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(54) Helipads and heliports landing system

Hubschrauberlandeplätze und Heliports- Landesystem

Système d'atterrissage pour hélisurfaces et héliports

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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.

[0004] Despite could be found patents for floor modular system similar to the proposed in this document, in particular including:

International Publication Number WO 2005/059254 A describes a helipads and heliports landing system with the features of the preamble of claim 1. This document discloses a main profile consisting in a longitudinal hollow aluminum profile, wherein the cross section shows a convex side with male profile and a concave side with a female profile that match each other;

helipads and heliport landing system consists of a set of aluminium profiles, with knurled surface, known from D1, that gives the possibility in a few hours, with the aid of 4 skilled workers, to build fully functional helipad, through special joining systems of this invention.

GOAL ACHIEVED BY THE INNOVATION

[0005] 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.

[0006] These goals are achieved with a helipads and heliports landing system with the features of claim 1.

BRIEF DESCRIPTION OF THE DRAWINGS:

[0007] The "Helipads and heliports landing system" is a device for the construction and development of helipads and heliports.

[0008] 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

[0009] **HNAR0816 profile.** Is the main device and consist in a longitudinal hollow aluminum profile, (Fig. 1(a)).

[0010] It is provided, on both side of its length, with male (Fig. 1(c)) and female (Fig. 1(d)) cross section, that enable the connection between themselves (Fig. 1(b)). Heat connection it is made by means of HNA100605 (Fig. 3(a)) and HNA100606 (Fig. 3(b)) special profiles, placed inside the cavity of the longitudinal profile HNAR.0816 through a comb-graft subsequently fixed with steel rivets (Fig. 3(d)).

[0011] **HNA100605 cross male profile**(Fig. 3(a)). Used as said before, in couple with HNA100606 (Fig. 3(b)), to connect, by their heads, the HNAR0816 profiles. HNA100605 profile are placed inside the cavity of the longitudinal profile HNAR0816 through a comb-graft subsequently fixed with steel rivets (Fig. 3(d)).

[0012] **HNA100606 cross female profile**(Fig. 3(b)). Used as said before, in couple with HNA100605 (Fig. 3(a)), to connect, by their heads, the HNAR0816 profiles. HNA100606 profile are placed inside the cavity of the longitudinal profiles HNAR0816 through a comb-graft subsequently fixed with steel rivets (Fig. 3(d)).

[0013] **HNA100607 flat profile** (Fig. 3(c)). This profile is placed into the slot created by the HNA100605 and HNA100606 connection (Fig. 3(d)).

[0014] This profile is used to strengthen this connection. HNA100606 sectional view show two vertical rails that improve its function.

[0015] **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.

[0016] **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.

[0017] **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)).

[0018] 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)).

[0019] HNAR0816IR Profile- Derived directly from HNAR.0816 with the addition holes for the helipad heating system integration (Fig. 7(a)), (Fig. 7(b)), (Fig. 7(c)).

ANALYSIS OF RESULTS

[0020] 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.

[0021] 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.

[0022] 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.

[0023] The "Helipads and heliports landing system" is an extremely innovative product with no impact on the environment.

[0024] The "Helipads and heliports landing system" pay particular attention to the environment: in fact the absence or activities typical of any other construction process and the use of a totally recyclable material such as aluminum allows the reduction of environmental impacts.

[0025] 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. Helipads and heliports landing system comprising longitudinal hollow main aluminum profiles (HNAR0816) with extrados knurled surface for perfect adherence even without the aid of a paint coating protection, which main profiles show in cross section a convex side with male profile and a concave side with female profile that match each other for connection along the longitudinal edge of the profiles, wherein said main profiles are transversely connected by special joints (HNAI00605, HNAI00606), placed inside their longitudinal cavities at the end of the profiles through a comb-graft subsequently fixed with steel rivets, **characterised in that** the system also comprises special male profile adapters

(HNAR0819) that are inserted in the longitudinal cavities at the end of the main profiles, having a head which reproduces the male cross-section of the main profiles, in such a way that said special male profile adapters (HNAR0819) can be used for T-connections of said main profiles.

2. Helipads and heliports landing system according to claim no.1 the system comprising a set of the aluminum main profiles (HNAR0816) which, through a male-female joint system and with the aid of the special joints (HNAI00605, HNAI00606) ensures the connection on longitudinal and trasversal directions between the same profiles, wherein by means of the special male profile adapter (HNAR0819) it is possible to connect each other 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.
3. Helipads and heliports landing system according to claim n.2 wherein the special male profile adapters (HNAR0819), reproducing the male profile of the main element of the pavement, allow:
 - connecting to T profiles for different angles, providing flexibility in the forms
 - to complete the system with ramp profiles (HNAR0818).
4. Helipads and heliports landing system according to any of the previous claims the system also comprising a special male - male profile (HNAR0817) which allows the reproduction, on the female side profile, of the male side of the same profile.

Patentansprüche

1. Das Landesystem für Hubschrauberlandeplätze und Heliports besteht aus länglichen hohlen Haupt-Aluminiumprofilen(HNAR0816) mit gewölbter und gerändelter Oberfläche für perfekte haftung auch ohne Zuhilfenahme einer Lackschutz-Beschichtung.
Der Querschnitt der Profile zeigt eine konvexe Seite mit Außenprofil, und eine konkave Seite mit Innenprofil, die gegenseitig für eine Längsverbindung zueinander passen. Hierbei sind die besagten Hauptprofile quer durch spezielle Gelenke (HNAI00605, HNAI00606) verbunden, die innen in ihren Längshohlräumen angebracht sind und zwar durch einen anschließend mit Stahlnieten befestigten Kamm-Pfropfen. Zum System gehören auch spezielle Außenprofil-Adapter-Verbindungen (HNAR0819), die in die Hohlräume der Hauptprofile eingesetzt sind. Ihre Köpfe geben den männlichen Querschnitt der Hauptprofile wieder und zwar so, dass die besagten Außenprofil-Adapter

(HNAR0819) für T-Verbindungen der Hauptprofile verwendet werden können.

2. Gemäß Anspruch Nr. 1 besteht das System aus einer Reihe von Aluminium-Profilen, die durch ein Männlich-Weiblich-Verbindungssystem und mit Hilfe spezieller Verbindungsstücke die Verbindung in Längs- und Querrichtung zwischen den gleichen Profilen gewährleistet. Mittels eines speziellen Adapter-Außenprofils ist es möglich, jedes der Aluminiumprofile auch orthogonal oder in einem bestimmten Winkel aneinander anzuschließen, wenn eine T-Verbindung angebracht wird. Dadurch erhält man eine außerordentliche Flexibilität der Montage und der und der erzielbaren Formen.

3. Das Landungs-System für Hubschrauberlandeplätze und Heliports gemäß Anspruch Nr. 2, bei dem die speziellen Außenprofil-Adapter (HNAR0819) das Außenprofil des Hauptelement des Untergrunds wiedergeben, ermöglicht folgendes:

- Anschluss an T-Profile für unterschiedliche Winkel, wodurch eine Flexibilität in den Form erzielt wird
- Vervollständigung des Systems mit Rampenprofilen (HNAR0818)

4. Zum Landungs-System für Hubschrauberlandeplätze und Heliports gemäß den vorgenannten Ansprüchen gehört außerdem ein spezielles Männlich - Männlich-Profil (HNAR0817), das auf dem weiblichen Seitenprofil die Reproduktion der männlichen Seite desselben Profils ermöglicht.

sent être utilisés pour les raccordements en T desdits profilés principaux.

2. Selon la revendication n°1, le système se compose d'un ensemble de profils en aluminium qui, au moyen d'un système de joint mâle-femelle et à l'aide de pièces de jonction spéciales, assurent le raccordement selon les orientations longitudinales et transversales entre les mêmes profilés.

Au moyen d'un profilé mâle d'adaptateur spécial, il est possible de raccorder également chacun des profilés en aluminium perpendiculairement, ou selon un angle donné, les uns aux autres en fournissant une jonction en T, ce qui conduit à une flexibilité extrême du montage et des formes pouvant être obtenues.

3. Un système d'atterrissage pour hélistations et héliports selon la revendication n° 2, dans lequel les adaptateurs de profilés mâles spéciaux (HNAR0819), reproduisant le profilé mâle de l'élément principal du pavement, qui permet :

- le raccordement à des profils en T selon des angles différents, fournissant une flexibilité des formes
- de compléter le système avec des profilés de rampe (HNAR0818)

4. Un système d'atterrissage pour héliports et hélistations selon l'une quelconque des revendications précédentes du système comprenant également un profilé spécial mâle-mâle, (HNAR0817) qui permet la reproduction, sur le profil du côté femelle, du côté mâle du même profile.

Revendications

1. Système d'atterrissage pour hélistations et héliports consistant en profilés principaux creux longitudinaux en aluminium (HNAR0816) qui comportent des surfaces d'extrados moletées pour une adhérence parfaite, même sans l'aide d'une couche de peinture de protection, dont la coupe transversale montre un côté convexe avec un profil mâle et un côté concave avec un profil femelle qui s'ajustent l'un à l'autre pour permettre un raccordement longitudinal. Dans lequel, lesdits profils principaux sont raccordés transversalement par des joints spéciaux (HNAI00605, HNAI00606), placés à l'intérieur de leurs cavités longitudinales à travers un greffage en peigne puis fixés avec des rivets en acier. Le système comprend également un joint pour adaptateurs de profilés mâles spéciaux (HNAR0819) qui est inséré dans les cavités des profils principaux, et qui comporte une tête qui reproduit la section transversale mâle des profilés principaux, de manière à ce que lesdits adaptateurs de profilés mâles spéciaux (HNAR0819) puissent

HNAR0816

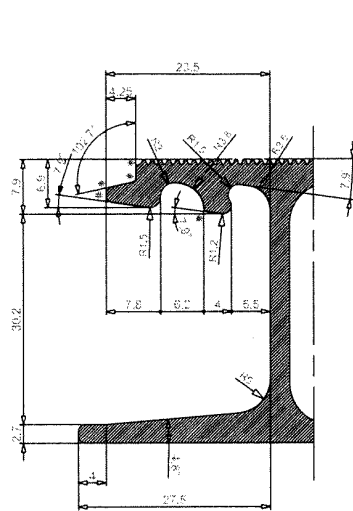


Fig. 1(d)

* = r 0.5 mm
= r 1 mm

Scale 1:1

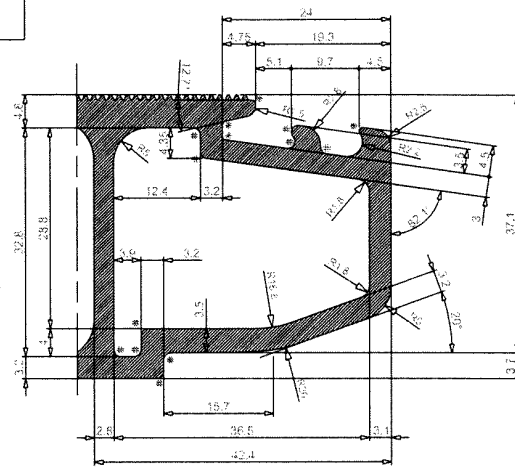


Fig. 1(c)

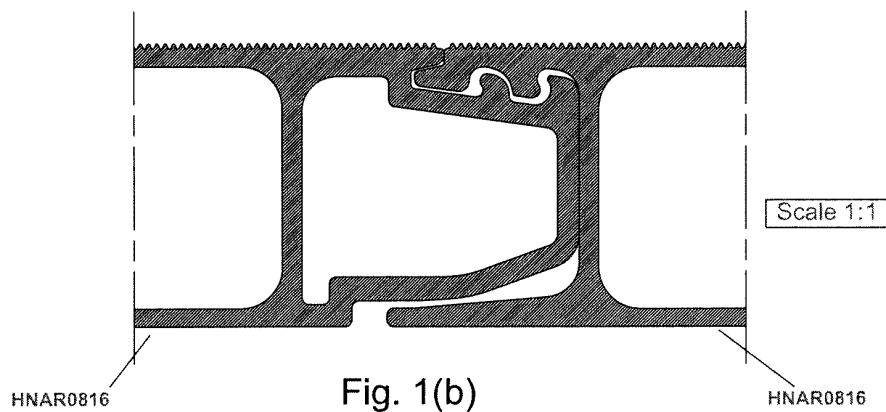


Fig. 1(b)

HNAR0816

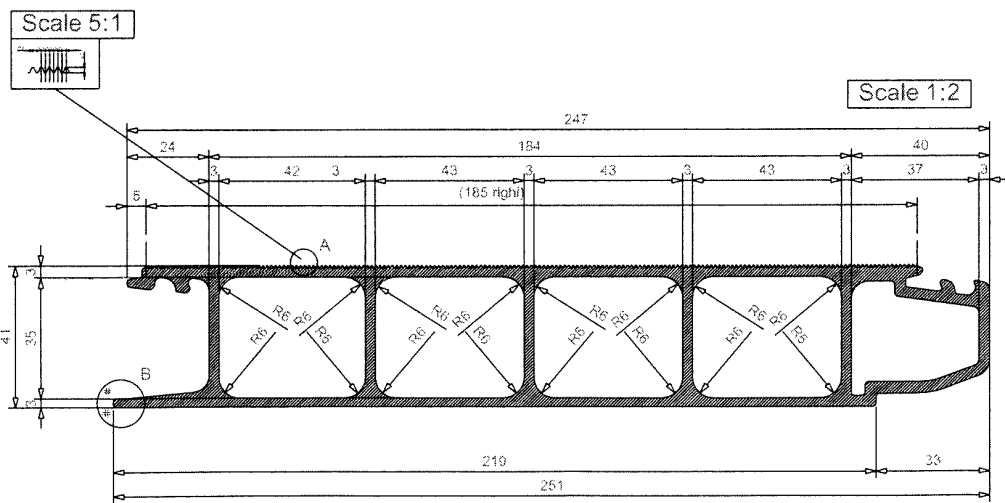


Fig. 1(a)

HNAR0818

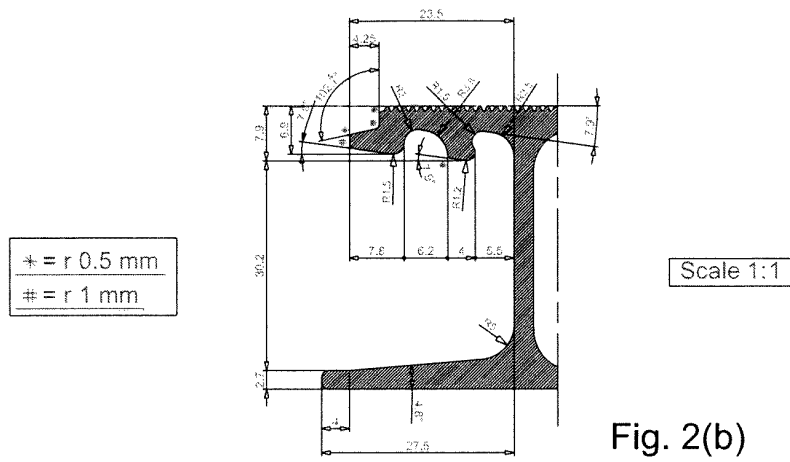


Fig. 2(b)

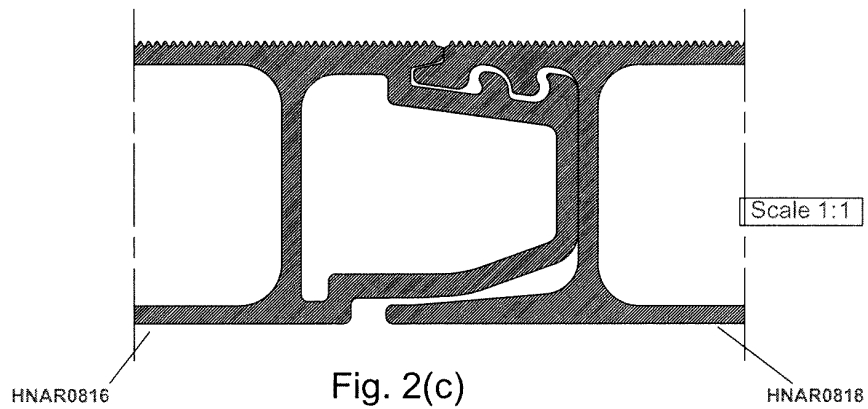


Fig. 2(c)

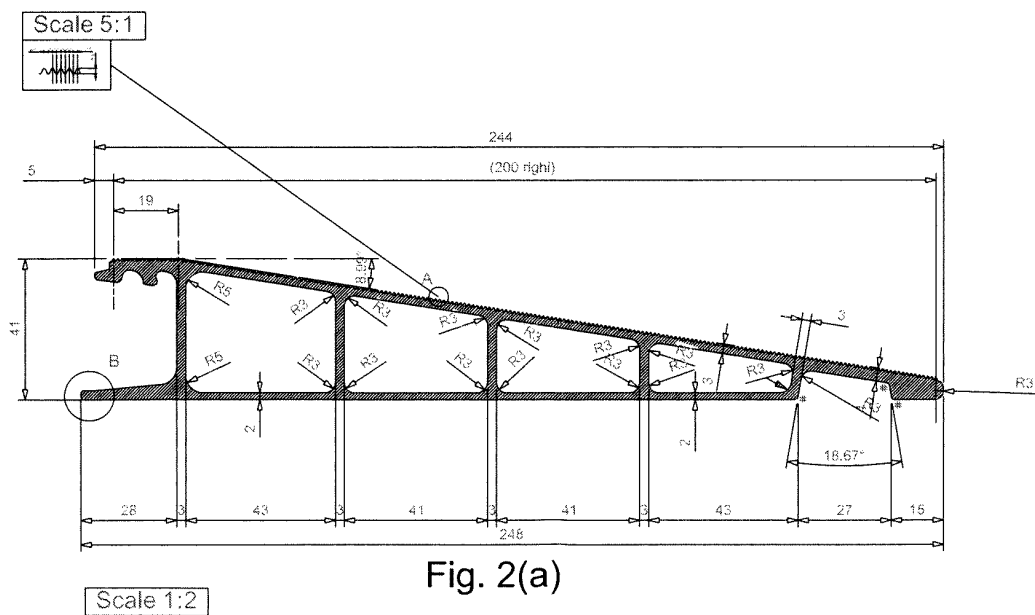


Fig. 2(a)

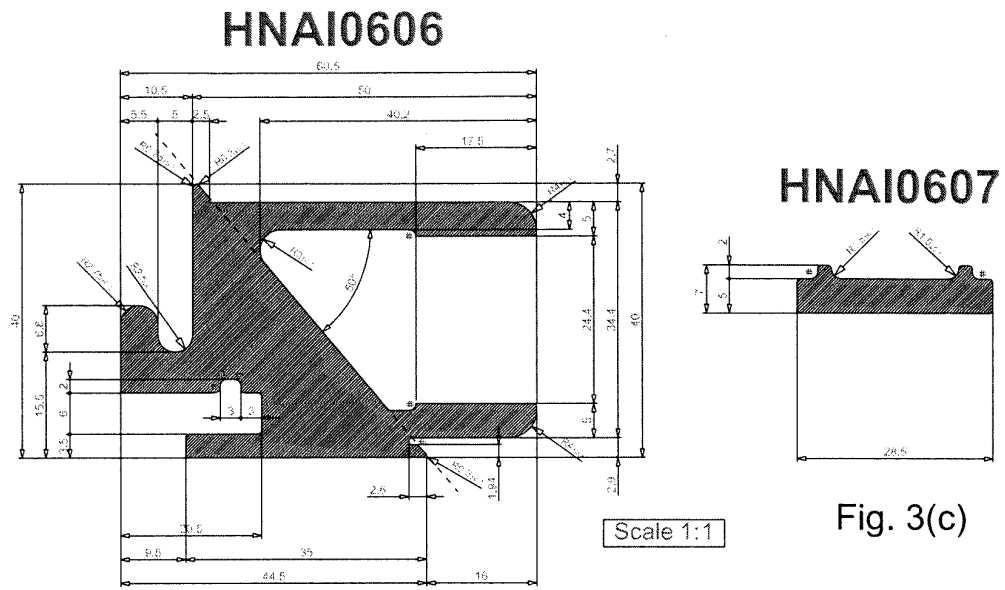


Fig. 3(b)

Fig. 3(c)

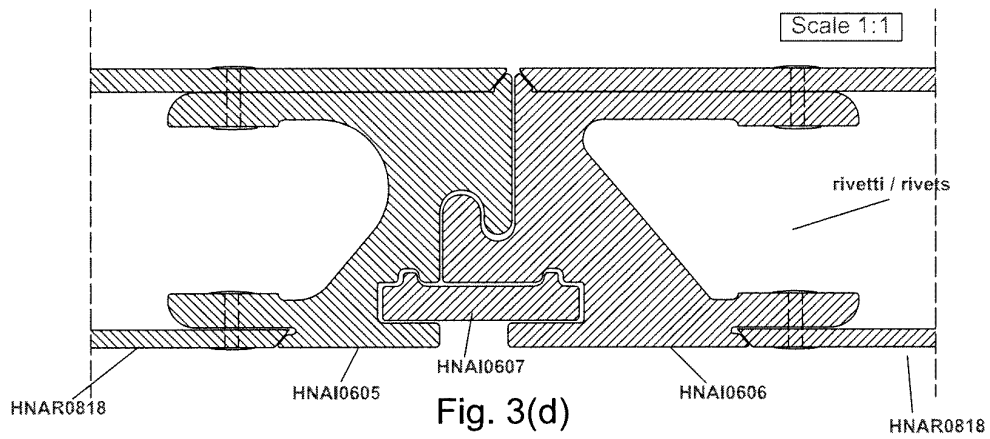


Fig. 3(d)

HNAI0605

Non quoted radius R=0.5

= r 1 mm

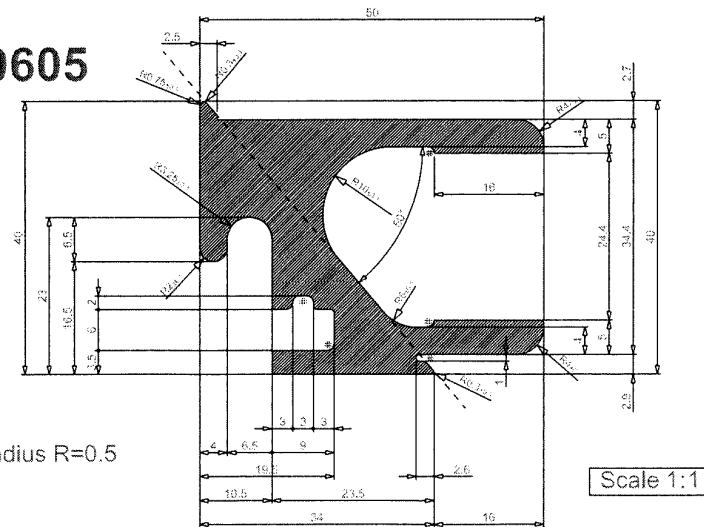


Fig. 3(a)

HNR0819

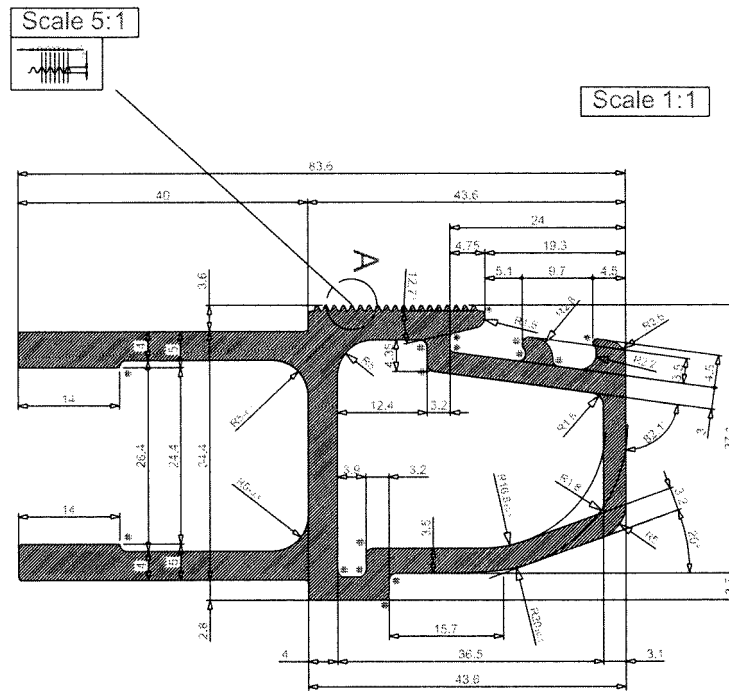


Fig. 4(a)

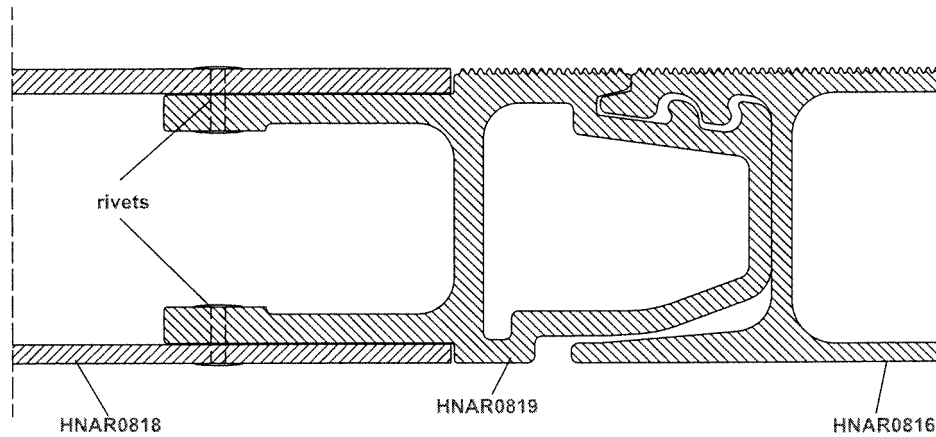
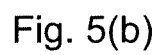
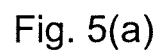


Fig. 4(b)

Scale 1:1

* = r 0.5 mm

A schematic diagram of the experimental setup. A subject is shown sitting at a table, viewing a screen. The screen displays a target (a small circle) and a starting point (a larger circle). The distance between the starting point and the target is labeled 'r = 1 mm'.



 r 0.5 mm
 r 1 mm

HNAR0816_AVL

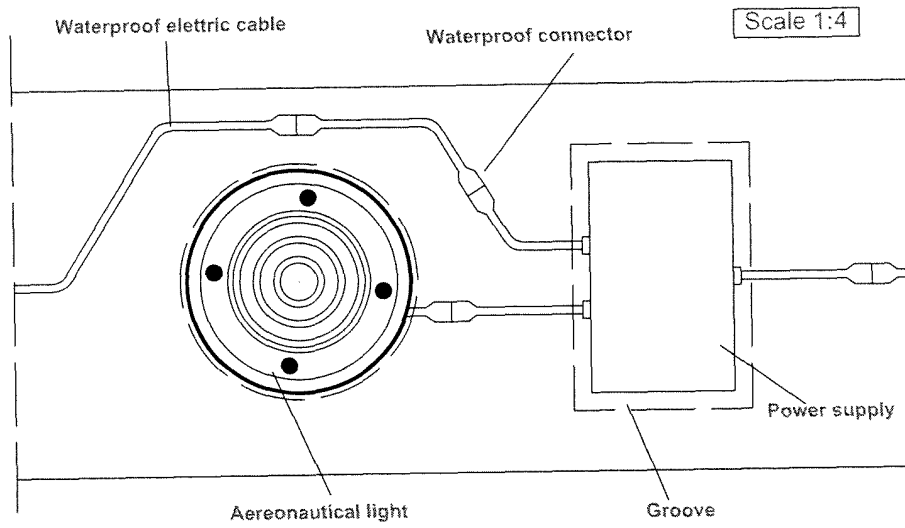


Fig. 6(c)

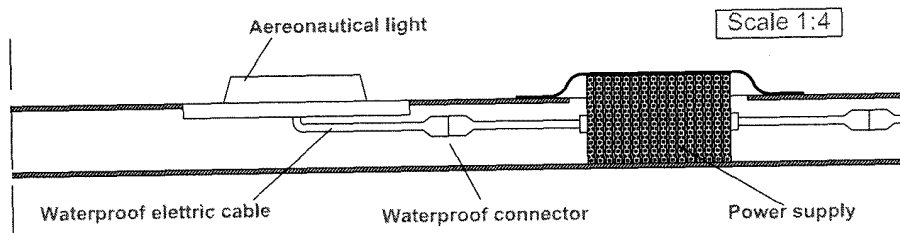


Fig. 6(b)

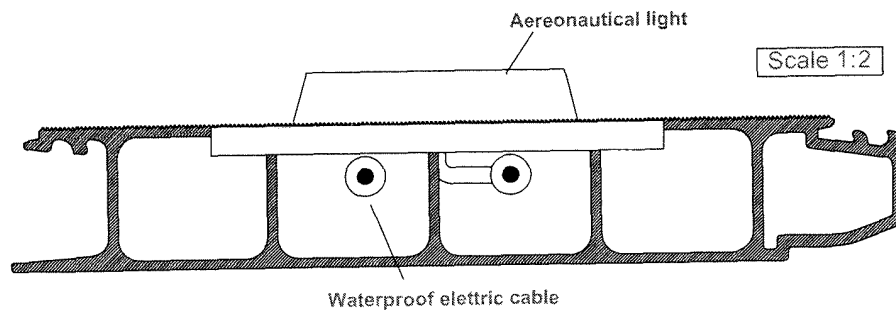
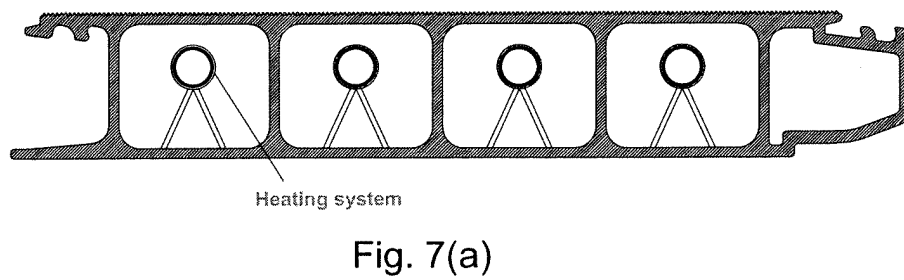
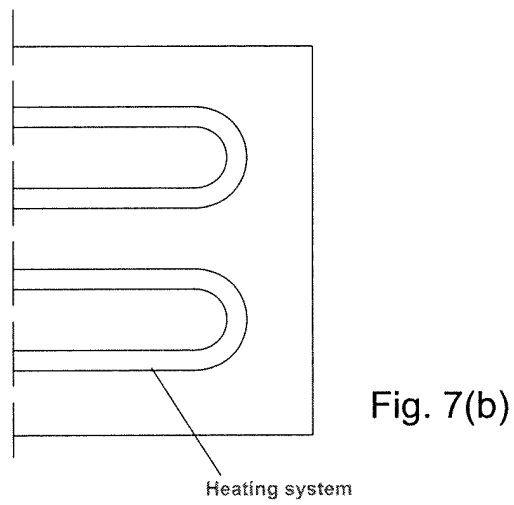
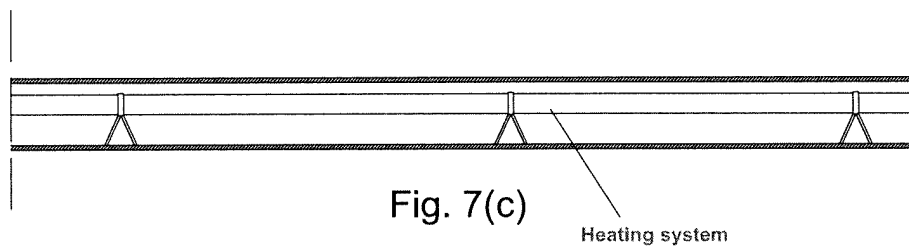
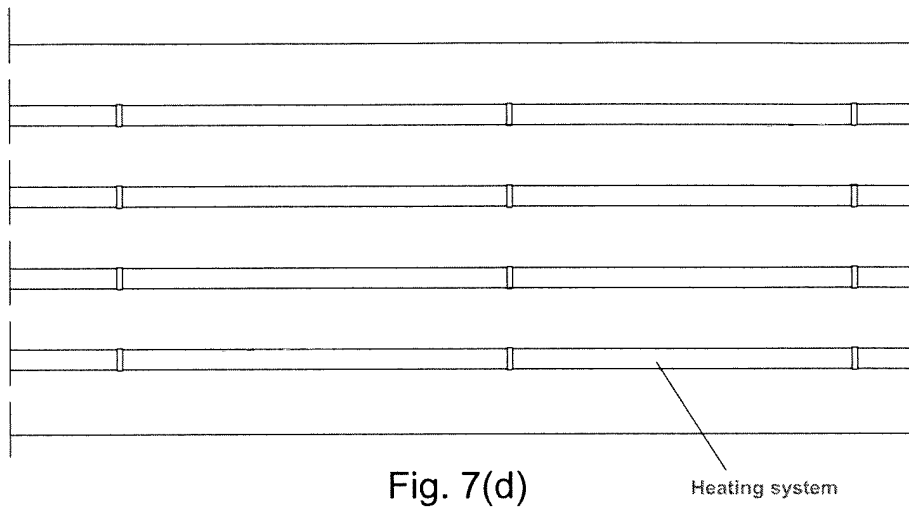


Fig. 6(a)

HNAR0816_IR



Connection scheme

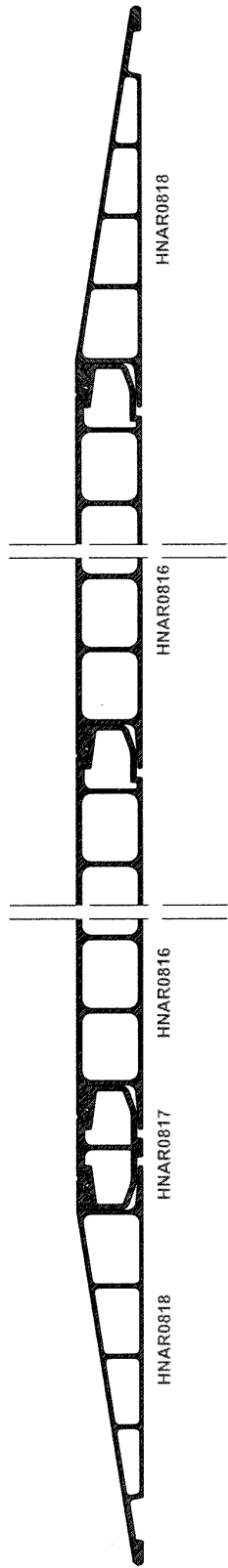


Fig. 8(a)

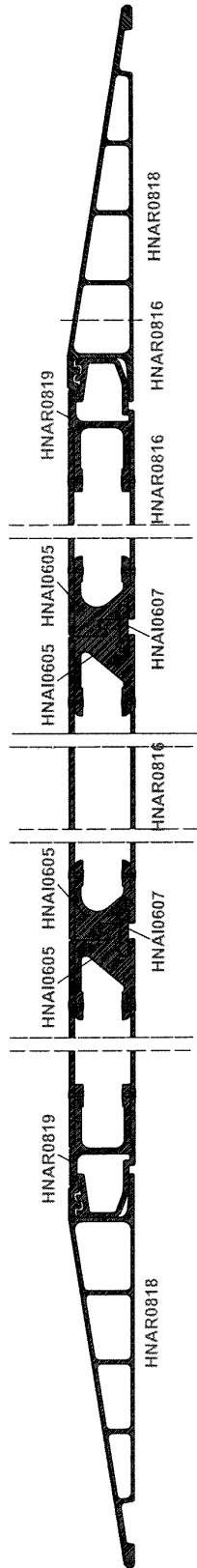


Fig. 8(b)

REFERENCES CITED IN THE DESCRIPTION

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