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(54) **RUBSTRIP WITH INTEGRAL LIGHTING FOR POSSIBLE USE IN AN AIRCRAFT**

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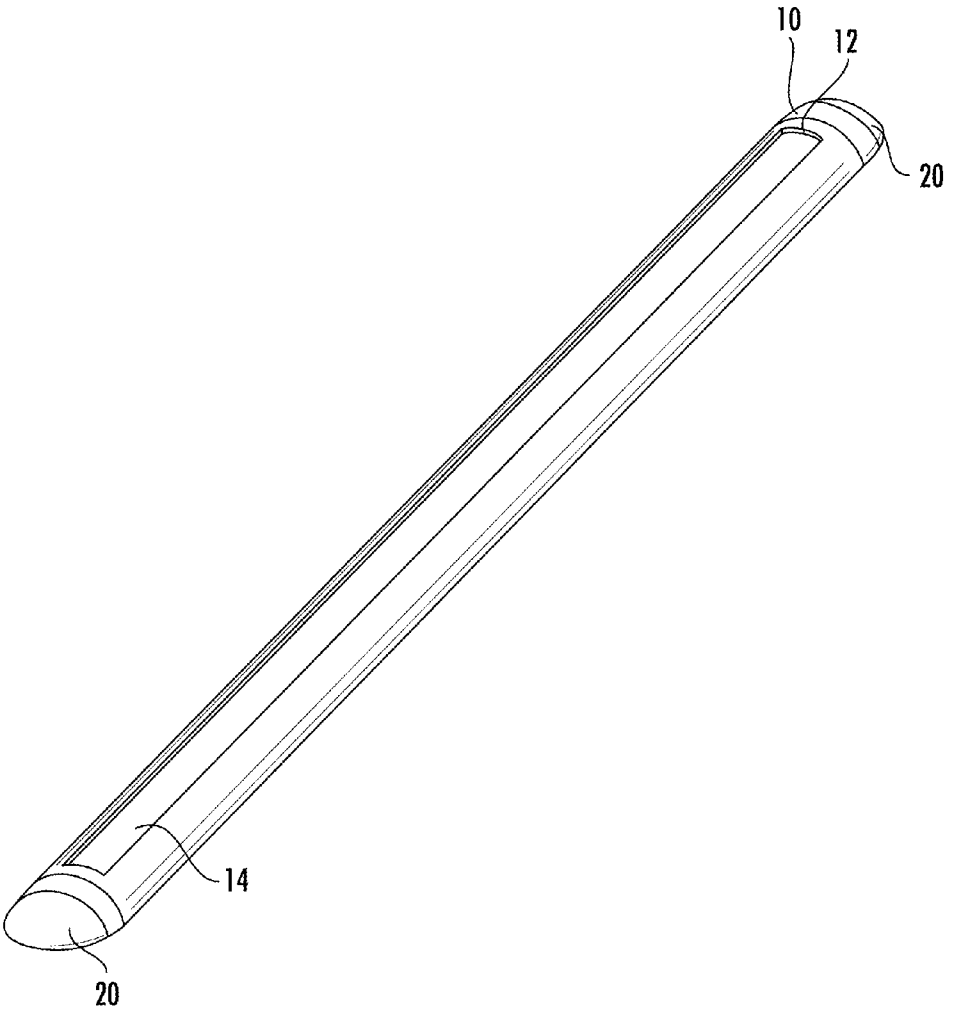
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(57) **ABSTRACT**

A rubstrip for protecting an exposed surface, such as a surface in the interior of an aircraft. The rubstrip is configured to house a light source within its interior. In some embodiments, an exterior of the rubstrip is formed with at least one passageway configured to emit light from the light source. The rubstrip is configured both to protect the surface from damage and to protect the housed light source from damage.



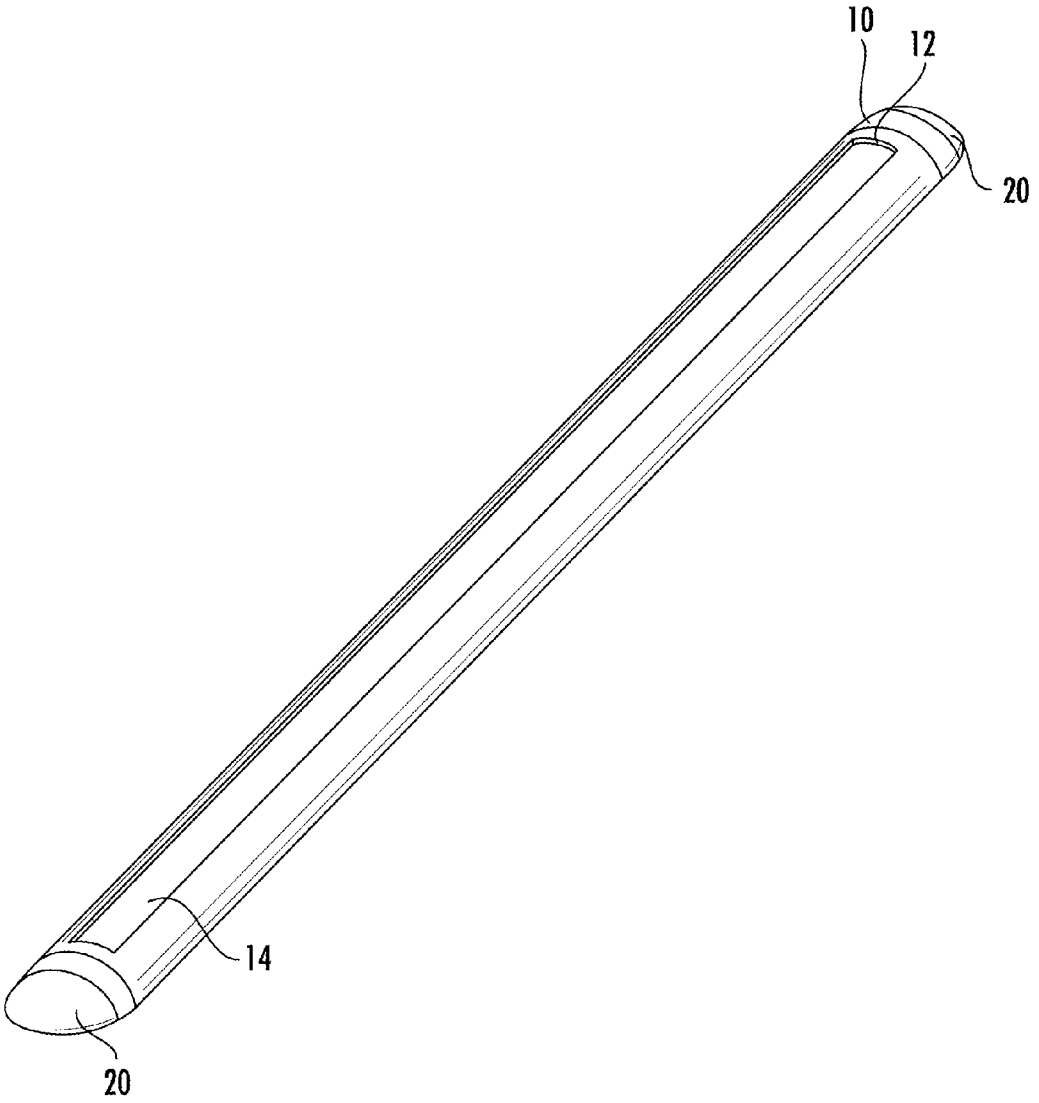


FIG. 1

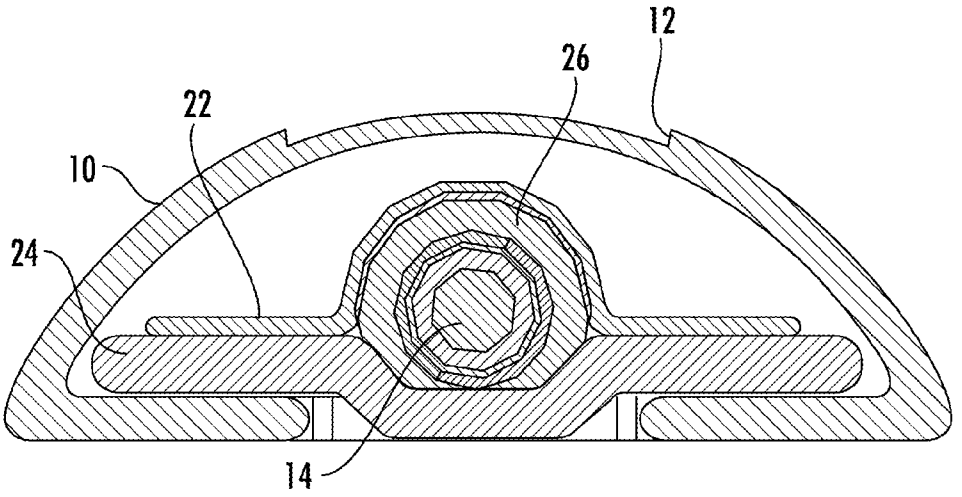


FIG. 2

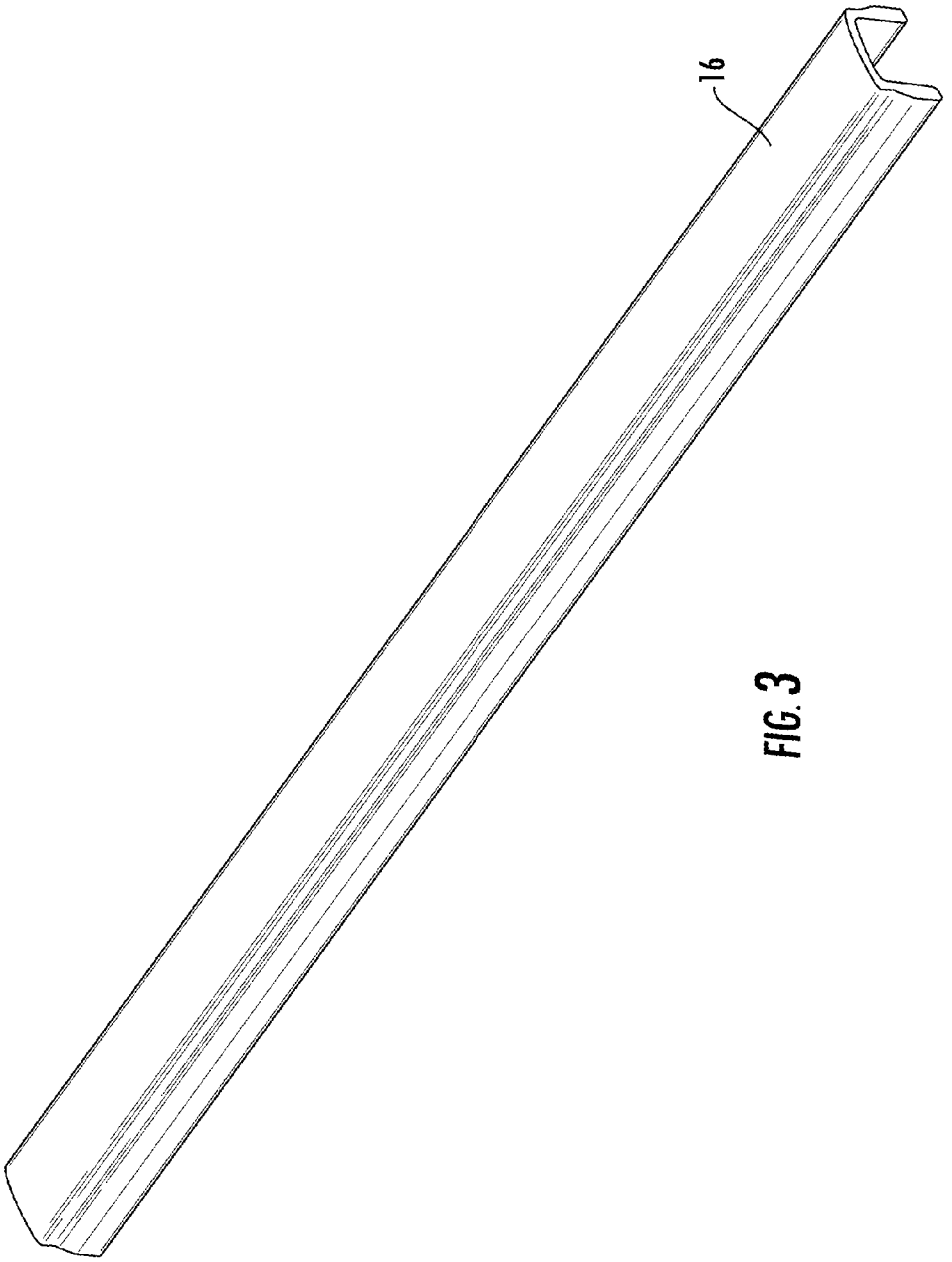


FIG. 3

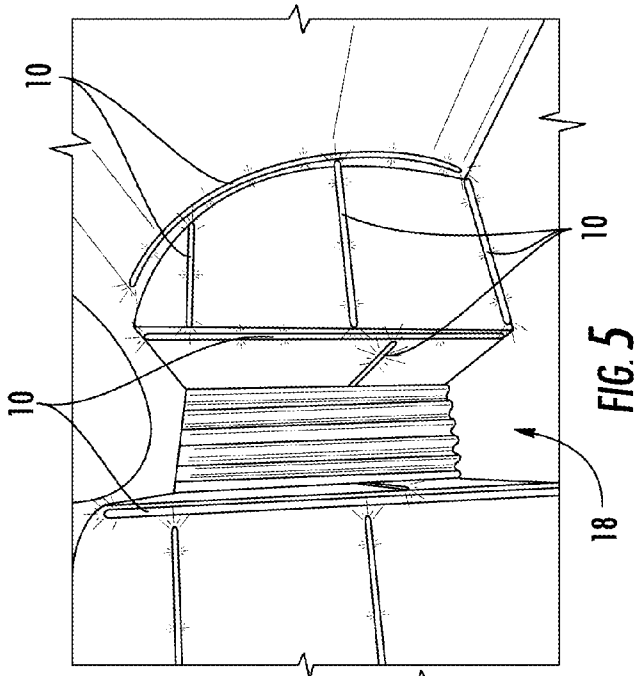


FIG. 5

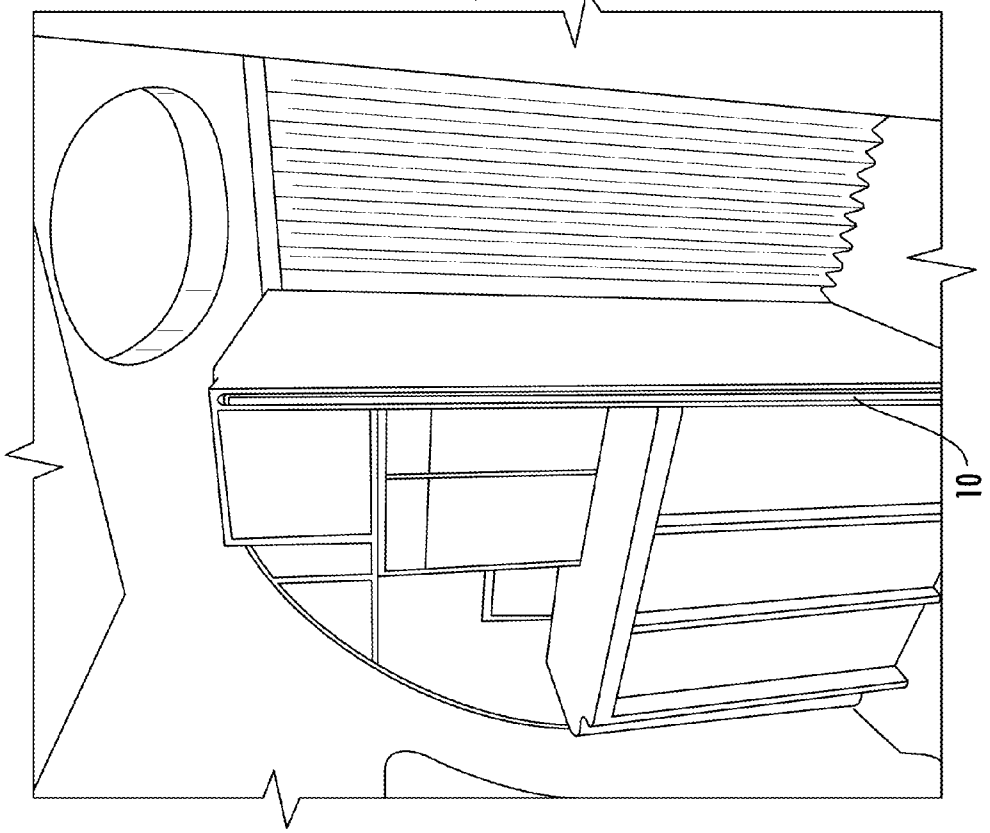


FIG. 4

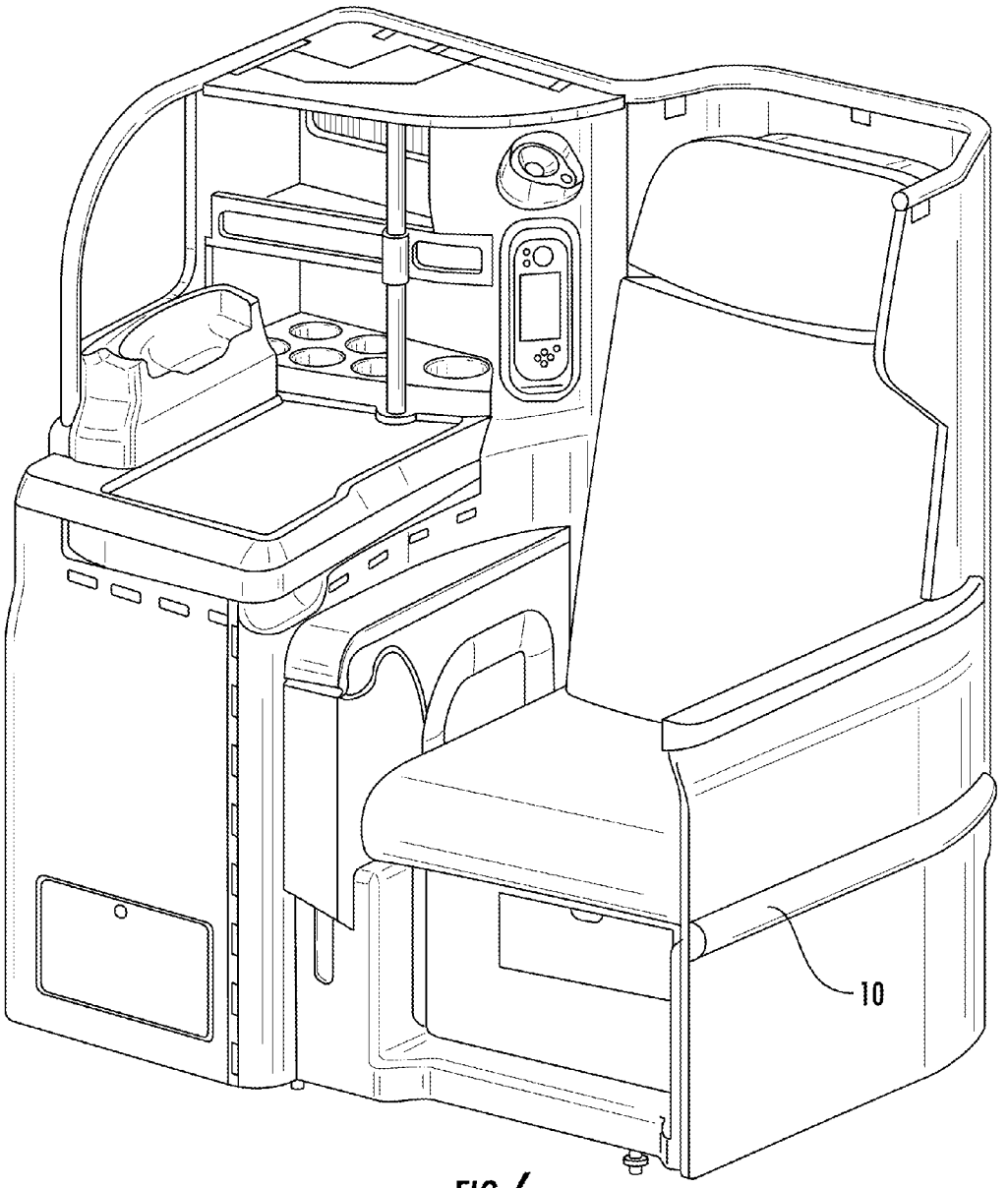


FIG. 6

RUBSTRIP WITH INTEGRAL LIGHTING FOR POSSIBLE USE IN AN AIRCRAFT

[0001] This application claims priority benefits from U.S. Provisional Application Ser. No. 61/682,936 filed Aug. 14, 2012 and titled "Aircraft Equipment Concepts," the contents of which are incorporated herein by reference.

FIELD OF THE INVENTION

[0002] Embodiments of the invention generally relate to rubstrips with integral lighting for possible use in the interior of an aircraft.

BACKGROUND OF THE INVENTION

[0003] Aircraft interiors typically include rubstrips (sometimes referred to as bumpers) to help protect various surfaces inside the aircraft from damage. For instance, luggage and trolleys (galley carts) move up and down the aisles of an aircraft and are prone to bumping against seats or other surfaces in their path, which subjects such surfaces to paint chipping or other damage. As such, rubstrips are typically positioned along any surface in an aircraft interior that may be damaged or scratched if bumped from passing traffic. In some cases, the rubstrips are positioned along the trolley or other movable object. The interior surfaces where a rubstrip may be used to protect the surface from damage include, but are not limited to: entryways; doorways; closets; galley surfaces including counters; walls; seats; corners; baseboards; lavatory surfaces, etc. Although the rubstrips described herein are discussed for use in aircrafts, they are by no means so limited and may be used in any suitable environment, including without limitation buses, trains, other forms of transportation or any stationary structure or building.

[0004] In addition to the rubstrips, aircraft interiors include various lighting (for example, emergency lighting, area lighting, proximity lighting, ambient lighting, mood lighting etc.). Aircraft interior lighting is added for safety and function and also to enhance the passenger experience. Aircraft lighting has very specific requirements, which are different from requirements for providing lighting in other vehicles. Since lighting is susceptible to damage from luggage or trolleys, aircraft lighting is typically positioned away from trolley and luggage paths and is therefore restricted to particular locations within the aircraft. Because of the susceptibility to damage and the limited placement of aircraft lighting, lighting in aircrafts is provided by a device that is separate from the rubstrip. Design complexity and weight of the aircraft are increased due to the multiple parts and assemblies for the lights and separate rubstrips.

SUMMARY OF THE INVENTION

[0005] The terms "invention," "the invention," "this invention" and "the present invention" used in this patent are intended to refer broadly to all of the subject matter of this patent and the patent claims below. Statements containing these terms should not be understood to limit the subject matter described herein or to limit the meaning or scope of the patent claims below. Embodiments of the invention covered by this patent are defined by the claims below, not this summary. This summary is a high-level overview of various aspects of the invention and introduces some of the concepts that are further described in the Detailed Description section below. This summary is not intended to identify key or essential features of the claimed subject matter, nor is it intended to be used in isolation to determine the scope of the claimed subject matter. The subject matter should be understood by reference to the entire specification of this patent, all drawings and each claim.

[0006] Described herein is a rubstrip with integral lighting. In some embodiments, the illumination is provided by a light emitting diode (LED) or other suitable light source that is housed within the rubstrip. The rubstrip is configured not only to protect a surface (such as an interior surface of an aircraft) from damage, but also to protect the light source housed within the rubstrip from damage.

BRIEF DESCRIPTION OF THE DRAWINGS

[0007] A full and enabling disclosure including the best mode of practicing the appended claims and directed to one of ordinary skill in the art is set forth more particularly in the remainder of the specification. The specification makes reference to the following appended figures, in which use of like reference numerals in different features is intended to illustrate like or analogous components.

[0008] FIG. **1** is a perspective view of a rubstrip with integral lighting according to one embodiment.

[0009] FIG. **2** is a cross-sectional view of the rubstrip of FIG. **1**.

[0010] FIG. **3** is a perspective view of a diffuser that may be used with a rubstrip with integral lighting.

[0011] FIGS. **4-5** are perspective views of portions of the interior of an aircraft.

[0012] FIG. **6** is a perspective view of a seat having a rubstrip with integral lighting according to one embodiment.

DETAILED DESCRIPTION OF THE DRAWINGS

[0013] The subject matter of embodiments of the present invention is described here with specificity to meet statutory requirements, but this description is not necessarily intended to limit the scope of the claims. The claimed subject matter may be embodied in other ways, may include different elements or steps, and may be used in conjunction with other existing or future technologies. This description should not be interpreted as implying any particular order or arrangement among or between various steps or elements except when the order of individual steps or arrangement of elements is explicitly described.

[0014] Disclosed herein are rubstrips with integral lighting. The rubstrips are configured to protect various exposed surfaces from damage and are also configured to protect the light source from damage. As shown in FIG. **1**, rubstrip **10** includes at least one passageway **12** from which light from the light source may be emitted. The at least one passageway **12** may be positioned in any suitable manner along an exterior of the rubstrip **10**. Although the at least one passageway **12** is illustrated in the Figures as positioned toward the center of the rubstip **10**, the at least one passageway **12** may be offset or positioned in any suitable location along the rubstrip **10**. The positioning of the at least one passageway **12** may be selected based on the configuration of the surface with which the rubstrip **10** will be used and/or the desired direction of the light to be emitted from the rubstrip **10**. The at least one passageway **12** may have any suitable dimensions and may be shorter/longer and/or wider/narrower than the embodiment illustrated in FIG. **1**.

[0015] In some embodiments, the at least one passageway is a transparent or semitransparent surface of the rubstrip that allows light to be emitted through that portion of the surface of the rubstrip. In some embodiments, the at least one passageway **12** may be a cutaway portion of the rubstrip, or it may be a groove or other opening. In some embodiments, the at least one passageway **12** optionally may be covered by a transparent or semi-transparent cover.

[0016] Positioned within an interior of the rubstrip **10** is a light source **14**. In some embodiments, light source **14** is positioned within the rubstrip **10** such that the rubstrip protects the light source **14** from damage. Light source **14** may be oriented within rubstrip **10** so that light source **14** aligns with the at least one passageway **12**. In this way, light emitted from the light source **14** can also be emitted through the at least one passageway **12** and out the exterior of the rubstrip **10**.

[0017] Light source **14** may be one or more standard light sources (e.g., but not limited to, a single source LED emitted through a clear rod, continuous lighting, an electroluminescent wire, a fluorescent bulb, an incandescent bulb, an arc lamp, one or more LEDs, or any other suitable light source). Another non-limiting example of a suitable light source is a molded silicone encapsulated light sold by Dow Corning. In some cases, the light source is flexible so it can be used along curved surfaces, as shown in FIGS. **4-5**, although it need not be.

[0018] Rubstrip **10** may optionally include one or more end caps **20**, as shown in FIG. **1**, to cover the ends of the rubstrip **10**. As shown in FIG. **2**, rubstrip **10** may also include a base **24** to assist with mounting of the rubstrip along the surface and/or to provide support to the rubstrip **10** and/or the light source **14**. Rubstrip **10** may also include a retainer assembly **22** configured to help retain the internal parts of the rubstrip, including the light source **14**.

[0019] Rubstrip **10** may optionally include a light channel **26**. If used, light channel **26** helps direct and modify the light by reflecting, deflecting, and/or diffusing the light emitted from light source **14**. In some embodiments, a diffuser, such as diffuser **16** shown in FIG. **3**, may be positioned within the rubstrip adjacent the light source **14** to diffuse light from light source **14**.

[0020] Rubstrip **10** may be formed of plastic or any other suitable shock absorbing or resistant material. In some embodiments, the base or other components of the rubstrip may be formed of metal or composite materials. In some embodiments, rubstrip **10** is formed by extrusion, injection molding, thermal formation, machine formation or any other suitable process. After rubstrip **10** is formed by any suitable process, light source **14** may be assembled with rubstrip **10**. In some embodiments, light source **14** is positioned within the interior of the rubstrip **10** through one of the ends of the rubstrip. In other embodiments, light source **14** is positioned within the interior of the rubstrip through the at least one passageway **12**.

[0021] In some embodiments, light source **14** is powered by any suitable existing power source. The rubstrip may be configured to cover and protect any desired surface, such as, but not limited to, walls, baseboards, counters, doorways, entryways, corners, or any desired surface, including but not limited to surfaces associated with seats, lavatories, galleys, trolleys, etc. If used in an aircraft, rubstrip **10** may be positioned along any suitable surface, such as aisle entrance **18** as shown in FIGS. **4-5** or a seat as shown in FIG. **6**. As mentioned above, the rubstrip is not limited for use in aircrafts, but may be used in any suitable interior or external surface.

[0022] The illuminated rubstrips described herein have a dual purpose of protecting a surface from damage and also protecting the rubstrip's integral light source from damage. Providing a single device that serves as a light source and that protects various aircraft internal surfaces from damage, as well as protects the light source itself from damage, results in cost savings in production and also reduces the overall weight of the aircraft. Because the rubstrip is capable of emitting light, it also satisfies various aircraft lighting requirements.

[0023] The foregoing is provided for purposes of illustrating, explaining, and describing embodiments of the present invention. Further modifications and adaptations to these embodiments will be apparent to those skilled in the art and may be made without departing from the scope or spirit of the invention. Different arrangements of the components depicted in the drawings or described above, as well as components and steps not shown or described are possible. Similarly, some features and subcombinations are useful and may be employed without reference to other features and subcombinations. Embodiments of the invention have been described for illustrative and not restrictive purposes, and alternative embodiments will become apparent to readers of this patent. Accordingly, the present invention is not limited to the embodiments described above or depicted in the drawings, and various embodiments and modifications can be made without departing from the scope of the claims below.

We claim:

1. A passenger aircraft comprising:

a) an interior passenger cabin; and

b) a rubstrip comprising an integral light source, the rubstrip configured to protect various surfaces of the interior passenger cabin from damage, the rubstrip also configured to protect the integral light source from damage.

2. The rubstrip of claim **1**, wherein the integral light source is housed within an interior of the rubstrip.

3. The rubstrip of claim **1**, further comprising at least one passageway along an exterior of the rubstrip, wherein the at least one passageway is configured to emit light from the light source.

4. The rubstrip of claim **3**, wherein the at least one passageway comprises at least a portion of an external surface of the rubstrip that is transparent or semitransparent to allow for the emission of light from the light source.

5. The rubstrip of claim **3**, wherein the at least one passageway is an opening or a cutaway portion.

6. The rubstrip of claim **1**, wherein the rubstrip is injection molded or extruded.

7. The illuminated rubstrip of claim **1**, wherein the light source is selected from a group consisting of: a single source light emitting diode, continuous lighting, an electroluminescent wire, a fluorescent bulb, an incandescent bulb, an arc lamp, a molded silicone encapsulated light, and one or more light emitting diodes.

8. A rubstrip assembly comprising:

a rubstrip comprising at least one passageway along an exterior of the rubstrip; and

a light source housed within the rubstrip,

wherein the at least passageway is configured to emit light from the light source, and

wherein the rubstrip is configured to protect a surface from damage and is also configured to protect the light source from damage.

9. The rubstrip assembly of claim **8**, wherein the surface is an interior surface of an aircraft.

10. The rubstrip assembly of claim **8**, wherein the at least one passageway is integrally formed with the exterior of the rubstrip.

11. The rubstrip assembly of claim **8**, wherein the at least one passageway is a transparent or semitransparent surface of the exterior of the rubstrip.

12. The rubstrip assembly of claim **8**, wherein the at least one passageway is an opening or a cutaway portion.

13. The rubstrip assembly of claim **12**, further comprising a cover that covers the at least one passageway.

14. The rubstrip assembly of claim **8**, wherein the light source is selected from a group consisting of: a single source light emitting diode, continuous lighting, an electroluminescent wire, a fluorescent bulb, an incandescent bulb, an arc lamp, a molded silicone encapsulated light, and one or more light emitting diodes.

15. The rubstrip assembly of claim **8**, wherein the light source is integral with the rubstrip.

16. The rubstrip assembly of claim **8**, further comprising at least one diffuser configured to diffuse light emitted from the light source.

17. The rubstrip assembly of claim **8**, further comprising a retainer assembly that retains the light source within the rubstrip.

18. The rubstrip assembly of claim **8**, further comprising a base configured to help secure the rubstrip to the surface.

19. The rubstrip assembly of claim **8**, wherein the light source is coupled to an interior of the rubstrip.

20. A method of assembling a rubstrip with integral lighting comprising:

coupling a light source to an interior of the rubstrip such that an exterior of the rubstrip protects the light source from damage,

wherein the rubstrip is configured to protect a surface of an aircraft from damage.

21. The method of claim **20**, further comprising aligning the light source with at least one passageway of the exterior of the rubstrip, wherein the at least one passageway is configured to emit light from the light source.

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