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

(11) **EP 4 403 729 A1**

(12) **EUROPEAN PATENT APPLICATION**
published in accordance with Art. 153(4) EPC

(43) Date of publication:
24.07.2024 Bulletin 2024/30

(21) Application number: **22869470.9**

(22) Date of filing: **11.08.2022**

(51) International Patent Classification (IPC):
E04H 15/38 *(2006.01)* ***E04H 6/44*** *(2006.01)*

(86) International application number:
PCT/ES2022/070533

(87) International publication number:
WO 2023/041820 (23.03.2023 Gazette 2023/12)

(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:
KH MA MD TN

(30) Priority: **16.09.2021 ES 202130862**

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(54) **SYSTEM FOR FOLDING AND UNFOLDING HANGARS**

(57) The invention relates to a system for folding and unfolding hangars (1), said system comprising: flat and concentric arched structures (2); at least one canvas element (3) connected to the arched structures (2); and two hinged, articulated joints (5), each connected to an end part of each arched structure (2). The articulated joints (5) are connected to rotational means (6) which are configured to rotate the arched structures (2), positioning the hangar (1) in either a closed position, in which the arched structures (2) are unfolded and inclined and the canvas element (3) is extended and tightened, or an open position, in which the arched structures (2) are folded and the canvas element (3) is folded and loosened.

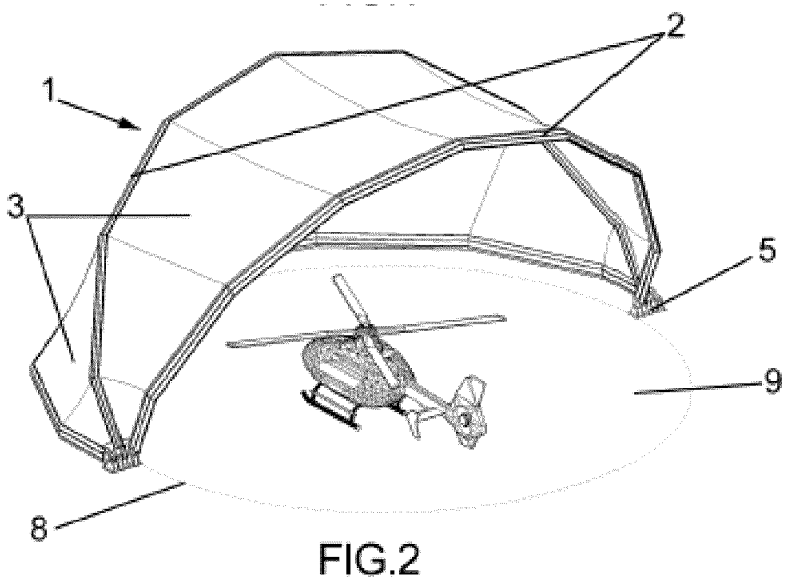

FIG.2

EP 4 403 729 A1

Description

OBJECT OF THE INVENTION AND TECHNICAL FIELD

[0001] The present invention relates to a system for folding and unfolding hangars, especially suitable for parking and storing vehicles of all types, especially aerial vehicles, said hangar being configured to fold and unfold, automatically and/or manually, in either a position closed, in which there is generated an inner space covered by one or more canvas elements, or membranes, and arched structures, or an open position, wherein the hangar can be completely stowed and concealed, leaving the vehicle exposed to the outside.

[0002] The present invention belongs to the technical field of construction, and more specifically to building constructions especially suitable for the storage of vehicles of all types, as well as the storage of other elements, by means of retractable articulated structures.

BACKGROUND OF THE INVENTION

[0003] Hangars are buildings specially used to store vehicles capable of navigating through the air, such as airplanes, helicopters or drones, under cover, for the purpose of protecting them from inclement weather, as well as carrying out in said vehicles, under suitable working conditions, the maintenance checks necessary for their use, these checks being very common in these means of transport.

[0004] The main difference with industrial warehouses is that there are no intermediate pillars inside the building and the door opens to almost the entire available width to allow the aircraft, as well as the necessary machinery to perform maintenance, to enter and circulate therein.

[0005] The design parameter that is usually taken to determine the dimensions of the hangar is usually the span of the vehicles to be stored, such as the distance between the tips of the wings in the case of airplanes, or the diameter of the rotor, in the case of helicopters.

[0006] Hangar doors are also usually based on the same design parameters, since they must allow the introduction and extraction of the vehicle inside the hangar without the need to assemble and disassemble any of its parts.

[0007] Given the large size of these doors, and the difficulty that their movement can entail to open and close the space covered by the hangar, these doors are usually sliding and comprise several leaves that allow them to be rolled up or stored when they are stowed. There is also a type of door, based on folding canvases, which have the advantage of not needing any lateral structure for folding as conventional ones do, these configurations being designed to save space.

[0008] The most common hangars on the market are metal steel constructions, based on a full web portal frame metal structure, with vertical walls and a roof made of sheet metal, which is sometimes bent and with an internal thermal and acoustic insulating filling.

[0009] Larger hangars, intended for storing large airplanes, or those used by companies with a large number of airplanes to protect, can be constructed according to different techniques, highlighting the use of two-dimensional trusses or spatial mesh.

[0010] One of the main problems that these hangars have is the need for a large space that their construction requires, close to the spaces enabled for the take-off and landing of aircraft, as well as a laborious construction process, since, as has been indicated, lacks pillars or columns at intermediate points, requiring load distribution and a very large and precise foundation support.

[0011] In addition to fixed constructions, there are also removable hangars on the market, which can be erected and disassembled, depending on the needs, in short periods of time, and can be reassembled in different locations. These hangars are usually constructed with an aluminium structure with design profiles made by extrusion and using composite panels finished with steel sheet and assembled as tongue and groove joints, as enclosures.

[0012] Other alternatives to traditional hangars, with fixed and stable constructions, are inflatable canvas hangars, which offer less protection against the elements outside, but are available at much lower prices.

[0013] Both removable hangars and those made up of inflatable canvas require a long assembly and disassembly period. Their main use is to deal with temporary situations, such as relocations, seasonal occupations or field bases. Furthermore, these alternatives are not designed to be assembled and disassembled between operations, but rather to be able to be assembled for a given time and then relocated elsewhere when they are no longer needed.

[0014] One of the constructions of this type that allows greater use of space are those known as retractable hangars. These hangars can fold part of their structure to take up less space, but with the exception that the problem of height is not solved, since a part of it always protrudes above ground level, with the problems that this entails when the vehicle to be stored is moved.

[0015] The operation of these hangars is usually based on a telescopic configuration of their walls and roof, so that when these parts are retracted or stowed, they can occupy less space but always keeping a part of the building (the largest) on the outside.

DESCRIPTION OF THE INVENTION

[0016] The present invention consists of a novel system for folding and unfolding folding and retractable hangars which covers a need that until now only had partial solutions. There are no hangars on the market which can be folded and unfolded quickly and automatically, sharing the same space with a landing surface, such as a heliport, thereby making it possible to install a hangar in places where there is not enough space for

both constructions. Therefore, if the hangar is not being used to store a vehicle or other element, its structure can be stowed and concealed.

[0017] The invention consists of a system for folding and unfolding hangars that comprises at least two flat and concentric arched structures, a canvas element connected to the two arched structures and two hinged, articulated joints, each connected to an end part of each arched structure.

[0018] These arched structures are, preferably, internally rigid, that is, they cannot be articulated or deformed internally, modifying their shape and/or size, but are articulated externally, in their connections with the hinged, articulated joints that they comprise in their two end parts of said structures. In this way, and preferably, the shape and size of these structures remain constant during their articulation, but not their orientation with respect to the joints or the base surface of the hangar.

[0019] Each of these arched structures comprises at least one extruded profile, that is, they are manufactured from one or more profiles, so that, when joined together, they comprise a substantially flat and arched shape.

[0020] The fact that the arched structure is flat means that said profile or profiles are included in virtually a single plane, and the fact that they are concentric means that the centre of each arch is the same, or substantially the same, for all the structures included in the hangar.

[0021] The canvas element can be any membrane or flexible element, made of any material suitable to act as a roof of a hangar, being sufficiently strong and resistant to outdoor weather conditions, maintaining the flexibility and lightness that allows its folding.

[0022] At least one articulated joint, which is connected to an end part of each arched structure of the hangar, is connected to rotational means, wherein said rotational means may comprise one or more motors, a system of pulleys, cables, etc.

[0023] The articulated joints and the rotational means are configured to rotate the arched structures, positioning, through said rotation, the hangar in either a closed position, in which the arched structures are unfolded and each of them inclined at a different angle with respect to a base surface of the hangar, and the canvas element is extended and tightened; or an open position, in which the arched structures are folded, stowed towards the same side with respect to the articulated joint, and the canvas element is folded.

[0024] In the closed position, a hangar is thereby created or constructed, and in the open position, the surface of said hangar is exposed to the outside so that it can be used as storage for elements or vehicles of any type, or as a free surface for landing and take-off.

[0025] In the closed state, the arched structures are at different angles of rotation, so that the canvas that connects them will be tight, and the set of arched structures with said canvas can form a volume that can be partially or completely closed, allowing to protect the vehicle from inclemency.

[0026] Preferably, when the hangar is in an open position, with the arched structures folded and stowed towards the same side with respect to the articulated joints, said structures as well as the canvas element or element comprised in the hangar can be concealed in a perimeter cavity or trench, under the base surface of said hangar, leaving said surface completely uncovered, where it can be used as a take-off and/or landing base, without there being nearby elements that could affect said operations.

[0027] In facilities or places where it is not possible to have said perimeter cavity or trench due to technical or budgetary reasons, the alternative of raising the surface of the approach and take-off or storage area enough to be able to install a frame with a cavity where the structure is folded and stowed, where at least 80 cm above ground level is necessary to conceal said structure, can be considered. That is, preferably, the hangar should be able to be completely concealed and stowed so that the base surface can be used as a take-off and landing surface.

[0028] Preferably, the rotational means comprise a steel pin in the form of a shaft with respect to which the arched structures rotate.

[0029] In order for the covering and/or securing of the arched structures, as well as the canvas elements, to be adequate, when the hangar is in the open position, it is preferable for said structures to be inclined at the same or substantially the same angle, with respect to the base surface of the hangar, where an inclination of zero degrees, or even lower, is suitable for this purpose.

[0030] In this way, when the hangar is in the open position, the canvas element will remain stowed, rolled or collapsed, stowed in the described cavity or trenches, directly on the ground, or on supports of a small height, leaving said canvas loosely folded.

[0031] In another embodiment in which said set of elements, structures and canvases are not concealed and remain above the ground, this set will preferably be located with an approximate semicircle shape, occupying a small height, so that it is not an obstacle for manoeuvres to be carried out in the proximity thereof. All the elements in this set can be secured by connecting them to the ground to prevent any unwanted movement.

[0032] This embodiment leads to a system for the construction of a hangar capable of folding and unfolding in a retractable manner, in a short time, and can be installed in the same space as a take-off and/or landing base, and it can be installed on airport platforms such as hangars for small aircraft and large drones.

[0033] In one embodiment, the system comprises three arched structures joined by their respective end parts to the two hinged, articulated joints; and two canvas elements each connected to two contiguous arched structures; wherein with the hangar in the closed position, with the arched structures inclined at a different angle with respect to the articulated joint, the two canvas elements are tightened and extended between each of these arched structures; therefore, the maximum separation size between the structures are determined by the width

of the canvas element.

[0034] With this embodiment, a good distribution of the arched structures, as well as the canvas elements, is allowed to create an environment, space or closed construction, with a substantially hemispherical shape, in the same way that the hangar can comprise more arched structures, depending on the needs and/or the space available or required.

[0035] Since the arched structures are concentric, all hangar structures can be of equal size, and remain stacked when stowed or folded, with very similar angles to the base surface. However, preferably, in order to be able to conceal the structures together with the canvas elements, it is preferable for said structures to have a decreasing size depending on their inclination with respect to the base surface of the hangar when it is closed. For example, in the case of comprising three structures, there would be three different sizes, so that in the open position, the structures each fit within the one immediately above. The decreasing size can be both the opening of the arch of each structure, as well as the width or thickness of each structure, with the smallest ones being able to fit into the inner spaces of the largest ones.

[0036] In one embodiment, the system comprises two canvas extensions each connected to an arched structure and connectable to a ground support.

[0037] With this embodiment, it is not necessary for an arched structure to be inclined 0 or 180 degrees with respect to the base surface to completely close the inner space of the hangar, using these canvas projections to cover the spaces that remain open when an arched structure is inclined at an angle between these limits.

[0038] With these canvas extensions, the perimeter of the hangar in contact with the ground will be secured, preventing unwanted movements and guaranteeing safety.

[0039] In one embodiment, the end parts of each arched structure, joined by the articulated joints, comprise an end connector to couple the rotational shaft.

[0040] In one embodiment, the hinged joint is connected to a foundation or footing of the base surface of the hangar. In this way, the arched structures as well as the canvases of the hangar support all their weight on said foundations.

[0041] In one embodiment, the arched structures comprised in the hangar each comprises different amplitude sizes, that is, radius of curvature, and wherein said arched structures are configured to fit with each other when said hangar is positioned in the position open.

[0042] In one embodiment, the rotational means comprise a motorised transmission system. Preferably, said system will have a closed cable circuit in each of the articulated joints, connected to the end parts of the structures, which must work synchronously to rotate said structures. By means of said embodiment, the cable is fastened at one point to the outer arch, and in this joint the force that must drive the arches in both directions will be transmitted. The cable will also pass through a pulley or similar device joined to the motor, which will provide the necessary drive, and through an arm provided with a pulley at its end to generate suitable deviation of the cable at the beginning of the opening or closing movements. The circuit may also include a tension pulley or a similar device to limit the range of tensile loads on the cable and to absorb variations in the length of the circuit in different positions.

[0043] In one embodiment, the transmission system is controllable by means of a remote control device. Said transmission system may also be operable manually while at the same time by means of remote control, or only manually in an alternative embodiment.

[0044] The mechanisms for folding and unfolding the hangar by means of remote control can be activated through a radio signal, even from an aircraft, and without the intervention of ground personnel.

[0045] In one embodiment, the arched structures are polygonal, and each comprises a set of straight extruded profiles joined at the ends of said extruded profiles.

[0046] The fact that the arched structure is polygonal means that said structure is located in a portion of the plane limited by straight lines, wherein said straight lines are straight profiles joined at their ends, with small inclinations, forming an arch-shaped structure.

[0047] In one embodiment, the extruded profiles are joined together at the ends by means of inner connectors. These connectors can be made of aluminium, steel or another material with similar structural strength characteristics. In turn, the profiles and connectors are connected using rigid joints such as screwed or welded joints.

[0048] In one embodiment, the extruded profiles comprise a cross-section with an oval outer perimeter and at least one inner alveolus. This profile is constant along its entire length and is specially designed to withstand the loads to which the arched structures are subjected when the hangar is in the closed position, as well as during the process of rotating said structures.

[0049] This oval profile can have a different size depending on the load to be supported, such as 500 by 200 mm, for the largest and smallest diameters, respectively, with sheet thicknesses between 5 to 8 mm, comprising up to three longitudinal cavities therein inside. Preferably, said profile comprises two lateral alveoli and a central rectangular prismatic cavity.

[0050] The profile design guarantees a simple, clean and aesthetically pleasing outer surface, helping to reduce the accumulation of dirt and rainwater and the corrosion they generate.

[0051] In one embodiment, the extruded profiles of each structure comprise at least one housing for fastening the canvas element. These housings can fasten the canvas elements without using additional elements.

[0052] In one embodiment, the extruded profiles are made of structural aluminium which, together with the special oval design of said profiles, make it suitable for the described use due to the structural strength and lightness it presents.

[0053] In one embodiment, the base surface of the hangar is configured to be covered by the canvas elements and comprises a heliport. Preferably, said heliport can have an approximate diameter of about 20 metres, which allows the landing and take-off of an aircraft with sufficient space.

[0054] In one embodiment, each canvas element is configured to roll up into an arched structure. Through this embodiment, the canvas is automatically stowed on the arched structure to which it is connected, preventing the folds of said canvas from affecting the storage and fitting of the structures.

[0055] In addition to the elements described in these embodiments, the hangar may comprise a lighting system, a fire protection system, as well as sanitation and plumbing facilities, like any building.

[0056] The described system makes it possible to install hangars in places where there is a space problem and a hangar with existing technologies cannot be installed by performing the function of hangar and heliport alternately in the same space.

BRIEF DESCRIPTION OF THE DRAWINGS

[0057] With the intention of helping to better understand the system developed and in relation to a practical and preferred exemplary embodiment thereof, a series of drawings is offered where the following has been represented:

- Figure 1 shows a perspective view of a hangar in an open position, in which the base surface comprising a heliport and an aircraft located on same can be seen, where the arched structures connected by the canvas elements are fitted on one side of the articulated joints.
- Figure 2 shows a perspective view of the hangar of Figure 1 in an intermediate position between open and closed, and the structures are partially folded.
- Figure 3 shows a perspective of the hangar of Figure 1, said hangar being completely closed, with the canvas elements and canvas projections fully extended and the arched structures inclined the maximum angle allowed by the width of said canvas elements.
- Figure 4 shows a perspective view of an articulated joint connected to three arched structures, arranged at different inclinations, in an intermediate position between open and closed.
- Figure 5 shows a cut section of the extruded profile, where the oval shape and the inner alveoli of said profile, as well as the housings for fastening the canvas element, can be seen.
- Figure 6 shows a perspective view of an angled joint of two extruded oval profiles.
- Figure 7 shows an exploded perspective view of an angled joint of two extruded profiles with an inner connector.

[0058] A list of the references used in the figures is provided below:

(1) Hangar
(2) Arched structures
(3) Canvas element
(4) Extruded profile
(5) Articulated joint
(6) Rotational means
(7) Canvas extensions
(8) Floor support
(9) Base surface
(10) End connector
(11) Inner connectors

PREFERRED EMBODIMENT OF THE INVENTION

[0059] As can be seen in the figures, especially in Figures 1 to 3, the invention consists of a system for folding and unfolding folding and retractable hangars (1), the enclosure of which mainly comprises three flat and concentric arched structures (2) connected by means of two canvas elements (3), wherein said arched structures (2) are connected, through each of their two ends, to two articulated joints (5), respectively, and wherein two of these arched structures (2) are attached to two canvas extensions (7).

[0060] These three flat arched structures (2) comprise a shape similar to that of a semicircle, the three structures (2) being concentric and of different diameters, so that one of these structures (2), the one located in the outermost part of Figure 1, has a diameter slightly larger than the one located in an intermediate position, and this intermediate one being slightly larger than the one located on the inside.

[0061] Each arched structure (2) comprises a plurality of straight extruded profiles (4) made of structural aluminium, joined at their ends by means of inner connectors (11), as can be seen in Figures 6 and 7, so that the shape of said structures (2) fits an arched polygonal shape, as can be seen in Figures 1 to 3.

[0062] The extruded profiles (4) comprise a slightly oval-shaped constant section, as can be seen in the section thereof shown in Figure 5, which includes two lateral alveoli and a central rectangular prismatic cavity. These profiles also comprise two housings at the ends of the largest diameter of the oval, configured to fit with or connect to the canvas elements (3) and/or canvas extensions (7).

[0063] As can be seen in Figure 4, the end parts of each of the arched structures (2) comprise an extruded profile (4) connected to an articulated joint (5) by means of an end connector (10), wherein said articulated joint (5) is connected to rotational means (6).

[0064] The joints between the extruded profiles (4) by means of the connectors (10, 11) are made by means of threaded joints, such as screws or bolts, although they can also be made using other rigid joints, such as rivets

or welding.

[0065] Both the end connectors (10) and the inner connectors (11) are made of steel, although in other embodiments they could also be made of different alloys or metallic materials, such as aluminium.

[0066] Preferably, all the arched structures (2) have the same number of extruded profiles (4), which are arranged with a small gap between them, from the largest structure to the smallest one.

[0067] The two articulated joints (5) are hinged, that is, they allow the rotation of the arched structures (2) only with respect to an axis, which is embodied in the form of a pin, located in said joints (5).

[0068] Preferably, the axes of the two articulated joints (5) are aligned but, if necessary, the arched structures (2) may not have an exact semicircle shape, and the ends of said structures (2) may be at different heights, depending on the geometry of the terrain and architectural needs, so articulated joints (5) may be deviated but always remain parallel.

[0069] The arched structure (2) of larger diameter is connected to the one that comprises an intermediate diameter by means of a canvas element (3), and this intermediate structure (2) is also connected to the arched structure (2) of smaller diameter by means of another canvas element (3).

[0070] In addition to these canvas elements (3), the arched structures (2) of larger and smaller diameter are also each connected on a side opposite the connection with the canvas element (3), to a canvas extension (7) which can be connected to a ground support (8) to form a closed environment or building.

[0071] The canvas elements (3) and the canvas extensions (7) have a shape similar to that of a spherical wedge, or a section, as can be seen in Figures 2 and 3, and are flexible elements, such as membranes or fabrics that are specially designed to act as building enclosures. That is, they have high structural strength and wear resistance, a long useful life, and an insulation capacity as well as impermeability suitable for use as an enclosure, without losing these capacities due to folding.

[0072] This arrangement of the arched structures (2) connected to the articulated joints (5), and the canvas elements (3) as well as the canvas extensions (7), allows the hangar (1) to function as a canopy, being able to be completely open, as shown in Figure 1, with the arched structures (2) being folded, stowed and aligned, in an offset manner on the base surface (9). In this open state, said arched structures (2) as well as the canvases (3, 7) can be concealed in a perimeter ditch or buried cavity, or on the side, off the runway, remaining fitted and secured, allowing the base surface (9) of the hangar (1) to be used as a take-off and/or landing surface, such as a heliport.

[0073] In the same way, the hangar (1) can be closed, as shown in Figure 3, by rotating the arched structures (2) with respect to the articulated joints (5), extending and tightening the canvas elements (3) and the canvas extensions (7), and connecting said canvas extensions (7) to the ground support (8), generating a completely closed space or construction.

[0074] To fold and unfold the hangar (1), the articulated joints (5) are connected to rotational means (6) that comprise a motorised transmission system, which in turn comprises a system of pulleys and cables connected to the arched structures (2) and one or more motors to provide the torque necessary to rotate said structures (2).

[0075] In this way, the system is made up of a light structure, suitable to facilitate the folding and unfolding of its components due to the reduced weight of the aluminium and the canvas, and so that its assembly on elevated heliports or on platforms is not an impediment, since it can be concealed or covered under said heliport when it is open so as not to interfere with landings and take-offs of the aircraft parked therein.

[0076] The system allows the hangar (1), in a closed state, with the arched structures (2) unfolded, to have an almost hemispherical shape, with an approximate diameter of 20 m and an approximate height of 10 m, sufficient to park aircraft. When the hangar (1) is open, with its structures (2) folded, it may be completely embedded below the grade of the base surface (9), not being perceptible to the eye and, therefore, without affecting the use of said base surface (9) as a heliport.

[0077] The definitive articulated construction is novel and covers a need that until now only had partial solutions, since there are no aircraft hangars on the market that allow them to be folded and unfolded quickly after landing and take-off, allowing a hangar to be installed in the same space as a heliport.

[0078] For the correct operation of the hangar (1), it may have lighting systems, such as lights for night landing, or in low visibility conditions, lighting projectors/reflectors, elevated perimeter lights or guidance lighting systems for flight path alignment. Similarly, it may also comprise painted signage, such as the heliport name, preferred approach and take-off direction signs, touchdown point signs and/or maximum allowable mass signs.

[0079] Furthermore, the defined hangar (1) is compatible with fire protection installations to comply with the applicable regulations, which can be materialised through nozzles integrated in the base surface (9), or by means of monitors installed on the perimeter of said surface (9).

[0080] The hangar (1) is also compatible with sanitation installations, with collection and purification systems for any hydrocarbon water that may exist, in such a way as to avoid producing any polluting discharges in the terrain where it is located.

[0081] The electrical supply can be carried out through the distribution grid, although, if said connection is not possible, a secondary electrical supply system can be provided both to prevent failures in the primary grid, and in the even that there is no electrical distribution grid.

[0082] It is also compatible with an energy island system for sustainable energy production, which allows its

air conditioning and electricity supply independently of the grid.

Claims

1. A system for folding and unfolding folding and retractable hangars (1), **characterised in that** it comprises:

   - at least two flat and concentric arched structures (2);
   - at least one canvas element (3) connected to the arched structures (2);
   - two hinged, articulated joints (5), each connected to an end part of each arched structure (2);
   wherein each of said arched structures (2) comprises at least one extruded profile (4);
   wherein at least one articulated joint (5) is connected to rotational means (6); and wherein the articulated joints (5) and the rotational means (6) are configured to rotate the arched structures (2), positioning the hangar (1) in either a closed position, in which the arched structures (2) are unfolded and each of them inclined at a different angle with respect to a base surface (9) of the hangar (1), and the canvas element (3) is extended and tightened; or an open position, in which the arched structures (2) are folded, stowed towards the same side with respect to the articulated joint (5), and the canvas element (3) being folded.

2. The system for folding and unfolding hangars (1) according to claim 1, comprising:

   - three arched structures (2), joined at their respective end parts to the two hinged, articulated joints (5); and
   - two canvas elements (3) each connected to two contiguous arched structures (2);

   wherein with the hangar (1) in the closed position, with the arched structures (2) inclined at a different angle with respect to the articulated joint (5), the two canvas elements (3) are tightened and extended between each of these three arched structures (2).

3. The system for folding and unfolding hangars (1) according to any of the preceding claims, comprising two canvas extensions (7) each connected to an arched structure (2) and connectable to a ground support (8).

4. The system for folding and unfolding hangars (1) according to any of the preceding claims, wherein the end parts of each arched structure (2), joined by the articulated joints (5), comprise an end connector (10) to couple to the rotational means (6).

5. The system for folding and unfolding hangars (1) according to any of the preceding claims, wherein the articulated joint (5) is connected to a foundation of the base surface (9) of the hangar (1).

6. The system for folding and unfolding hangars (1) according to any of the preceding claims, wherein the arched structures (2) comprised in the hangar (1) each comprises different amplitude sizes, and wherein said arched structures are configured to fit with each other.

7. The system for folding and unfolding hangars (1) according to any of the preceding claims, wherein the rotational means (6) comprise a motorised transmission system.

8. The system for folding and unfolding hangars (1) according to the preceding claim, wherein the transmission system is controllable by means of a remote control device.

9. The system for folding and unfolding hangars (1) according to any of the preceding claims, wherein the arched structures (2) are polygonal and each comprises a set of straight extruded profiles (4) joined at the ends of said extruded profiles (4).

10. The system for folding and unfolding hangars (1) according to the preceding claim, wherein the extruded profiles (4) are joined together at the ends by means of inner connectors (11).

11. The system for folding and unfolding hangars (1) according to any of the preceding claims, wherein the extruded profiles (4) comprise a cross-section with an oval outer perimeter and at least one inner alveolus.

12. The system for folding and unfolding hangars (1) according to any of the preceding claims, wherein the extruded profiles (4) of each structure (2) comprise at least one housing for fastening the canvas element (3).

13. The system for folding and unfolding hangars (1) according to the preceding claim, wherein the extruded profiles (4) are made of structural aluminium.

14. The system for folding and unfolding hangars (1) according to any of the preceding claims, wherein the base surface (9) of the hangar (1) is configured to be completely covered by the canvas elements (3) as the arched structures (2) are unfolded, and wherein the base surface (9) comprises a heliport.

15. The system for folding and unfolding hangars (1) according to any of the preceding claims, wherein each canvas element (3) is configured to roll up into an arched structure (2).

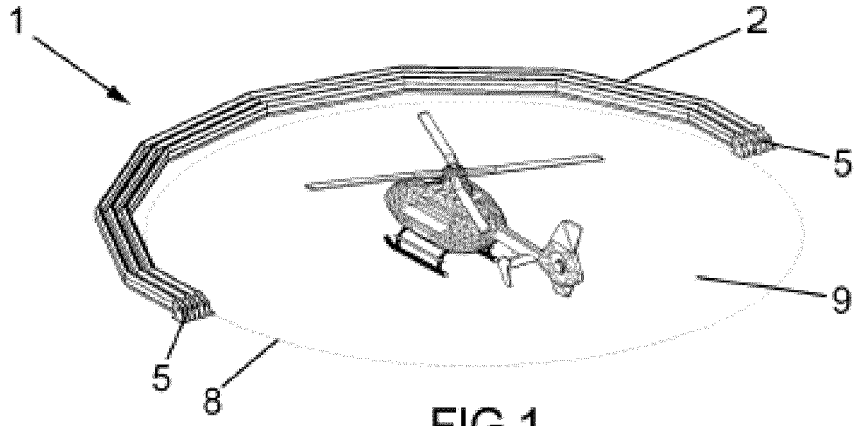

FIG.1

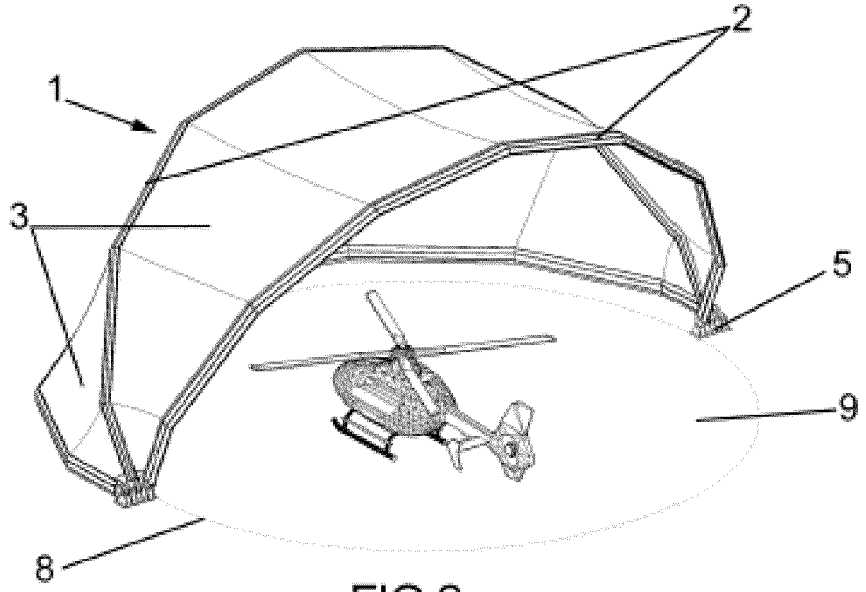

FIG.2

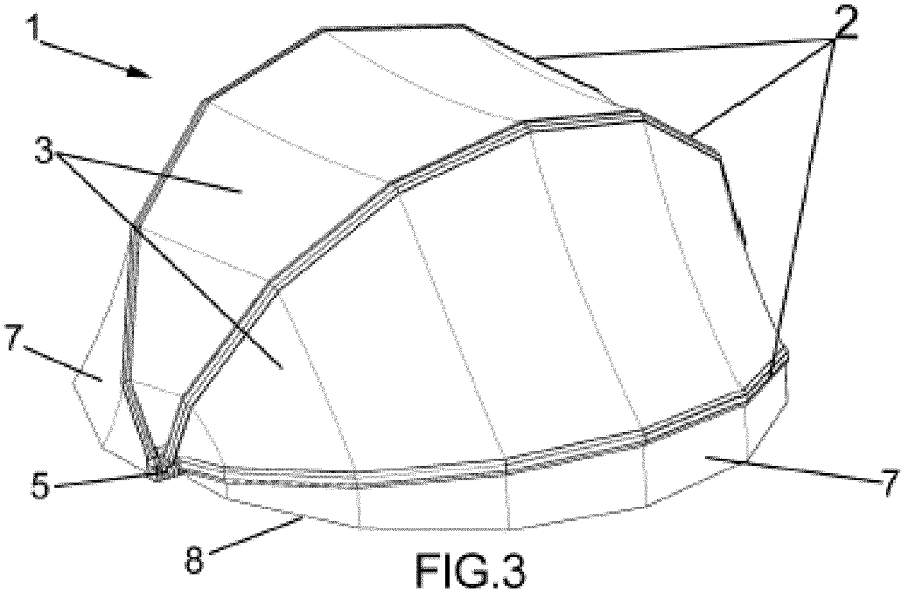

FIG.3

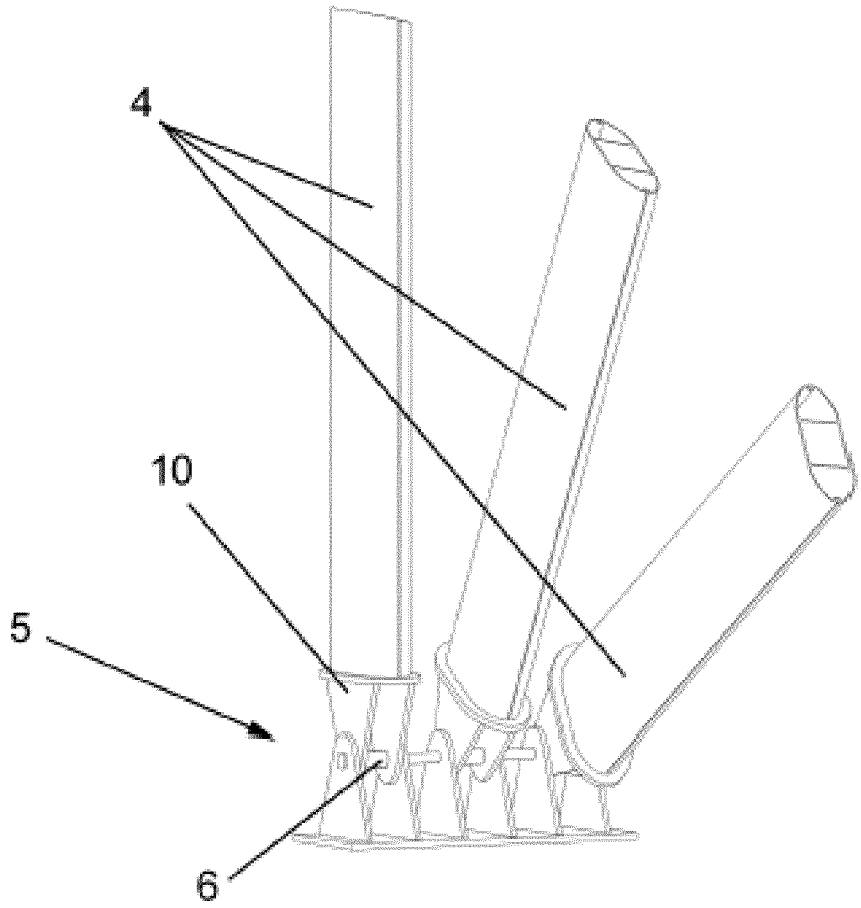

FIG.4

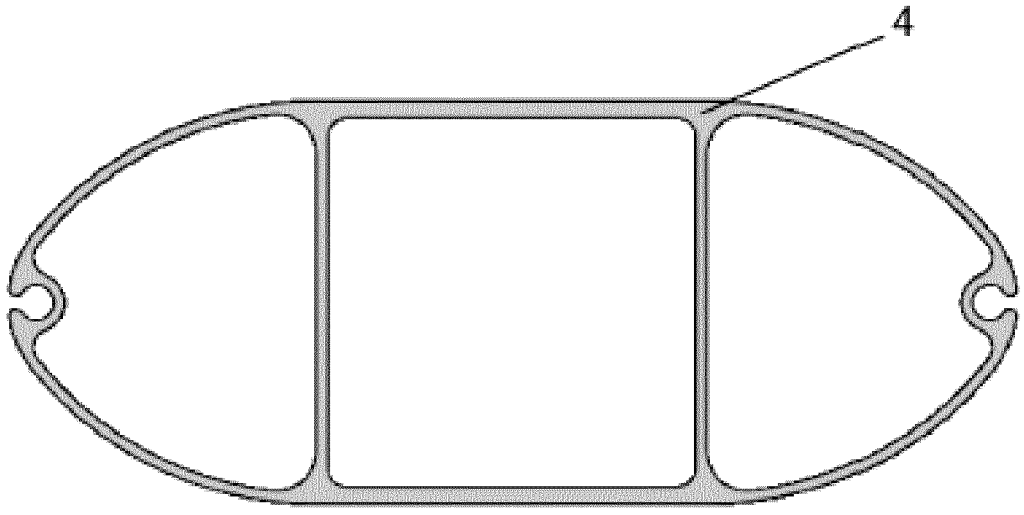

FIG.5

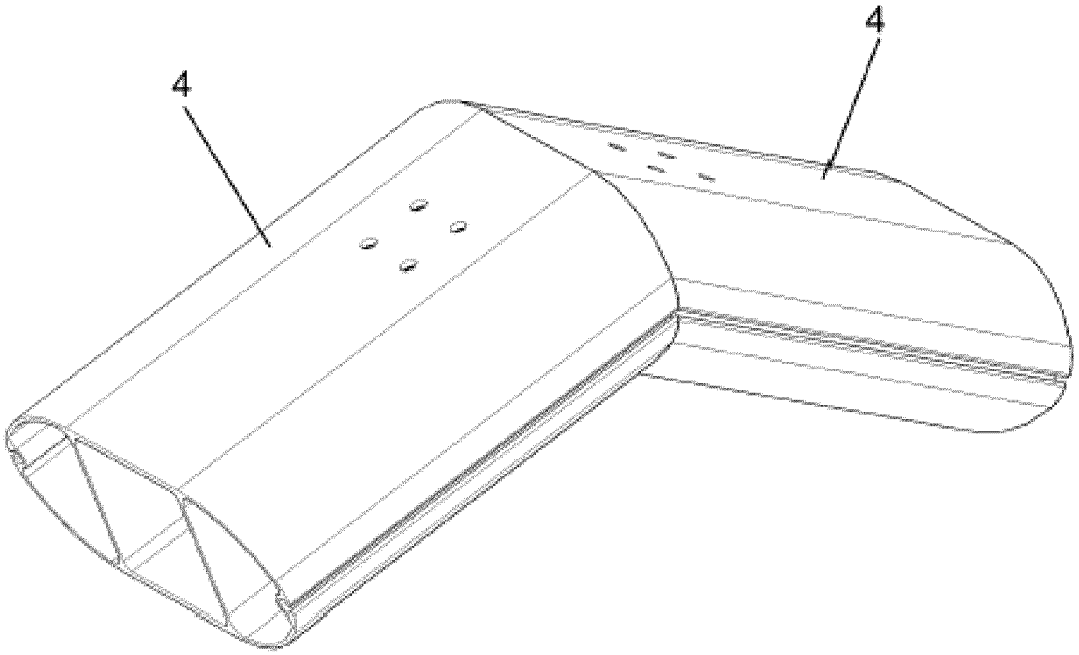

FIG.6

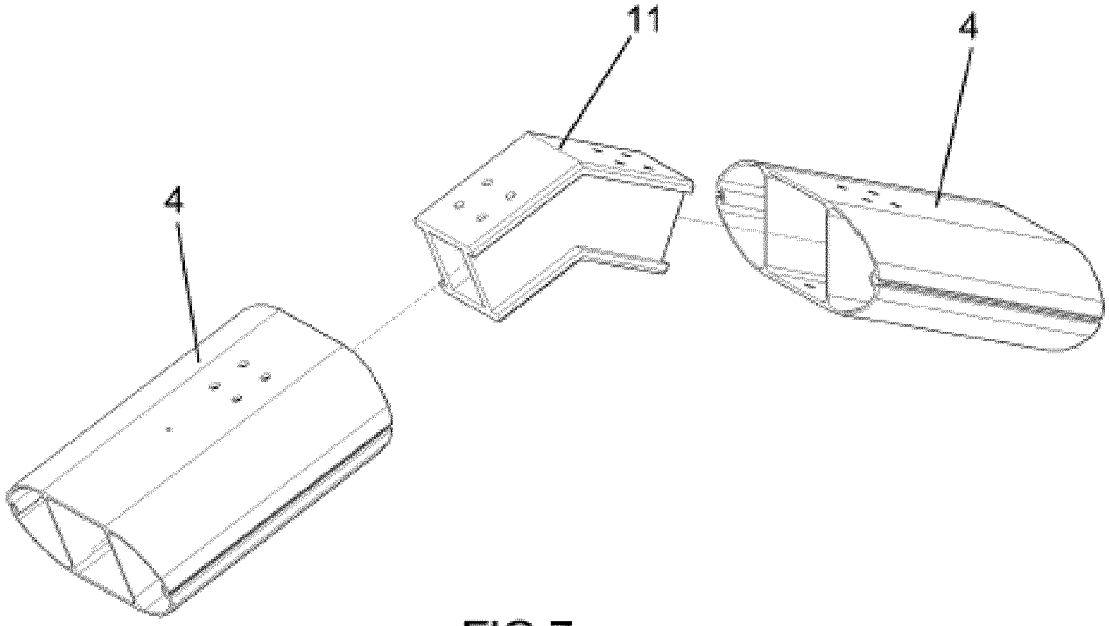

FIG.7

INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2022/070533

A. CLASSIFICATION OF SUBJECT MATTER

E04H15/38 (2006.01)
E04H6/44 (2006.01)
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
E04H

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, INVENES

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	GB 752911 A (LEA BRIDGE IND LTD) 18/07/1956, page 1, line 9 - page 5, line 62; figures 1 - 8.	1-15
X	GB 521976 A (NICHOLAS STRAUSSLER) 05/06/1940, page 1, line 6 - page 2, line 123; figures 1 - 4.	1-15
A	US 4583331 A (HUNT ROWLAND D ET AL.) 22/04/1986, column 1, line 5 - column 9, line 16; figures 1 - 27.	1-15
A	US 3149703 A 22/09/1964, column 1, line 9 - column 2, line 68; figures 1 - 22.	1,3,4,5

☒ Further documents are listed in the continuation of Box C. ☒ See patent family annex.

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
28/10/2022	**(03/11/2022)**
Name and mailing address of the ISA/ OFICINA ESPAÑOLA DE PATENTES Y MARCAS Paseo de la Castellana, 75 - 28071 Madrid (España) Facsimile No.: 91 349 53 04	Authorized officer O. Fernández Iglesias Telephone No. 91 3498500

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INTERNATIONAL SEARCH REPORT

International application No.
PCT/ES2022/070533

C (continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of documents, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5085240 A (LITTLEDEER TOMISLAV F) 04/02/1992, column 3, line 7 - column 6, line 7; figures 1 - 10.	1-6
A	US 4833837 A (BONNEAU ALAIN) 30/05/1989, Column 2, line 53 - column 7, line 48; figures 1 - 13.	1,7,8
A	FR 2438716 A1 (SPRUNG PHILIP SPRUNG PHILIP) 09/05/1980, page 2, line 25 - page 6, line 38; figures 1 - 8.	1,10,11

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/ES2022/070533

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FR2438716 A1	09.05.1980	NONE	

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