of any desired shape as long as the functioning of the fixture described above is retained. For example, the screens 22 and 32 may be in the form of inverted cones or each of the screens may be provided with a different contour. The light sources 33 may be any desired color for the purpose of presenting a decorative variable arrangement which allows the blending of a color with changes in the color of the white light sources 34. Still further, while incandescent light sources have been illustrated, fluorescent lamps may be used. While the foregoing description has dealt with utilizing the fixture to simulate constellations in their natural environment, it should be understood that the apertures or openings in the inner screen 22 may be such as to project any shape of light spots or areas desired. The fixture 10 may be used, for example, to convey a written or printed message as well as various abstract decorative designs.

Obviously many modifications and variations of the invention as hereinbefore set forth may be made without departing from the spirit and scope thereof, and therefore only such limitations should be imposed as are indicated in the appended claims.

I claim:

1. A lighting fixture comprising a housing carrying a plurality of light sources, a first screen in said housing enclosing some of said light sources, and a second screen forming an outer surface of said housing, said first screen being provided with apertures to admit spaced limited fields of light therethrough emanating from the light sources enclosed thereby, said spaced limited fields each being directed against the inner surface of said second screen to be diffused thereby, the remainder of said light sources being positioned so that light rays therefrom are directed intermediate said screens to provide light rays for reflection by said first screen toward said second screen at least substantially throughout the entire surface thereof, said remainder of light sources being shielded by means forming a part of said fixture to prevent normal direct observance of the same from points outwardly of said fixture.

2. A lighting fixture comprising a housing having a surface thereof defined by a light diffusing screen, a first series of light sources within said housing peripherally arranged relative to said diffusing screen for illuminating the same, a further screen within said housing in spaced relation to said diffusing screen and positioned inwardly of said first series of light sources, and a second series of light sources within said housing positioned behind said further screen, said further screen being opaque and having a plurality of spaced openings therethrough to transmit controlled beams of light emanating from said second series of light sources therethrough onto the inner face of said diffusing screen to define limited areas of observable concentrated light thereon.

3. A lighting fixture comprising a housing having a surface thereof defined by a light diffusing screen, a first series of light sources within said housing peripherally arranged relative to said diffusing screen for illuminating the same, a further screen within said housing in spaced relation to said diffusing screen and positioned inwardly of said first series of light sources, and a second series of light sources within said housing positioned behind said further screen, said further screen being opaque and having a plurality of spaced openings therethrough

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to transmit controlled beams of light emanating from said second series of light sources therethrough onto the inner face of said diffusing screen to define limited areas of observable concentrated light thereon, said first series of light sources being substantially shielded by opaque portions of said fixture to prevent direct observance of the same from points outwardly of said fixture.

4. A lighting fixture comprising a housing having a surface thereof defined by a light diffusing screen, a first series of light sources within said housing peripherally arranged relative to said diffusing screen for illuminating the same, a further screen within said housing in spaced relation to said diffusing screen and positioned inwardly of said first series of light sources, and a second series of light sources within said housing positioned behind said further screen, said further screen being opaque and having a plurality of spaced openings therethrough to transmit controlled beams of light emanating from said second series of light sources therethrough onto the inner face of said diffusing screen to define limited areas of observable concentrated light thereon, the outer surface of said further screen being light reflective to reflectively spread illumination of said first series of light sources throughout the area of said diffusing screen.

5. A lighting fixture comprising a housing having a surface thereof defined by a light diffusing screen, a first series of light sources within said housing peripherally arranged relative to said diffusing screen for illuminating the same, a further screen within said housing in spaced relation to said diffusing screen and positioned inwardly of said first series of light sources, and a second series of light sources within said housing positioned behind said further screen, said further screen being opaque and having a plurality of spaced openings therethrough to transmit controlled beams of light emanating from said second series of light sources therethrough onto the inner face of said diffusing screen to define limited areas of observable concentrated light thereon, the outer surface of said further screen being light reflective and being shaped relative to said diffusing screen to reflectively spread illumination of said first series of light sources throughout the area of said diffusing screen, said first series of light sources being substantially shielded by opaque portions of said fixture to prevent direct observance of the same from points outwardly of said fixture.

6. A lighting fixture comprising a housing having a surface thereof defined by a light diffusing screen, a first series of light sources within said housing peripherally arranged relative to said diffusing screen for illuminating the same, a further screen within said housing in spaced relation to said diffusing screen and positioned inwardly of said first series of light sources, and a second series of light sources within said housing positioned behind said further screen, said further screen being opaque and having a plurality of spaced openings therethrough to transmit controlled beams of light emanating from said second series of light sources therethrough onto the inner face of said diffusing screen to define limited areas of observable concentrated light thereon, both of said screens being outwardly convex in shape to a substantially equal degree with the outer surface of said further screen being light reflective to reflectively spread illumination of said first series of light sources throughout the area of said diffusing screen.

7. A lighting fixture comprising a housing having a surface thereof defined by a light diffusing screen, a first series of light sources within said housing peripherally arranged relative to said diffusing screen for illuminating the same, a further screen within said housing in spaced relation to said diffusing screen and positioned inwardly of said first series of light sources, and a second series of light sources within said housing positioned behind said further screen, said further screen being

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opaque and having a plurality of spaced openings there-
through to transmit controlled beams of light emanating
from said second series of light sources therethrough
onto the inner face of said diffusing screen to define
limited areas of observable concentrated light thereon, 5
both of said screens being outwardly convex in shape to
a substantially equal degree with the outer surface of
said further screen being light reflective to reflectively
spread illumination of said first series of light sources
throughout the area of said diffusing screen, said first 10

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series of light sources being substantially shielded by
opaque portions of said fixture to prevent direct ob-
servance of the same from points outwardly of said
fixture.

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