July 24, 1956 J. H. TUSLY 2,756,323

ILLUMINATED STAIRWAY

Filed April 17, 1953

FIG. 2

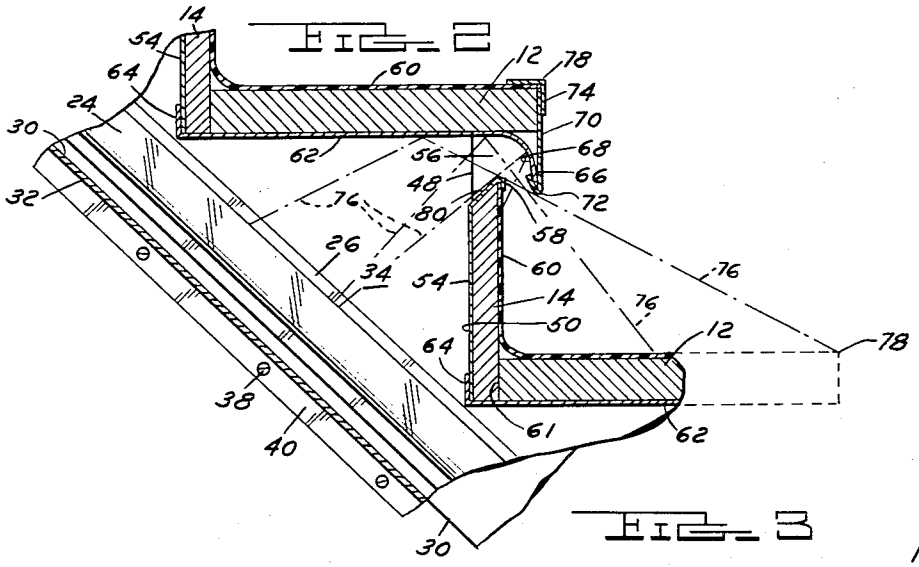


FIG. 3

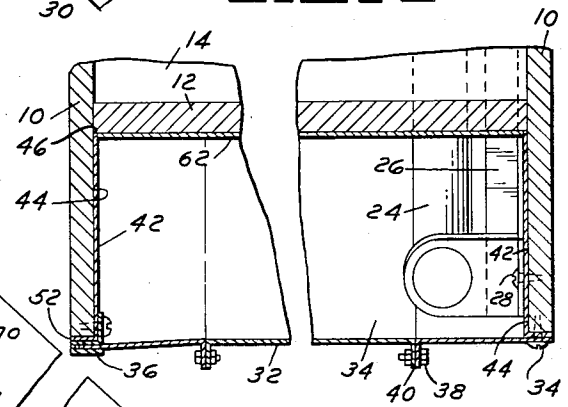


FIG. 1

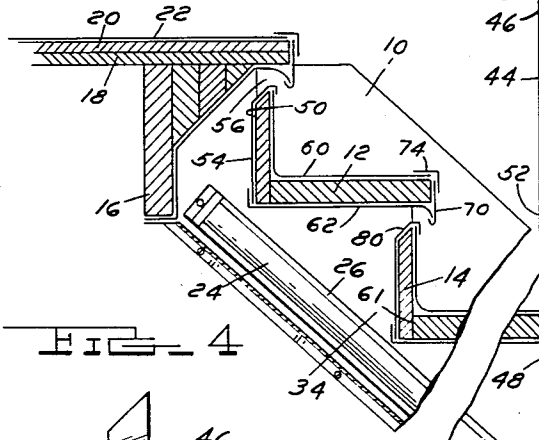
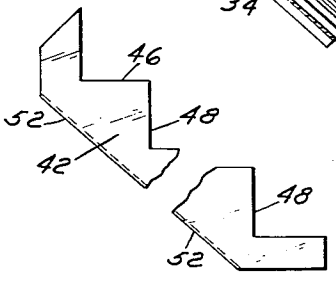
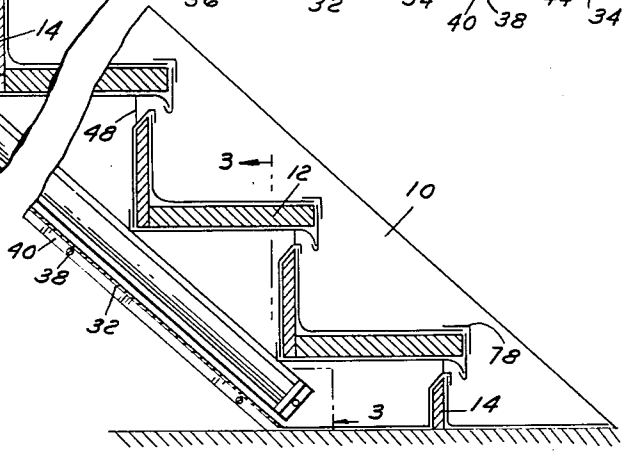


FIG. 4





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ILLUMINATED STAIRWAY

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3 Claims. (Cl. 240—2)

This invention relates to the illumination of a stairway by means of a light source concealed in a chamber beneath the stairway and means associated therewith for separately illuminating each individual step.

The essential requirement in the illumination of a stairway is that every stair be lighted sufficiently to be clearly visible. Usually, either one or more light sources have been employed to illuminate the entire general area of a stairway, or a number of separate lights are used to illuminate each stair individually. Since a stairway is generally elongate and usually has quite a few steps, the latter type system, though desirable in many situations, is relatively complex and expensive of installation as compared to the former, so that its use is precluded. It is an object of this invention to provide a simple and economically installed means for illuminating each stair in a stairway, separately and individually, from a single common light source.

The invention is carried out by means of a single light source such as a fluorescent or neon tube mounted in a chamber beneath the stairway and extending substantially the length thereof, the surfaces of the chamber exposed to the lamp being provided with reflectors for reflecting light therefrom through an open space subjacent each stair tread, and a reflector associated with each open space to reflect light emanating therefrom downwardly to illuminate the underlying stair. One embodiment of the invention is shown in the accompanying drawings, of which the following is a brief description:

Fig. 1 is largely in section showing a stairway with the reflectors of this invention mounted thereon and showing the tube type lamp.

Fig. 2 is an enlarged generally sectional view showing details of construction.

Fig. 3 is an enlarged view partly in section taken generally on line 3—3 of Fig. 1.

Fig. 4 is an ensmalled elevational view of a stringer reflector removed from the stringer.

The stairway shown in the drawings has a stringer **10** extending longitudinally along each side thereof, a number of horizontal stair treads **12** secured between the stringers and extending laterally the width of the stairway, and a riser **14** extending generally vertically between each pair of stair treads. The head of the stairway is shown connected with a floor having a joist **16**, a subfloor **18**, and a finish floor **20** with an overlayment **22** such as carpeting or linoleum thereon. The foot of the stairway may connect with a lower floor or level by suitable construction.

A tube type lamp **24**, such as a neon tube or a fluorescent tube, is disposed beneath the stairway and extends substantially the entire length thereof. The tube is held in a fixture **26** which may be secured into place by such means as screws **28** secured to one of the stringers **10**. The fixture and tube in their entirety are positioned above the lower edge **30** of the stringer as best shown in Fig. 1. Where it is convenient or necessary because of the length of the stairway, the light source may be comprised of a

plurality of tubes mounted end to end in a single fixture or in a plurality of fixtures.

A closure panel and reflector **32** is secured to the lower edges **30** of the stringers **10** in such a way as to define, together with the stringers **10**, stair treads **12** and risers **14**, an illumination chamber **34** extending the length of the stairway and enclosing the lamp **24**. To facilitate easy removal of the reflector **32** from time to time for cleaning purposes or for replacement of the lamp **24**, one edge portion thereof is preferably secured to one of the stringers by removable means such as screws **34** while the other edge may be secured to the other stringer by such means as the bracket **36**. The reflector **32** may consist of a single monolithic member or, where desirable, may comprise a plurality of members secured together by such means as the bolts **38** extending through flange portions **40** as shown.

A stringer reflector **42** which may have the shape shown in Fig. 4 is secured by suitable means to the inner surface **44** of each stringer **10**. One edge of the stringer reflector is stepped, having horizontal portions **46** and vertical portions **48** to mesh respectively with the lower surfaces of the stair treads **12** and the reverse surfaces **50** of the risers **14**. The other edge of the stringer reflector is shaped to fit the lower edge **30** of the stringer **10**, which is preferably straight, and may have a flap **52** adapted to be folded around the lower edge **30** for attachment purposes. One of the flaps may be secured into position by the bracket **36** and the other flap by an edge portion of the closure panel and reflector **32** as shown in Fig. 3. The ends of the stringer reflector may be shaped as desired to conform to the structure at the head and foot of the stairway.

A riser reflector **54** is mounted by suitable means on the reverse surface **50** of each riser **14** and preferably extends the length of the riser between the stringers **10**. There is a window or light port **56** subjacent each stair tread **12** which extends substantially the length of the riser and which is preferably formed by a hiatus between portions of the riser and the stair tread as shown. One end portion **58** of the riser reflector may be folded over an upper portion of the riser for attachment thereto. The end portion **58** may also be utilized to secure linoleum or other overlayment **60** to the outer face of the riser as best shown in Fig. 2. In the type of stairway having no risers **14**, the reflector **54** may be secured to the inner end **61** of the stair tread **12**.

A stair tread reflector **62** is secured by suitable means to the bottom surface of each stair tread and extends the length thereof between the stringers **10**. One edge portion **64** of the stair tread reflector extends at right angles thereto for attachment to the contiguous riser **14** and may be utilized to secure the lower edge of the riser reflector **54** into place (Fig. 2). The opposite edge **66** of the stair tread reflector extends outwardly beyond the riser **14** and is curved downwardly, as the drawings are viewed, through substantially 90° in order to provide a reflecting surface **68** disposed outside of the illumination chamber **34** and forwardly of the window **56**, whose purpose will appear subsequently.

A nose plate **70** is secured by suitable means to the face of the forward edge of each stair tread **12** as shown. Each nose plate runs the length of the stair tread and extends downwardly therefrom to a location below the lowest extremity of the window or light port **56**. At the lowest edge **72** of the nose plate is an inwardly returnbent portion which engages the curved edge portion **66** of the stair tread reflector and provides support therefor. The upper edge of the nose plate is preferably secured in place by means of an L-shaped molding strip **74** which also serves to secure into place the linoleum or

other overlayment 60 on the wearing surface of the stair tread.

Other reflectors may be fashioned as required to line the portions of the illumination chamber 34 at the head and foot of the stairway. The various reflecting surfaces which face or line the interior of the illumination chamber have a high albedo or are highly reflective and to this end they may advantageously comprise white or pastel colored sheathing or coating material or the like, or bright sheet metal, which, moreover, may be easily fashioned into the reflector shapes described.

The windows 56 may constitute slit-like openings in the illumination chamber through which light may emanate to illuminate the stairs in the manner generally illustrated by the dotted lines 76 in Fig. 2. As shown, each stair tread reflector 62, including the curved portion 68 lying outside of the illumination chamber 34, serves to direct light emanating from the chamber in a generally downward direction in such a way as to illuminate the entire outer or obverse surface of the stair tread 12 and riser 14 subjacent thereto. The lower extremity 72 of the nose plate 70 is positioned on or below a line between the lower edge of the opening 56 and the forward upper edge 78 of the stair tread 12 so that light emanating from the opening 56 cannot shine directly into the eyes of a person ascending the stairway while his eye level is lower than stairs above him. Where the riser 14 has a substantial thickness, the upper portion 80 thereof may be bevelled as shown to increase the amount of light passing through the opening 56. The exterior reflector structure comprising elements 68 and 70 thus serves the dual purpose reflecting the light for illumination and obscuring the light from direct view.

All of the various reflective surfaces lining the illumination chamber 34 are exposed to the lamp 24 and light therefrom is hence diffused generally throughout the chamber. As a result, a substantially equal amount of light emanates from each of the openings 56 so that all of the stairs are substantially equally illuminated. Further, there is very little difference between the intensity of the light emanating from regions of the opening 56 adjacent the lamp 24 and regions remote therefrom so that there is substantially uniform illumination of the stairs throughout their length, i. e., laterally of the stairway.

The reflector-lined light chamber beneath the stairway and the slit-like light orifice at the top of each stair thus constitutes simple, efficient, and economically installed means for separately illuminating each individual stair in the stairway.

Such terms as "up," "down," "vertical," and "horizontal" are used herein merely as convenient terminology and not as delimitations.

I claim:

1. A stairway comprising, a plurality of longitudinal stringers, a plurality of risers and treads extending transversely of said stringers in alternate arrangement and forming stairs, the forward edge portions of said treads overhanging said risers, means forming a window adjacent the top of each riser for transmitting light, a light source mounted beneath said stairs, and a reflector depending from the forward edge portion of each tread, said reflectors being operative to reflect downwardly light passing through said windows, whereby to illuminate the obverse portions of said stairs, each reflector extending below the lower extremity of the window in the subjacent riser a sufficient distance to reflect substantially all light passing said window downwardly of the forward edge of the next lower tread, whereby to obscure said windows from the view of a person ascending said stairway.

2. A stairway comprising, a plurality of longitudinal stringers, a plurality of risers and treads extending transversely of said stringers in alternate arrangement and forming stairs, the forward edge portions of said treads overhanging said risers, means forming an elongate window adjacent the top of each riser for transmitting light, closure means cooperating with said stringers and said stairs to form a light chamber beneath said stairs, an elongate light source in said chamber, said light source extending substantially the length of said stairway and extending transversely of said windows, reflector means on the surfaces defining the interior of said chamber for diffusing the light therein to provide generally uniform radiation through said windows, the reflector means on the underside of each stair tread having an end portion projecting through the window in the subjacent riser exteriorly of said chamber, said end portions being formed downwardly to reflect downwardly light passing through said windows, whereby to illuminate said stairs, each end portion extending below the lower extremity of the window in the subjacent riser to reflect substantially all light from said window downwardly of the forward edge of the next lower tread, whereby to obscure said windows from the view of a person ascending the stairway, and an element secured to said forward edge portion of each tread, said elements supporting said end portions of said reflectors.

3. A stairway comprising, riser means and tread means secured in alternate arrangement, said tread means having forward edge portions overhanging said riser means, window means adjacent the top of said riser means for transmitting light, means forming a light source beneath said riser means and tread means, and reflector means extending downwardly from said forward edge portions of said tread means, said reflector means being operative to reflect downwardly light passing through said window means whereby to illuminate the obverse portions of said stairway, said reflector means extending below the lower extremity of said window means a sufficient distance to reflect substantially all light passing through said window means downwardly of the forward edge portion of the next lower tread means, whereby to obscure said window means from the view of a person ascending said stairway.

References Cited in the file of this patent

UNITED STATES PATENTS

903,730	Kohn et al.	Nov. 10, 1908
1,854,104	Burkhart	Apr. 12, 1932
2,015,730	Rosin et al.	Oct. 1, 1935
2,106,995	Clary	Feb. 1, 1938
2,282,050	Handy et al.	May 5, 1942
2,640,143	Malone	May 26, 1953
2,691,718	Bowers	Oct. 12, 1954

FOREIGN PATENTS

490,921	Great Britain	Aug. 24, 1937