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Remarks:
Amended claims in accordance with Rule 137(2) EPC.

(54) **Helipads and heliports landing system**

(57) The "Helipads and heliports landing system" is a device for the construction and development of helipads and heliports.

The system consists of a set of aluminum profiles, with knurled surface, that gives the possibility to build turnkey fully functional helipad, including aeronautical lighting systems totally integrated into the system.

Its main features are:

Rapidity: It is possible to build a 20x20 msq helipad in two or three days.

Flexibility: It can be installed on any ground surface, after a briefly preparation of the substrate with a limit of 5% slope.

Duration: It is a profile that last. The spontaneous formation of an oxide layer protects the aluminum, making it particularly resistant to corrosion.

Low environment impact: the absence of typical activities of any other construction process and the use of a totally recyclable material such as aluminum, allows the reduction of environmental impacts.

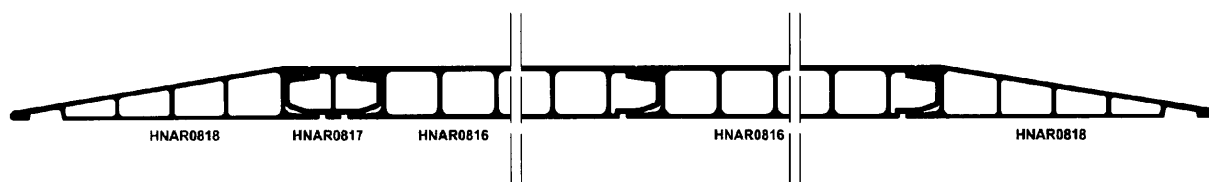


Fig. 8(a)

Scale 1:4

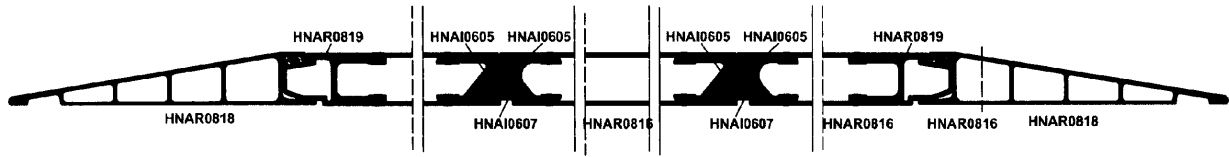


Fig. 8(b)

Scale 1:4

Description

TECHNICAL FIELD TO WHICH THE INVENTION RELATES

[0001] Mechanical, Aerospace, Construction.

PRIOR STATE OF THE TECHNIQUE

[0002] The priority of each country to organize themselves properly in order to meet the mobility and infrastructure needs, combined with the lack of the current infrastructure system in responding to the changing mobility needs, have made increasingly urgent the use of helicopters as a transportation system for medium and large distances.

[0003] The use of the helicopter, however, is severely limited by the lack of adequate infrastructure dedicated, such as heliports and helipad, whose implementation is slowed by the process of design, approval and implementation of such infrastructures.

GOAL ACHIEVED BY THE INNOVATION

[0004] The goals that the innovation will achieve can be summarized as follows:

Build turnkey fully functional H24 helipad, with the integration of aeronautical lighting systems, in very short time and at a reasonable cost.

Extreme flexibility in the location and installation of heliports.

Reduction of the civil construction site activity interaction, compared to the helipads / heliports standard constructions methods (use of reinforced concrete, etc.).

Reduction of the bureaucracy compared to the helipads / heliports standard constructions methods.

Reduction of the environmental impacts.

BRIEF DESCRIPTION OF THE DRAWINGS:

[0005] The "Helipads and heliports landing system" is a device for the construction and development of helipads and heliports.

[0006] The "Helipads and heliports landing system" consists of a set of aluminum profiles, with knurled surface, called Helinest 139, that gives the possibility in a few hours, with the aid of few skilled workers, to build turnkey fully functional helipad. (Fig. 8(a)), (Fig. 8(b)), (Fig. 9(a)).

HELINEST 139 - Ribbed profile

[0007] **HNAR0816 profile.** Is the main device and consist in a longitudinal hollow aluminum profile (Fig. 1(a)).

[0008] It is provided, on both side of the its length, with male (Fig. 1(c)) and female (Fig. 1(d)) cross section, that

enable the connection between themselves (Fig. 1(b)). Head connection it is made by means of HNAI00605 (Fig. 3(a)) and HNAI00606 (Fig. 3(b)) special profiles, placed inside the cavity of the longitudinal profile HNAR0816 through a comb-graft subsequently fixed with steel rivets (Fig. 3(d)).

[0009] **HNAI00605 cross male profile**(Fig. 3(a)). Used as said before, in couple with HNAI00606 (Fig. 3(b)), to connect, by their heads, the HNAR0816 profiles. HNAI00605 profile are placed inside the cavity of the longitudinal profile HNAR0816 through a comb-graft subsequently fixed with steel rivets (Fig. 3(d)).

[0010] **HNAI00606 cross female profile**(Fig. 3(b)). Used as said before, in couple with HNAI00605 (Fig. 3(a)), to connect, by their heads, the HNAR0816 profiles. HNAI00606 profile are placed inside the cavity of the longitudinal profile HNAR0816 through a comb-graft subsequently fixed with steel rivets (Fig. 3(d)).

[0011] **HNAI00607 flat profile** (Fig. 3(c)). This profile is placed into the slot created by the HNAI00605 and HNAI00606 connection (Fig. 3(d)).

[0012] This profile is used to strengthen this connection. HNAI00606 sectional view show two vertical rails that improve its function.

[0013] **HNAR0817 male-male profile** (Fig. 5(a)). It connects transversely with the female side of HNAR0816 (Fig. 5(b)) main profile in order to reproduce the male cross section of the from the female side of the same profile.

[0014] **HNAR0818 Ramp profile** (Fig. 2(a)). It connects with longitudinally HNAR0816 directly or through interposed HNAR0817 or HNAR0819 profiles (Fig. 2(c)). The ramp profile complete the landing surface providing a link with the helipad ground foundation.

[0015] **HNAR0819 special male profile adapter** (Fig. 4(a)). It reproduce the male cross section of the HNAR0816 main profiles from their heads and can be used to make a T- connection with a same profile (Fig. 4(b)).

[0016] **HNAR0816AVL profile** - Derived directly from HNAR0816, with the addition of grooves and holes for the aeronautical light electric system integration (Fig. 6(a)), (Fig. 6(b)), (Fig. 6(c)). **HNAR0816IR Profile**- Derived directly from HNAR0816 with the addition holes for the helipad heating system integration (Fig. 7(a)), (Fig. 7(b)), (Fig. 7(c)).

ANALYSIS OF RESULTS

[0017] The "Helipads and heliports landing system", being a modular aluminum landing system, gives the possibility in a few hours, with the aid of few skilled workers, to build turnkey fully functional helipad, including additional aeronautical lighting systems totally integrated into the system.

[0018] The "Helipads and heliports landing system" can be installed on any ground surface, after a briefly preparation of the substrate with a limit of 5% slope.

[0019] The "Helipads and heliports landing system" is a profile that last. The spontaneous formation of an oxide layer protects the aluminum, making it particularly resistant to corrosion.

[0020] The "Helipads and heliports landing system" is an extremely innovative product with no impact on the environment.

[0021] The "Helipads and heliports landing system" pay particular attention to the environment: in fact the absence of activities typical of any other construction process and the use of a totally recyclable material such as aluminum allows the reduction of environmental impacts.

[0022] The "Helipads and heliports landing system" can be used both in the sanitary field for the realization of HEMS helipad and for private and business executives fields or in civil protection emergency situations. At the industry level it could be used effectively to implement quickly an infrastructure network of helipads.

Claims

1. Main profile is called HNAR0816 and consist in a longitudinal hollow aluminum profile (*Fig. 1(a)*). HNAR0816 sectional view show a convex side with male profile (*Fig. 1(c)*) and a concave side with a female profile (*Fig. 1(d)*) that match each other (*Fig. 1(b)*). HNAR0816 profile have the extrados with knurling for perfect adherence even without the aid of a paint coating protection. HNAR0816 elements are transversely connected by the means of a special male-female profiles, that prevent profiles detachment (*Fig. 1(b)*).
2. According with claim No.1, the transversely connection of the HNAR0816 profile is made by the special joints HNAI00605 (*Fig. 3(a)*) and HNAI00606 (*Fig. 3(b)*), placed inside the cavity of the longitudinal profile HNAR0816 through a comb-graft subsequently fixed with steel rivets. (*Fig. 3(d)*).HNAI00605 and HNAI00606 profile prevent HNAR0816 profiles transversely detachment.
3. In accordance with claim No. 2, the HNAI00605 and HNAI00606 connection creates a slot for the insertion of the HNAI00607 flat profile (*Fig. 3(c)*), in order to strengthens the connection. HNAI00606 sectional view show two vertical rails that improve its function.
4. In accordance with each of the previous claims, HNAR0816 profile can be connected in a T-connection with a same profile, by the HNAR0819 (*Fig. 4(a)*) profile who reproduce the male element HNAR0816 cross-section. HNAR0819 profile are placed inside the cavity of the longitudinal profile HNAR0816 through a comb-graft subsequently fixed with steel rivets (*Fig. 4(b)*).

5. In accordance with each of the previous claims, the HNAR0816 profile can be connected with HNAR0817 special male - male profile (*Fig. 5(a)*), which reproduce the male element HNAR0816 cross-section from the female side of the same profile (*Fig. 5(b)*).
6. In accordance with each of the previous claims, the HNAR0818 ramp profile (*Fig. 2(a)*), which lies at the edge of "helipads and heliports landing system", complete the landing surface providing a link with the helipad ground foundation. HNAR0818 ramp profile has a cross sectional female profile (*Fig. 2(b)*) that can be connected with HNAR0816 male side (*Fig. 2(c)*), and through the HNAR0817 male - male profile even with its female side. HNAR0818 ramp profile can also be longitudinally connected (T-connection) with the head of HNAR081 profile by HNAR0819 special male profile that, as said above, reproduce the male element HNAR0816 cross-section.
7. In accordance with each of the previous claims, the helipads and heliports landing system is completed with the HNAR0816AVL profile, which provides housing and integration of the aeronautical lights, allowing the construction of H24 helipad. HNAR0816AVL is derived directly from HNAR0816, with the addition of grooves and holes for the aeronautical light electric system integration (*Fig.6(a)*), (*Fig.6(b)*), (*Fig.6(c)*).
8. In accordance with each of the previous claims, the HNAR0816IR profile provides housing and integration of the helipad heating system. HNAR0816IR is derived directly from HNAR0816 with the addition holes for the helipad heating system integration (*Fig. 7(a)*), (*Fig. 7(b)*), (*Fig. 7(c)*), (*Fig. 7(d)*).

Amended claims in accordance with Rule 137(2) EPC.

1. Helipads and heliport landing system consists of a set of aluminum profiles, with knurled surface, called Helinest 139, that gives the possibility in a few hours, with the aid of 4 skilled workers, to build turn-key fully functional helipad (*Fig. 1*), (*Fig. 2*), (*Fig. 3*). The system consists of main profiles, ramp profiles and special junction profiles.
 - 1.a) The system consists of a set of aluminum profiles which, through a male - female joint system and with the aid of special joining pieces, ensures the connection on longitudinal and transversal directions between the same profiles.

By means of a special adapter male profile, it is possible to connect the aluminum profiles also orthogonally (or at a given angle) to each other by providing a T-junction, resulting in extreme flexibility of assembly and of the forms obtainable. Fig. 1), Fig. 2), Fig. 3)

2.a) The special HNAR0819 male joint (Fig. 4), reproducing the male profile of the main element of the pavement, allows:

- connecting to T profiles for different angles, providing flexibility in the forms.
- to complete the entire infrastructure with ramp profiles.

3.a) The special HNAR0817 male - male profile (Fig. 5) allows the reproduction, on the female side profile, of the male side of the same profile. In this way, this profile allows the completion of all the infrastructure with the ramp profile.

HNAR0816

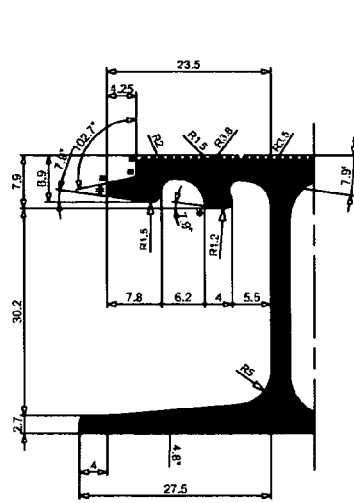


Fig. 1(d)

* = r 0.5 mm
= r 1 mm

Scale 1:1

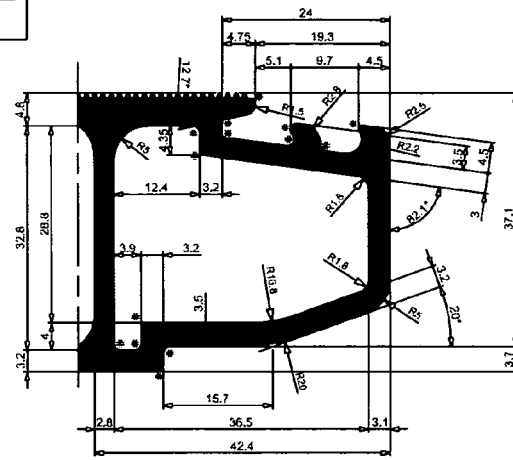


Fig. 1(c)

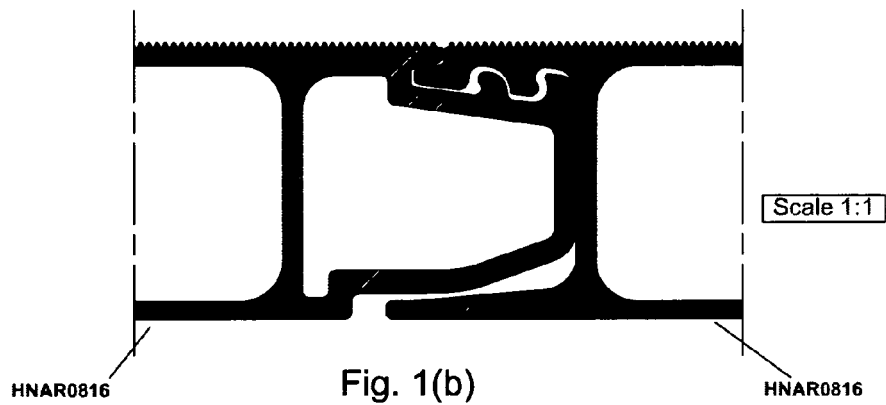


Fig. 1(b)

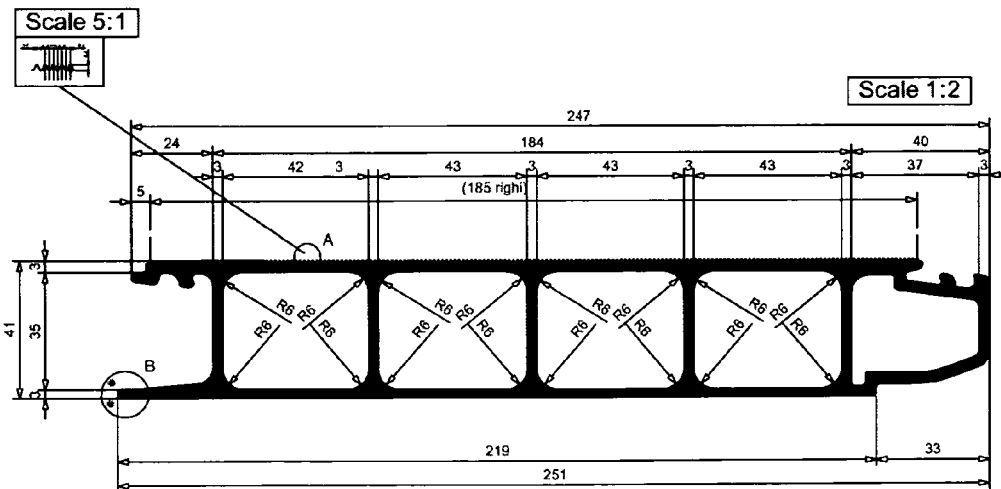
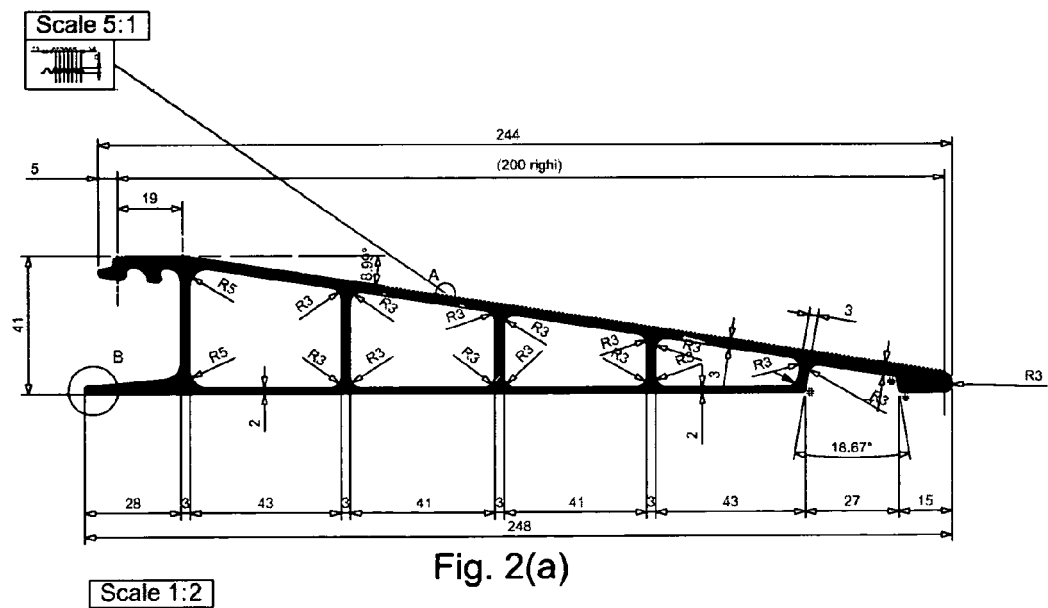
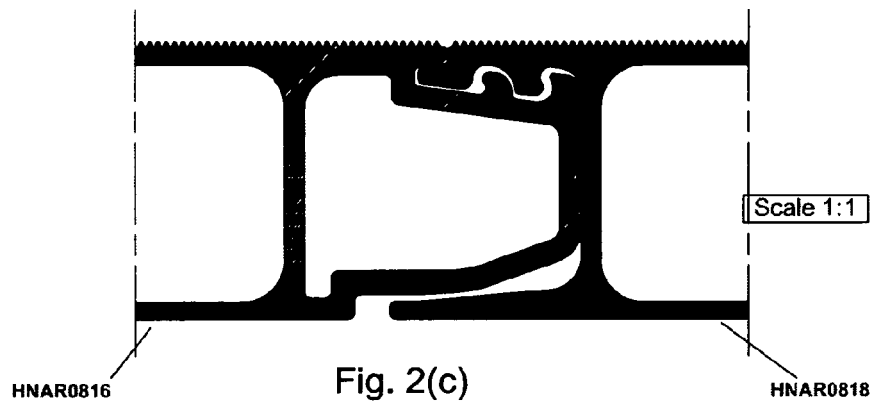
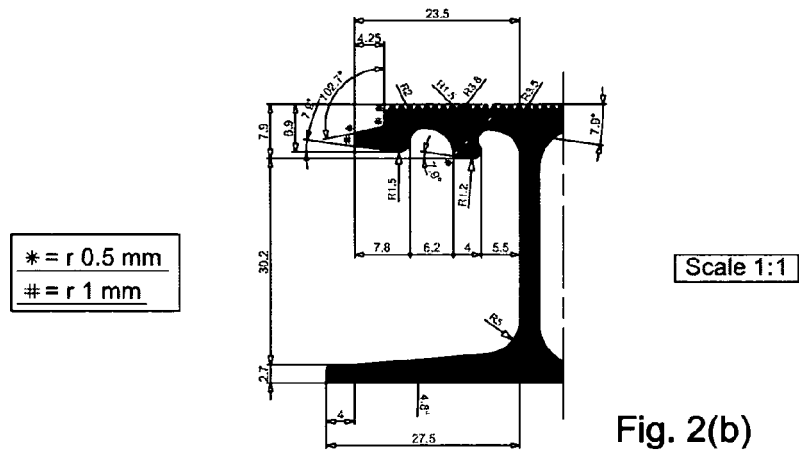
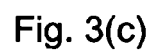
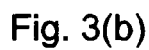


Fig. 1(a)





Scale 1:1

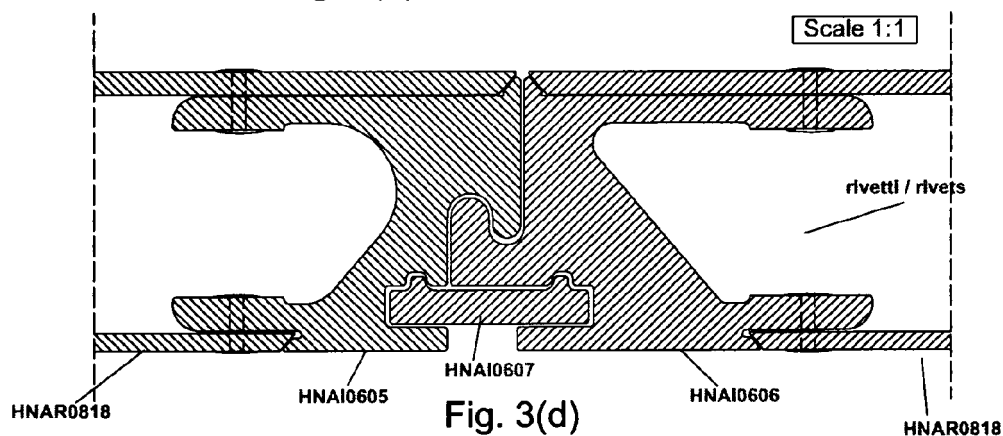
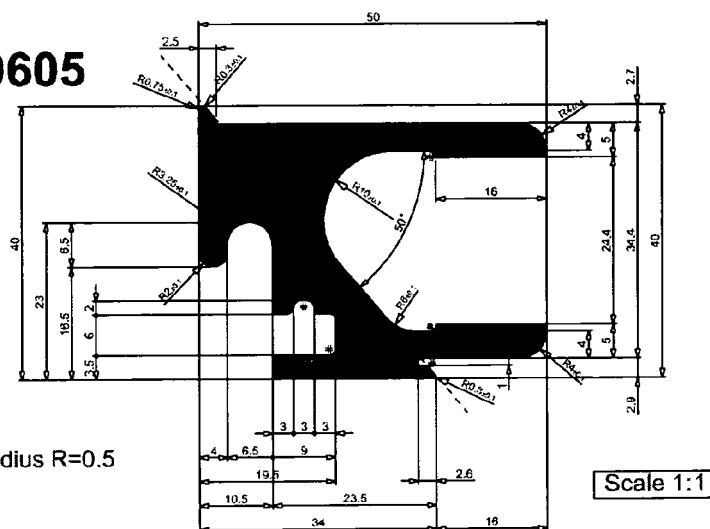


Fig. 3(d)

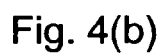
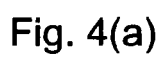


Non quoted radius $R=0.5$

= r 1 mm

Scale 1:1

Fig. 3(a)



= r 1 mm

HNAR0817

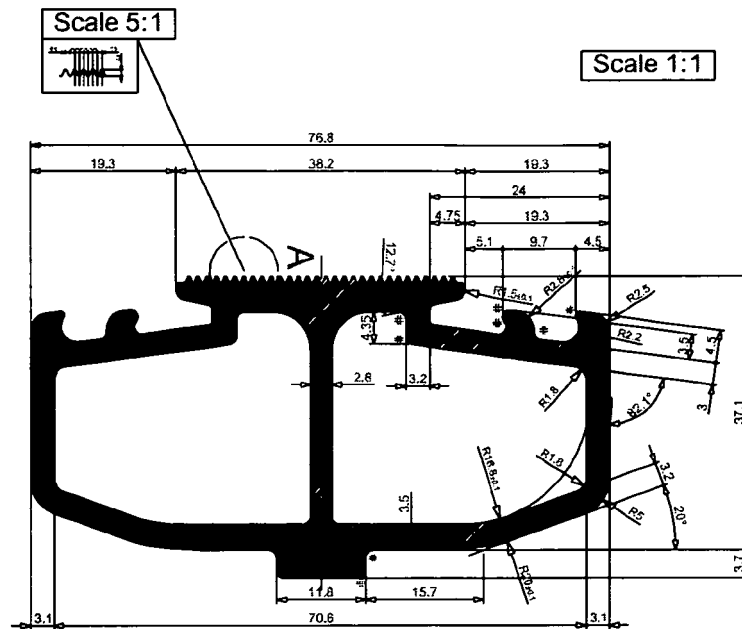


Fig. 5(a)

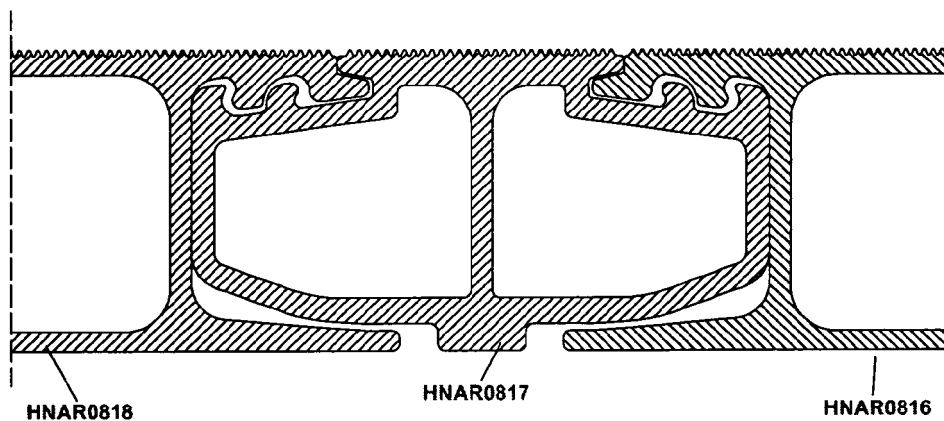


Fig. 5(b)

Scale 1:1

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= r 1 mm

HNAR0816_AVL

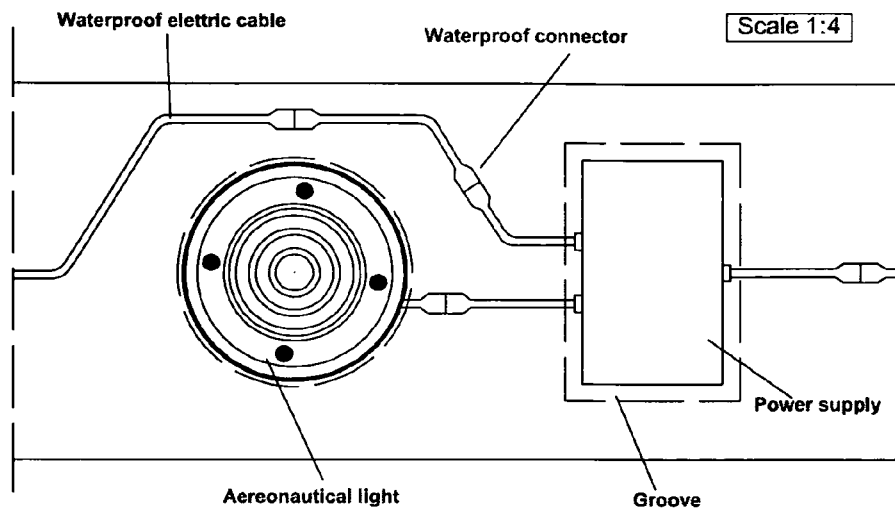


Fig. 6(c)

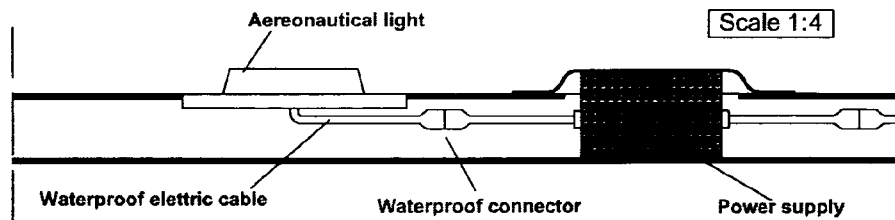


Fig. 6(b)

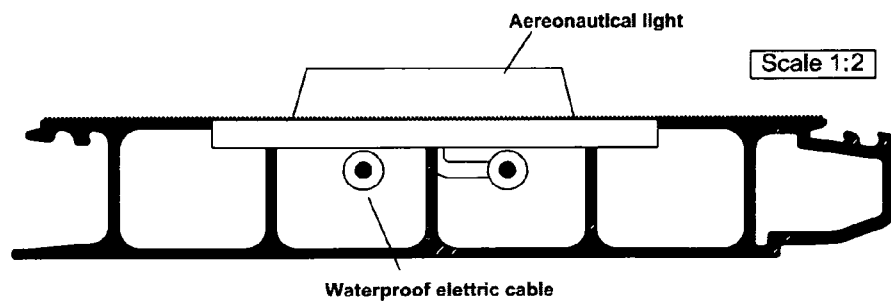
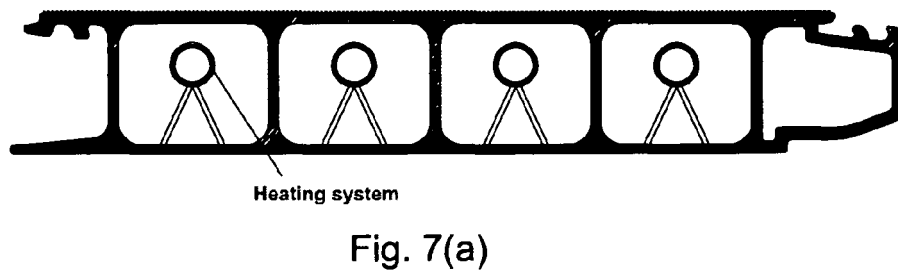
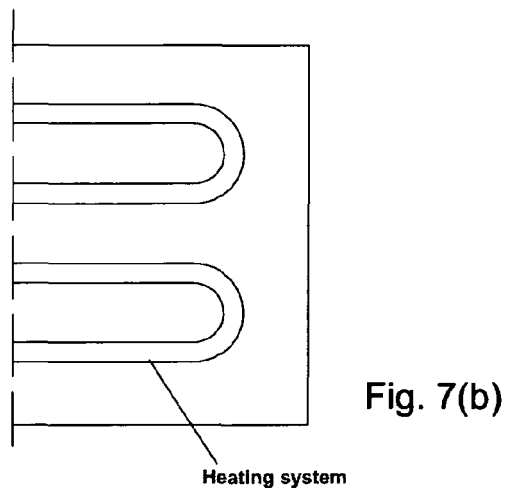
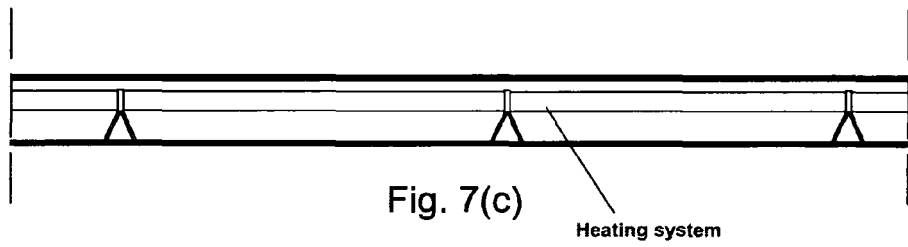
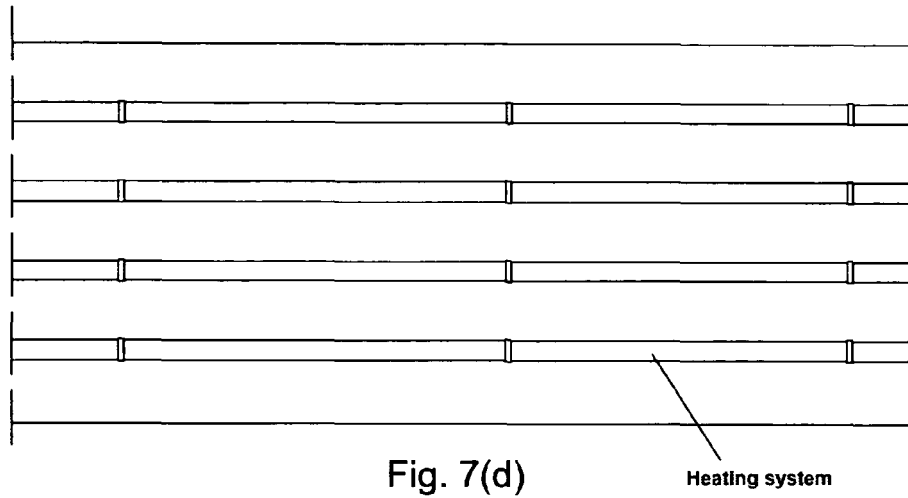


Fig. 6(a)

HNAR0816_IR



Connection scheme

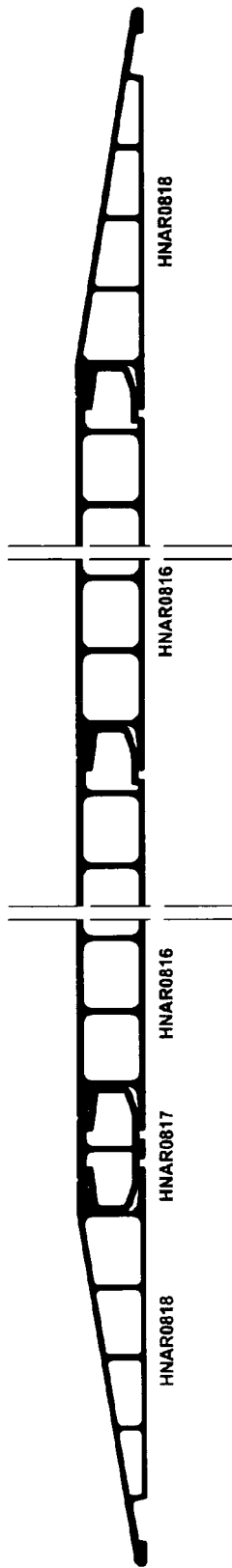


Fig. 8(a)

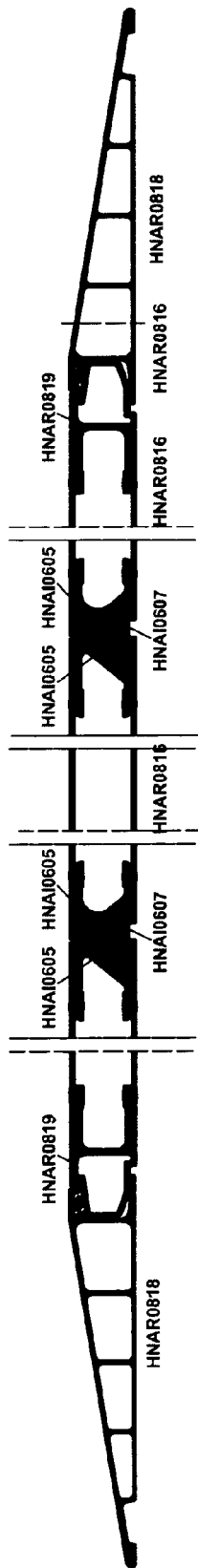


Fig. 8(b)



EUROPEAN SEARCH REPORT

Application Number
EP 11 42 5154

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
X	WO 2005/059254 A1 (SAVOLDI ALVARO [IT]) 30 June 2005 (2005-06-30)	1-6	INV. E01C9/00 E01F3/00
Y	* paragraphs [0009], [0025] - [0066]; figures *	7,8	
Y	----- EP 1 408 156 A1 (MIZAR AB OY [FI]) 14 April 2004 (2004-04-14) * paragraphs [0005], [0007] *	7,8	
X	----- DE 19 33 777 A1 (HARVEY ALUMINUM INC) 14 January 1971 (1971-01-14) * figures 1,2 *	1	
A	----- US 3 172 508 A (JOHN DOERING ET AL) 9 March 1965 (1965-03-09) * column 3, line 28 - column 4, line 53; figures *	4	
The present search report has been drawn up for all claims			TECHNICAL FIELDS SEARCHED (IPC)
			E01C E01F
Place of search The Hague		Date of completion of the search 1 December 2011	Examiner Gallego, Adoración
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EPO FORM 1503 03.82 (P04C01)

**ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.**

EP 11 42 5154

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report.
The members are as contained in the European Patent Office EDP file on
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01-12-2011

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For more details about this annex : see Official Journal of the European Patent Office, No. 12/82