(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) **EP 2 993 117 A2**

(12) **EUROPEAN PATENT APPLICATION**

(43) Date of publication:
09.03.2016 Bulletin 2016/10

(51) Int Cl.:
B63B 17/04 *(2006.01)* ***E04F 11/18*** *(2006.01)*

(21) Application number: **15002241.6**

(22) Date of filing: **29.07.2015**

(84) Designated Contracting States:
AL AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HR HU IE IS IT LI LT LU LV MC MK MT NL NO PL PT RO RS SE SI SK SM TR
Designated Extension States:
BA ME
Designated Validation States:
MA

(30) Priority: **30.07.2014 IT GE20140076**

(71) Applicant: **Marinoni S.p.A.**
16152 Genova (IT)

(72) Inventor: **Ronco, Romeo**
98000 Montecarlo (MC)

(74) Representative: **Forattini, Amelia**
Internazionale Brevetti
Ing. ZINI, MARANESI & C. S.r.l.
Piazza Castello 1
20121 Milano (IT)

(54) **HANDRAIL**

(57) A handrail assembly, particularly for parapets and guard rails, including a tubular member that forms a resting surface and is applied to a support means; the assembly being characterized in that the tubular member is provided with a dissipation means adapted to increase the surface for heat exchange between the tubular member and the surrounding air. The assembly is studied in particular for extruded handrails made of aluminum for naval applications.

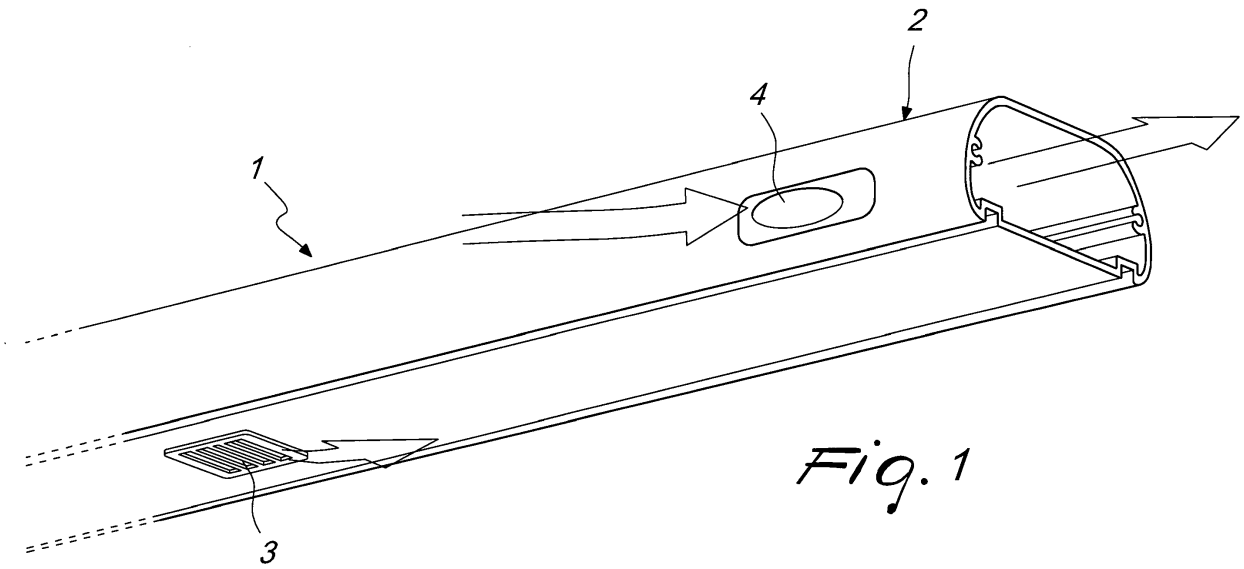

Fig. 1

EP 2 993 117 A2

Description

[0001] The present invention relates to a handrail assembly, particularly for parapets and guard rails.

[0002] In the naval sector, handrails were mainly made of solid wood, but more recently cheaper and more durable materials, in particular metals, such as aluminum, and other metal alloys, and composite materials, such as PRFV, Kevlar, carbon fiber, composites with epoxy resins in light alloys and plastic elastic VTR-Kevlar-carbon-thread fibers have become established.

[0003] Handrails arranged on the outside of a ship, on decks, balconies, etc. and in all applications in the civil and industrial field, when exposed to the sun, absorb a lot of heat and can reach temperatures that are so high as to be dangerous and prevent their use.

[0004] One must in fact consider that a human hand cannot touch an object that has a surface temperature of more than approximately 50°C and that this temperature is easily exceeded by an object exposed to the sun.

[0005] The opposite situation, of extreme cold, also makes a handrail unusable and dangerous but while heated handrails for ships traveling on Arctic routes have been proposed, with systems that comprise in general heating based on water, electrical resistors, diathermic liquids and the like, effective and economically feasible cooling systems have not yet been proposed.

[0006] FR2144027 discloses a handrail made of a hollow body provided with slots adapted to receive the upper end of a post for easy and quick assembly.

[0007] US2009/211512 discloses a boat windshield having a rail disposed adjacent to one edge of a transparent pane. An opening is defined through the rail and an air discharge opening is positioned adjacent to the rear surface of the transparent pane to direct air along the rear surface of the transparent pane upon exiting the air discharge housing.

[0008] EP2695807 discloses a heating device for a handrail of a vessel. The heating device is not built into the handrail, but detachably mounted on the outside of the handrail.

[0009] KR20140035669 discloses a heated handrail for ships. The handrail is a hollow pipe made of aluminum; a support is installed inside the handrail body and a hot wire is mounted on one side of the support.

[0010] The aim of the present invention is to provide a handrail assembly that ensures a sufficient reduction of surface temperature when the handrail is subjected to intense exposure to the sun.

[0011] Within the scope of this aim, an object of the invention is to provide a handrail assembly that can be manufactured economically.

[0012] Another object of the invention is to provide a handrail assembly that can be used in various civil and industrial sectors and in particular in the marine sector.

[0013] Another object of the present invention is to provide an assembly which, by virtue of its particular constructive characteristics, is capable of giving the greatest assurances of reliability and safety in use.

[0014] This aim and these and other objects that will become better apparent hereinafter are achieved by a handrail assembly, particularly for parapets and guard rails, comprising a tubular member that forms a resting surface and is applied to a support means; the assembly being characterized in that the tubular member is provided with a dissipation means adapted to increase the surface for heat exchange between the tubular member and the surrounding air.

[0015] Further characteristics and advantages will become better apparent from the description of preferred but not exclusive embodiments of the invention, illustrated by way of non-limiting example in the accompanying drawings, wherein:

Figure 1 is a perspective view of a portion of a handrail assembly according to the present invention;
Figure 2 is a cross section view of a handrail assembly;
Figure 3 is a cross section view of the assembly, taken at a lower opening;
Figure 4 is a front view of an example of a guard rail provided with the handrail assembly according to the present invention.

[0016] With reference to the cited figures, the handrail assembly according to the invention, globally designated by the reference numeral 1, comprises a tubular member 2 provided with a dissipation means adapted to increase the heat exchange surface.

[0017] The dissipation means may be constituted by finned members which are extended at least partially within the tubular member.

[0018] A finned surface is a wall that has an inner surface and an outer surface with greatly different areas; this allows the cooling fluid, in this case the air, to exchange heat more rapidly.

[0019] Air in fact has a low heat exchange coefficient and in order to increase it, it is necessary to use a rather large exchange surface.

[0020] Therefore, a finned surface is used when one wishes to maximize the heat exchanged between two environments at different temperatures.

[0021] Figure 1 shows two constructive examples of finned members, designated by the reference numerals 3 and 4.

[0022] An additional refinement that is useful to lower the temperature of the handrail is constituted by a series of air intakes 5 arranged on the lower part of the tubular member 2.

[0023] The shapes, dimensions and number of the air intakes 5 are variable in relation to the type of handrail on which they must be applied.

[0024] These air intakes are configured so as to generate a circulation of air within the tubular member.

[0025] In particular, the air intakes are arranged advantageously so that when the ship is moving they be-

have as true cooling air intakes.

[0026] These air intakes, in any case, even when the ship is not moving, allow the exchange of heat between the outer surface and the inner surface.

[0027] The handrail assembly 1 according to the present invention is mounted on a support means, which can be constituted for example by the struts of a guard rail 100 or by a wall that constitutes a parapet of a ship, not shown in the figures.

[0028] Advantageously, the tubular member 2 is an extruded member made of aluminum which exactly reproduces the aesthetic appearance of a handrail made of solid teak wood.

[0029] In practice it has been found that the invention achieves the intended aim and objects, providing a handrail assembly in which, by virtue of the dissipation devices, the temperature of the exposed surface is contained within an acceptable limit in order to prevent user scalding.

[0030] In addition to naval use, the present handrail assembly can be used advantageously in different applications, for example for balustrade, railings and parapets that are subject to intense exposure to the sun, for example in terraces, walkways, etc.

[0031] The handrail according to the present invention utilizes the advantages of tubular products as regards economy and reduction of total weight, with a consequent better applicability and reduced impact on the type of work to be performed for installation and a better possibility of maneuverability with low impact on sustainable workload.

[0032] The handrail according to the present invention is provided with dissipation means made of finned members that operate as radiator means. The air intakes improve the action of the dissipation means.

[0033] The materials used, as well as the dimensions, may of course be any according to the requirements and the state of the art.

Claims

1. A handrail assembly comprising a tubular member (2) that forms a resting surface and is applied to a support means; said assembly being **characterized in that** said tubular member (2) is provided with dissipation means (3, 4) adapted to increase the surface for heat exchange between said tubular member (2) and the surrounding air; said dissipation means comprising finned members (3, 4).

2. The handrail assembly according to claim 1, **characterized in that** said finned members (3, 4) at least partially extend within said tubular member (2).

3. The handrail assembly according to claim 1, **characterized in that** said tubular member (2) comprises one or more air intakes (5) arranged on the lower part of said tubular member (2).

4. The handrail assembly according to claim 3, **characterized in that** said air intakes (5) are configured so as to generate an air circulation within said tubular member (2).

5. The handrail assembly according to one or more of the preceding claims, **characterized in that** said support means is constituted by struts of a guard rail (100).

6. The handrail assembly according to one or more of the preceding claims, **characterized in that** said support means is constituted by a wall that constitutes a parapet.

7. The handrail assembly according to one or more of the preceding claims, **characterized in that** said tubular member (2) is an extruded member made of aluminum that reproduces exactly the aesthetic appearance of a handrail made of solid teak wood.

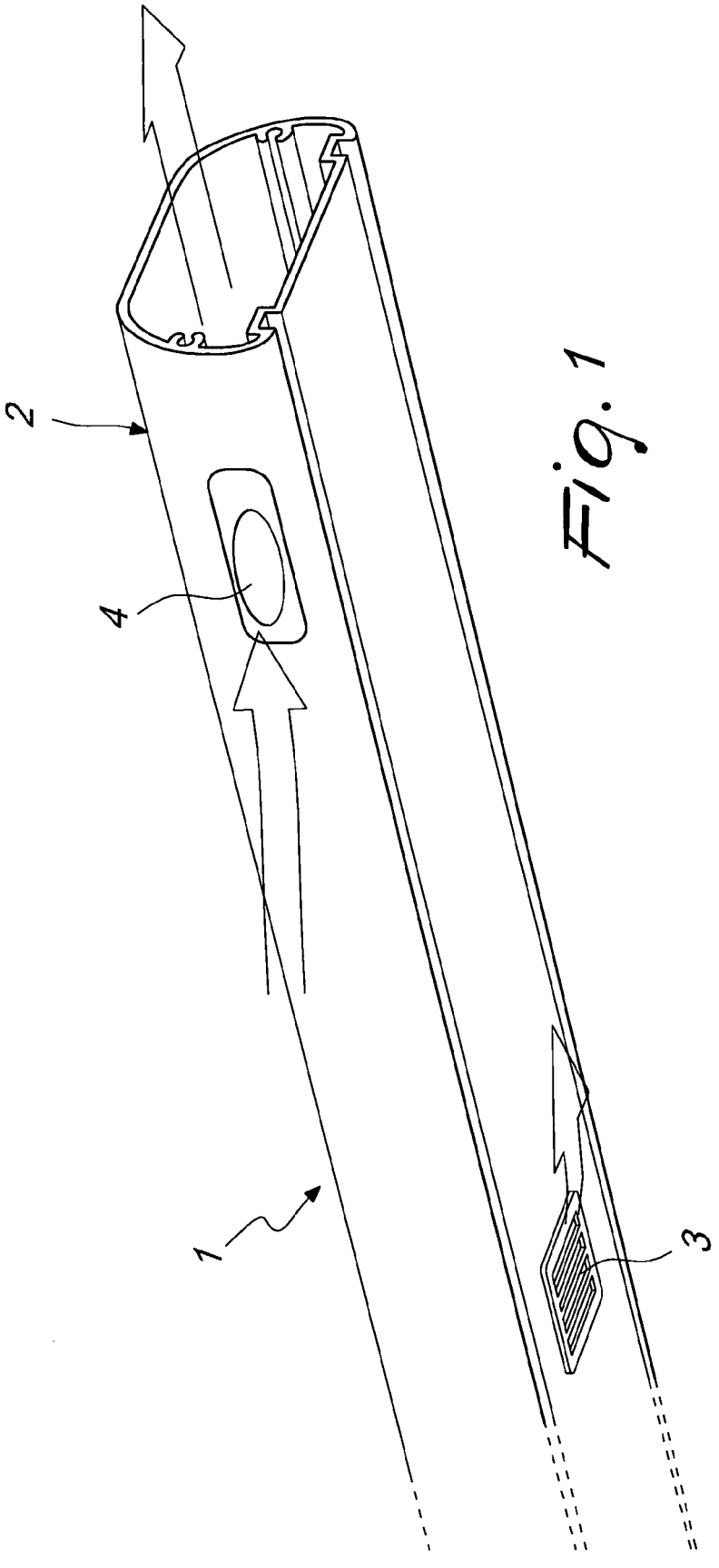

Fig. 1

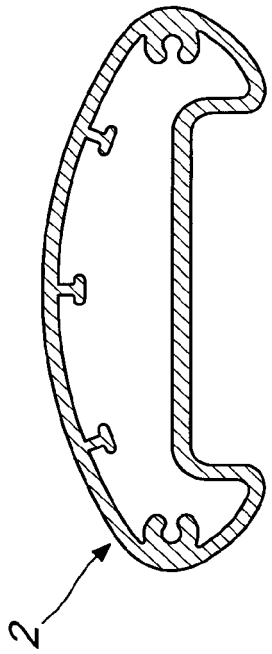

Fig. 2

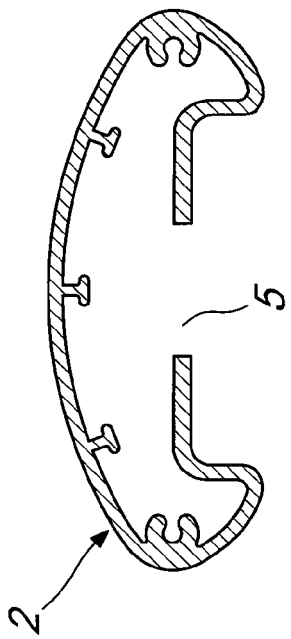

Fig. 3

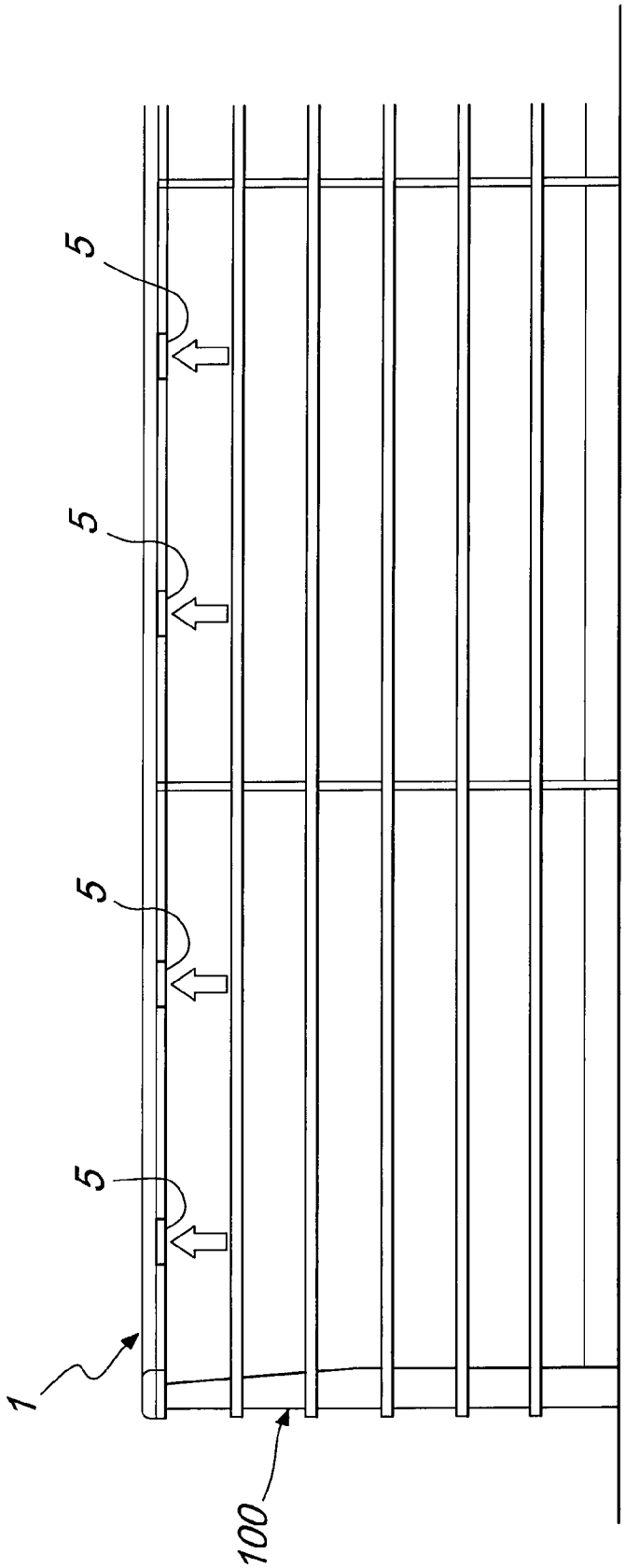

Fig. 4

REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- FR 2144027 **[0006]**
- US 2009211512 A **[0007]**
- EP 2695807 A **[0008]**
- KR 20140035669 **[0009]**