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(54) **Title:** MODULAR STRUCTURE SIMULATING ZERO GRAVITY FOR DYNAMIC FLOATING/FLIGHT OF ONE OR MORE PEOPLE

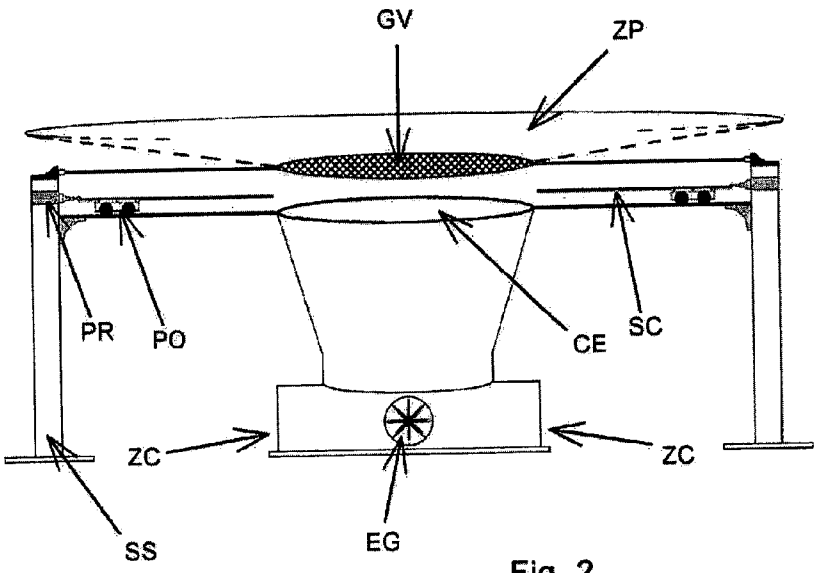

Fig. 2

(57) **Abstract:** Modular structure capable of simulating a zero gravity condition by means of a flow of constant and stabilized air, allowing the free and dynamic floating/flight of one or more people simultaneously, by means of the single flow of the air coming from a three-propeller turbine or from a multi-turbine system capable of creating a vertical air flow through an expulsion duct (CE), wherein, for protecting such duct, two semicircles (SC) with pneumatic closure are placed along with a flight grate (GV) permeable to the flow and capable of supporting the weight of the user/users in free fall from a maximum predetermined height without breaking and at whose periphery a zone (ZP) is created, it too capable of supporting and smoothing the free fall of the user(s).

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Description

Modular structure simulating zero gravity for dynamic floating/flight of one or more people

State of the art

From the very beginning, man has desired, tried, gained experience and risked his life so to be able to soar through the air in complete and absolute freedom.

Aldous L. Huxley (English writer, 1894-1963) wrote: "Experience is not what happens to a man; it is what a man does with what happens to him."

In man's imagination, in the depth of his being, flying has always been a dream to be achieved, a challenge, a goal to attain. The desire to soar through the air, enjoying the purity of the wind on one's skin, the need to be free which only the infinite sky can satisfy, in our ancient memory has inspired man over the centuries to climb to ever higher points, until he reached previously unthinkable destinations. Who among us has not flown with his/her imagination for a few precious moments alongside Icarus? In order to escape from prison, Icarus created waxen wings for flying away - the fact that the wings melted did not prove a deterrent for man in his attempt to approach the Sun.

With his studies, Leonardo Da Vinci blazed a trail that was steadily improved upon through the centuries, up to the achievement of modern technology, evolving in different directions and disciplines with one single goal in mind: flight.

At the beginning of last century, modern aerodynamics studies were carried out which have permitted man to experience the emotion of being in a kind of lack of gravity. In July of 1969, we were on the Moon. The path there was long, difficult, costly, and required the lifelong dedication of bright minds as well as the painful sacrifice of human lives. Today, our machines are on the planet Mars, sending us wonderful, absolutely thrilling images.

Indeed, it is for these emotions that TV and movies often show suggestive images of astronauts floating inside their space shuttles. Probably, at least once in our lives, we envied these astronauts, as weightlessness must be a truly unique and enjoyable experience. That which the astronauts experience in those moments is so-called microgravity, a state in which gravity, or better yet its effects, are practically non-existent.

Nevertheless, even when one is in free fall, the sensation is that of floating in the void; essentially this is experienced when an airplane hits an air pocket or when an elevator begins to go down, or on the roller coaster when the carriage begins its descent.

One such sensation is due to the fact that when an object is in continuous free fall, without external forces acting thereon, the object becomes weightless. Such sensation, in other words, is entirely analogous to that which parachutists experience with the free fall after launching from the airplane, in general for not over one minute.

Currently, there are not many devices capable of simulating weightlessness.

The only simulation still valid today, even if existing for over thirty years, is that on board of an airplane during a parabolic flight: due to particular maneuvers executed by the pilots, a lack of gravity effect is created for all passengers on board. Such situation permits the passengers within the fuselage to soar through the air for a period of about 30 seconds, and such passengers perceive this as a free fall sensation. Nevertheless, while valid enough to be used by space agencies throughout the world (ESA, NASA etc.) for astronaut training, such condition results rather costly and thus the prerogative of only a few people.

Another simulator, which nevertheless has limitations due to the binding of the users to the mechanical support means composing the simulator itself, consists of concentric circles which, due to the numerous articulations, permit the movement and 360° rotation of the user harnessed inside the device itself. The individual will

have to develop unconventional forces similar to those which must be created in a lack of gravity situation.

Another simulation is that attained inside particular wind tunnels, which allow, due to strong vertical air flows, greater than 210 Km/h, lifting and maintaining the user in a floating state. Nevertheless, even if valid and thus used predominantly by professional parachutists in training, the technologies used for such simulation are still quite bulky and costly, with structure heights that can reach 50 meters and with costs that only regarding energy consumption can be around 1.6 million Watt.

In order to make a device adapted to effectively create the aforesaid condition, i.e. the free and dynamic floating/flight of one or more people through the air simultaneously, for example referred to the parachutists during free fall and for the other objects which will be referred to below, there arises the need to make the inventive object of the present patent application.

Description of the invention

The present invention refers to a structure capable of simulating a zero gravity condition by means of a flow of constant and stabilized air, which permits the free and dynamic floating/flight of one or people simultaneously.

As can be observed in Figures 1, 2 and 3, said inventive structure comprises a common support structure SS made of metal structural work, composed of vertical posts and horizontal longitudinal members, capable of suitably supporting and sustaining the main and secondary devices overall composing the inventive object of the present invention.

The main devices of said inventive structure comprise:

- a turbine (Figure 1) composed of at least three variable pitch propellers and/or vane blades referred to below as propellers/rotors, connected by means of the respective drive shafts to the electric motors and/or combustion motors integral

with the support structure SS, the suction collectors CA for the static air entering each propeller/rotor EG, the convergence zone ZC of the dynamic air thrust by the propellers/rotors, placed without interruption with regard to said suction collectors CA, and wherein between said convergence zone ZC and said suction collectors CA, at least one propeller/rotor EG is vertically placed for every single collector, and finally the expulsion duct CE, which can be considered a protrusion extending vertically from the aforesaid convergence zone ZC and in which the dynamic air coming from the aforesaid propellers/rotors EG assumes a controlled, laminar, vertical and upward flow;

- at least one emergency pneumatic device for covering the expulsion duct CE (Figures 2 and 3), composed of two semicircles SC slidable on a horizontal plane and made of lightweight aluminum and/or of ABS with high impact strength, overall composing a circular surface having a total diameter greater than the flight grate GV (referred to below), wherein said semicircles are each connected by means of three points to the support structure; wherein at least two of said three points, i.e. the support points PE diametrically placed on the base of each semicircle SC, are integral with two blocks PO which horizontally slide on the horizontal longitudinal members of the aforesaid support structure SS and wherein at least one point PC, i.e. that medially arranged on the semicircle SC, is connected to a rod connected to an instantaneous release piston PR integral with said support structure SS and wherein the actuation of said release piston PR is carried out manually or automatically;

- at least one semi-elastic circular protection net sufficiently permeable to the aforesaid laminar air flow and termed flight grate GV which, as can be observed in Figure 2, is situated on a horizontal plane above both the upper border of the expulsion duct CE and the plane occupied by the two semicircles SC (sliding by means of the blocks PO), wherein such flight grate GV is capable of supporting and damping, without breaking, the weight of a human body or where provided

the weight of several people in free fall from a maximum height predetermined for every single position, and wherein, in contact with such flight grate GV, at least one seismic sensor is present which is adapted to detect the breaking point and is capable of instantaneously and automatically activating the aforesaid instantaneous release piston PR;

- zone ZP arranged peripherally and without interruption with regard to said flight grate GV, capable of supporting and smoothing the falls of those who use the structure, from hereon termed users, preventing possible user injuries and having a size such to render impact impossible between the user/users of different adjoining positions and/or between the user/users and any complementary part of the structure, such as the stands TB, perimeter walls, covers etc.

In an alternative embodiment of the present invention, the aforesaid turbine can be substituted with a multi-turbine system with multiple chambers for dynamic air induction at constant and controlled flow, as represented in Figure 4. In such embodiment, at least two separate chambers are present, that is, the stabilized air compression and containment chamber CC and the stabilized air transformation and induction chamber CT preferably positioned at a higher level. Both said chambers are mutually communicating by means of at least one nozzle AV, whose variable opening is electronically stabilized with a negative antireflux valve system, capable of allowing the inflow, in the chamber CT, of the highly compressed and stabilized air coming from the chamber CC. Said system also comprises at least three variable pitch propellers/rotors EG connected by means of the respective drive shafts to the electric motors and/or combustion motors, which due to the related static air inlet collectors CA first push the air through the negative antireflux valves VA and then into the aforesaid chamber CC. Said system also comprises three further variable pitch propellers/rotors EG connected by means of respective drive shafts to the electric motors and/or combustion motors, which due to the related static air inlet collectors CA, push the air into the

chamber CT. Such embodiment, due to the combined flow of extremely high pressure air coming from the chamber CC, which encounters the air flow present in the chamber CT, allows obtaining an upward laminar air flow in the expulsion duct CE which is perfectly modulatable and at the same time provided with a wide section, that can thus be simultaneously used even by a high number of users.

Such multi-turbine system with multiple chambers for dynamic air induction at constant and controlled flow innovatively has the particular innovative features of limited bulk and requiring lower energy consumption, and can provide a quantity of dynamic flow so vast and uniform as to make a flight grate having a diameter in the range of 3 - 13 meters, more preferably 9.00 m, allowing over 20 users to fly and likely simultaneously.

For merely exemplifying and non-limiting purposes, considering the greater size of such inventive structure of the alternative embodiment, part of the stabilized air compression and containment chamber CC could be buried or situated underground.

The secondary devices of said inventive structure comprise the accessory parts of the present invention, and are by no means of secondary importance:

1) Telescopic upper cover with asymmetric, dynamic multiple sheets, for all the aforesaid main devices and possibly for all the additional complementary structures described below, is a structure, as shown in Figure 6, made by means of at least four dynamic multiple sheets VM of plastic or metal material, wherein said dynamic multiple sheets VM are shaped as telescopic segments, i.e. they have the lower surface of each segment capable of sliding, being superimposed on the upper surface of the adjoining segment, and forming, when there is the minimum possible superimposition of the aforesaid surfaces, a hermetic cap cover; such dynamic telescopic cover with asymmetric multiple sheets has the particular feature of being manipulated and thus adaptable, through a suitably conceived software, for multiple situations, all with the object of enhancing, accentuating and

improving both the free flight phases and the sensations that they produce. In an alternative embodiment of the present invention, said dynamic multiple sheets VM are composed of synthetic fiber with multiple high performance solar cells, capable of picking up solar heat energy and transforming it into electrical energy, thus allowing an average surface area equal to 600 m^2 to obtain considerable electrical energy efficiency.

2) An innovative weighing system SP (Figure 5) consisting of the presence of a weighing plate, a load cell OCF and a central unit UAV. The plate has a maximum capacity of 150 Kg and is made of stainless steel, with a floor surface equal to 0.64 m^2. The load cell is a device which detects, in input, the weight of the user(s) and provides, in output, an electrical signal proportional to the weight itself, wherein such signal, by means of an innovative software, is immediately and automatically read and processed, thus permitting the regulation of the motor and propeller revolutions. The central unit UAV consists of a connector, to which an alphanumeric display is connected which carries out various functions:

- managing and regulating the propeller revolutions as a function of the weight of the user(s), wherein the detection of the weight is carried out through pressure meters;
- detecting the air speed and consequent blocking over a certain deviation value from that set;
- recording the use time of the machine and statistical storing of the possibly failures or malfunctions.

All of the above leads to an economical and technological improvement of considerable importance, since all the settings, memorization and processing of the various statistics permit preventing failures due to use or stress and consequently allow financial savings since routine maintenance operations can be programmed with a certain degree of precision.

3) An innovative joined inverter and variable pitch propeller/rotor system for

controlling the flow speed. The inverter is an electrical system which by varying the frequency of the current permits varying the revolutions of the motor; in addition, such device allows considerably reducing the power required by the starting motor to reach nominal running power. Such variation results extremely reliable and convenient since it is easily adaptable to the electronic weighing system, indeed such system detects the weight of the user/users and immediately generates an electrical signal proportional to the weight itself, the inverter acquires such signal and varies the frequency of the input current so as to obtain the desired flow speed.

4) The variable pitch propeller/rotor is an electromechanical mechanism, which, due to the variation of the pitch of the propeller/rotor also operated from a system of electronic inputs coming from the load cell, perfectly sets the air flow with regard to the weight of the user/users and the height which these must reach, maintaining the rotation speed unaltered.

This further mechanism permits starting the ascent or descent of the user/users in an entirely modulatable and controllable manner, the user/users at the start of the flight phase sets/set on the air flow which has not yet reached lift speed (previously calculated through the load cell OCF) but is sufficiently suitable for starting the flight at a height of about one meter; subsequently the flow increases in a modulated manner, up to reaching the flow speed for bringing the user/users to a pre-established height in the range of 3 m - 15 m height with respect to the flight plane. With the same technique but in reverse manner, the flow is modulated, making the user/users descend in an entirely controllable and fully safe manner. From this, it is inferred that the sensations tied to the flight are greatly enhanced, rendering the flight phase more enjoyable, simple and safe, thus simultaneously covering multiple age ranges, builds and experience – the high commercial possibilities of the entire system can therefore be comprehended.

5) Semi-lift suit made of highly resistant non-woven fabric fiber which in addition

to protecting the user's clothes is capable of harmonizing and unifying the entire body surface exposed to the air flow.

6) Semi-rigid, enclosing helmet complete with ear flaps.

7) Earphones placed inside the ear flaps in order to be able to hear possible advice or instructions by the operator at the consoles or by the grate tutors - such instructions can be of technical character on how to assume and maintain an optimal position during the flight phase; also through the same earphones it is possible to listen to music that has been especially designed for enhancing all the sensations attached to the flight experience.

8) Microphone with high sensitivity integrated into the lower right/left side of the helmet, such microphone accomplishing the double task of allowing communications between the user/users and the operator at the consoles or the grate tutor, and case of need launching a voice alarm to the control room so that the latter can electronically intervene, modulating or interrupting the air flow causing the flight.

9) Integrated 3D visor placed to protect the eye zone of the face, in addition such visor will be made with three-dimensional technology (3D) in order to permit the viewing of films projected on enclosing large screens of dynamic three-dimensional images, which surround the user(s) during the flight phase as well as the spectators which take part in the show from the stands.

10) Radio alarm microsensor placed on one of the wrists or fixed to one end of the helmet whose signal is immediately displayed on the command console in the control room.

An alternative embodiment of the present invention provides for placing said inventive system at about 0.50 - 1.00 m from the ground, positioning all of the equipment in a reinforced concrete tank. This system actually offers numerous advantages, consisting of the simplicity of putting away the system in winter months, where the structure is used seasonally for a few months a year, in that the

visibility of the entertainment system with respect to the surrounding public is particularly emphasized. In addition, the economical advantage attained with respect to a system placed on a modular structure of metal structural work must also be considered.

Brief description of the drawings

FIGURE 1 shows the top view of the three-propeller turbine of one embodiment of the present invention;

FIGURE 2 shows the upper-front view of the main devices composing the present invention, with the front part of the zone ZP partially omitted for display reasons;

FIGURE 3 shows the top view of the main devices composing the present invention;

FIGURE 4 shows the upper-front view of the multi-turbine system with multiple chambers of the alternative embodiment of the present invention.

FIGURE 5 shows the overall top view of all the devices of the present invention, including the overall plan of the structure with one position.

FIGURE 6 shows the front view of the perimeter walls and telescopic cover with asymmetric, dynamic multiple sheets.

FIGURE 7 shows the rear view of a truck with bolster with the main devices integrally mounted and with the mobile vertical support walls in the process of opening.

FIGURE 8 shows the rear view of the truck with bolster of Figure 7 with all of the main and secondary devices mounted.

Preferred description of the invention

As a non-limiting example, we will now describe an embodiment of the present invention applied to the actual case.

Without at all wishing to limit the range of the invention, it is first of all necessary to state that the structure, object of the present invention, can be favorably used not only for parachutist preparation, but also in the most common and popular amusement parks and certain military applications.

The functioning of said structure is actually rather simple, since it is based on the air jet generated by the propellers/rotors EG, positioned under the various positions, which push the users positioned on the flight grates from the bottom upward, until they are suspended in air at a pre-established height.

While it seems spectacular, in reality such phenomenon is based on the fundamental laws of physics regarding "external motion", where by “external motion” it is intended that part of fluid-dynamics which studies the motion of fluids around bodies, or better yet studies the forces that the bodies receive from the moving fluids. The general principle states that the force exerted by a fluid on a body is generated by the pressure acting on the surface of said body.

Specifically, the force of the air acting on the user body is proportional to the product of the pressure exerted, by the surface on which the flow acts.

Consequently, when the force exerted by the fluid exceeds the weight force of the user, the user tends to go up, while when the force exerted by the fluid equals the weight force of the user, the user tends to remain suspended in air (point of equilibrium). Therefore, by varying the surface exposed by the user/users with respect to the laminar air flow, that is by tilting the user’s body to a greater or lesser degree with respect to the fluid force lines, the user will vary the pressure

exerted on himself and will therefore receive a greater or lesser upward thrust. In practical terms, the user/users will reach the maximum pre-established height, equal to a height in the range of 3 m - 15 m, when he assumes a position perfectly orthogonal to the air flow.

In practice, before entering his position, the user will put on the semi-lift suit and the related integrated 3D helmet, then his physical characteristics will be detected, such as weight and build, which will be transformed by means of the load cell into an electrical signal sent in output towards the central unit UAV. Then the user/users will place himself/themselves on the flight grate GV, which is only hit by a low air flow. After which the central unit, due to the aforesaid innovative joined inverter and variable pitch propeller/rotor system, will create a flow of modulatable air through the flight grate, precisely set with regard to the build and weight of the user and thus capable of starting the rise and fall of the user in an entirely modulatable and controllable manner. As already mentioned, the user, at the start of the flight phase, will be set on the air flow that is not yet at lift speed, but is sufficient for starting the free flight at a height of about one meter. Subsequently, the flow will gradually increase until it reaches the flow speed which will bring the user to a pre-established height of 3 - 15 meters from the floor. Finally, and in reverse manner, the flow will be modulated in order to make the user descend in an entirely controllable and fully safe manner.

The inventive joined use of the variable pitch propeller and the inverter also leads to numerous advantages, both economical and industrial, such as the possibility of not having to stop the motor during the weighing and entrance of the user/users in the flight grate, drastically reducing energy consumptions and the motor stops and thus the stresses to which the joint and the drive shaft are subjected during motor restart.

Another entirely exclusive and particular feature of such structure is the safety equipment which allows the users to savor their experience in complete safety.

It is first of all necessary to recall the pneumatic emergency device composed of two semicircles SC slidable on a horizontal plane and forming a circular surface placed to further protect the expulsion duct CE. Such semicircles SC are controlled by means of the suitable rod by the instantaneous release pneumatic pistons PR which in case of emergency, detected by the seismic sensors via break point control of the flight grate GV and/or by the operator of the consoles in the control room, allow the total closure of the expulsion duct CE in just two seconds. Actually such system has a double advantage, since on one hand it prevents the user, in case of improbable breaking of the flight grate GV, from falling inside the turbine, on the other hand it can also be actuated for the closure and consequent protection of the motor and all electronic and mechanical devices constituting the core of the inventive structure when raining or during idle periods.

Other devices, regarding the safety of the users beyond the usual suit and helmet, are the electronic ones referred to above, such as the earphones, the microphone and possibly the radio alarm microsensor, which allow communication between the user and the operator at the consoles at any moment and in such a manner that the latter can electronically intervene, modulating or interrupting the air flow. In reality, the earphones placed inside the earflaps of the helmet carry out multiple functions, including that of listening to possible advice or instructions by the control room or grate tutor, i.e. calming down the user/users, also from possible panic attacks, and of no less importance listening to music or the audio from the 3D film projection that has been especially designed for enhancing all flight experience sensations.

A further characteristic, where the possibility is provided for using several positions simultaneously and/or the stands TB (used by those who wished to see the users in action), are the suitably and rigidly created structural dimensions. Each position must be spaced from the adjoining one by means of said zones ZP, so as to totally prevent contact between the users of different positions. Also the

aforesaid stands, which preferably surround the single or additional positions, must be totally separate from the positions themselves (Figure 5) and unreachable by the users during flight, and moreover for obvious safety reasons they must not allow the public direct access to the user positions.

Another inventive characteristic is that referable to the telescopic cover with dynamic multiple sheets VM (Figure 6), which has the particular feature of being manipulated and thus adaptable through a suitably designed software to multiple situations, all with the object of enhancing, accentuating and improving both the free flight phases and the sensations produced by such flight. For example, as specifically shown in Figure 6, it is possible to create, by maintaining only one single sheet suitably closed, i.e. leaving only one cover segment, the dynamic image projection PD on the wall under such sheet and thus enhance all the free flight sensations experienced by the user/users and by those who watch them.

Further characteristic of the present inventive structure is that, due to the constituent and structural characteristics, it results completely modular and thus adapted to be easily assembled and dismantled. Such particular feature renders said structure practically unique, since once dismantled it can be transported by an articulated tractor-trailer and thus be part of the popular so-called "itinerant show" sector, or it can be packed inside a container and then easily shipped.

Another characteristic of the preceding invention, and complementary to the modularity concept just discussed, is that the main devices referred to in the description of the invention can all be integrally mounted on a truck with bolster or on a trailer truck, so that by dismantling the secondary and bulkier parts, everything can be transported in a manner analogous to that of common itinerant show trailers towed by tractor trucks. As can be specifically observed in Figures 7 and 8, the present invention provides that the aforesaid truck with bolster has mobile vertical support walls PV actuated by means of an electromechanical and/or hydraulic system, easily capable of supporting and partially or totally

constituting the secondary structures of the present invention, and also to render the itinerant version of said structure completely autonomous, both regarding functioning and transportability.

Finally, the versatility of use of the present invention must not be ignored, which due also to the aforesaid alternative embodiment allows - through the system of multi-turbines with multiple chambers for dynamic air induction at constant and controlled flow, as shown in Figure 4 - making a flight grate with a diameter in the range of 3 - 13 meters, preferably 9.00 m, that is capable of making over 20 users fly, likely simultaneously. All of this while maintained unaltered the safety, quality, technology and even maintaining the dimensions and electrical consumptions at acceptable levels.

Even if such invention has been described with reference to the specific and actual embodiment shown in the present document, it must not be considered limited to the indicated details; moreover, the patent must be considered comprehensive of the modifications and changes which can derive from the following claims.

Claims

1. A modular structure capable of simulating a zero gravity condition by means of the single flow of constant and stabilized air, allowing the free and dynamic floating/flight of one or more people simultaneously, characterized in that it comprises a common support structure (SS) made of metal structural work, composed of vertical posts and horizontal longitudinal members, capable of suitably supporting the main devices of the present invention comprising:

- a turbine composed of at least three variable pitch propellers and/or vane blades referred to as propellers/rotors (EG), connected by means of the respective motor shafts to the electric motors and/or combustion motors integral with the support structure (SS), the suction collectors (CA) for the static air entering each propeller/rotor (EG), the convergence zone (ZC) of the dynamic air thrust by the propellers/rotors (EG), placed without interruption with regard to said suction collectors (CA) and wherein between said convergence zone (ZC) and said suction collectors (CA) at least one propeller/rotor (EG) is vertically placed for every single collector, and finally the expulsion duct (CE) which can be considered as a protrusion extending vertically from the aforesaid convergence zone (ZC) and in which the dynamic air coming from the aforesaid propellers/rotors (EG) assumes a controlled, laminar, vertical and upward flow;
- at least one emergency pneumatic device for covering the expulsion duct (CE), composed of two semicircles (SC) slidable on a horizontal plane, made of lightweight aluminum and/or ABS with high impact strength and overall constituting a circular surface, wherein said semicircles are each connected by means of at least three points to the support structure and wherein at least two of said three points, i.e. the support points (PE) diametrically placed on the base of each semicircle (SC), are integral with two blocks (PO) which slide horizontally on the horizontal longitudinal members of said support structure (SS) and wherein

at least one point (PC), i.e. that medially arranged on the semicircle (SC), is connected to a rod connected to an instantaneous release piston (PR) integral with said support structure (SS) and wherein the actuation of said instantaneous release piston (PR) is carried out manually or automatically;

- at least one semi-elastic circular protection net sufficiently permeable to the aforesaid laminar air flow and called flight grate (GV), placed along a horizontal plane that is above both the upper edge of the expulsion duct (CE) and the plane occupied by the aforesaid semicircles (SC) slidable by means of the blocks (PO), wherein such flight grate (GV) is capable of supporting and damping, without being broken, the weight of a human body or where provided the weight of additional people, in free fall from a maximum height predetermined for every single position and wherein in contact with such flight grate (GV), at least one seismic sensor is present which is adapted to detect the break point and is capable of instantaneously and automatically activating the aforesaid instantaneous release piston (PR);

- zone (ZP) arranged peripherally and entirely without interruption with regard to said flight grate (GV), capable of supporting and smoothing the falls of the users, preventing possible user injuries and having a size such to render impossible the impact between the users of different adjoining positions and/or between the user/users and any complementary part of the structure, such as the stands (TB), the perimeter walls and the covers.

2. A structure according to claim 1, characterized in that said turbine is entirely substituted with a system of multi-turbines with multiple chambers for dynamic air induction at constant and controlled flow wherein at least two separate chambers are present, that is the stabilized air compression and containment chamber (CC) and the stabilized air transformation and induction chamber (CT), preferably positioned at an upper level, wherein both said chambers are mutually

communicating by means of at least one nozzle (AV), whose variable opening is electronically stabilized with a negative anti-reflux valve system and is capable of allowing the inflow, in the chamber (CT), of the highly compressed and stabilized air coming from the chamber (CC), wherein said system comprises at least three variable pitch propellers/rotors (EG) connected by means of the related motor shafts to electric motors and/or combustion motors, which, due to the respective static air inlet collectors (CA), push the air to first pass through the negative anti-reflux valves (VA) and then into the chamber (CC), wherein said system also comprises three further variable pitch propellers/rotors (EG) connected by means of the related motor shafts to the electric motors and/or combustion motors, which by means of the respective static air inlet collectors (CA) push said air into the chamber (CT), characterized in that due to the combined flow of high pressure air coming from the chamber (CC) which encounters the compressed air flow present in the chamber (CT), a perfectly modulatable, vertical laminar air flow is created in the expulsion duct (CE), such air flow at the same time provided with a wide section that can be simultaneously utilized by a high number of users.

3. A structure according to claim 2 capable of supporting a flight grate (GV) with a diameter in the range of 3 - 13 metres, more preferably 9.00 metres and capable of being used even by 20 or more users simultaneously.

4. A structure according to the preceding claims, characterized in that it comprises the following further structures:

- dynamic telescopic upper cover with asymmetric multiple sheets made by means of at least four dynamic multiple sheets (VM) of plastic or metal material, wherein said dynamic multiple sheets (VM) have the shape of telescopic segments, i.e. they have the lower surface of each segment capable of sliding and being superimposed on the upper surface of the adjoining segment, forming, where there

is the minimum possible superimposition of the aforesaid surfaces, a hermetic cap cover, wherein such dynamic telescopic cover with asymmetric multiple sheets has the particular feature of being manipulated and thus adaptable, through a suitably conceived software, for multiple situations;

- weighing system (SP) composed of the presence of a weighing plate, of a load cell (OCF) which detects in input the weight of the user and which supplies an electrical signal proportional to the weight itself in output towards the central unit (UAV) placed in the control room, composed of a connector to which an alphanumeric display is connected and wherein said central unit (UAV) carries out the functions of managing and adjusting the propeller revolutions as a function of the user weight, detecting the speed of the air and consequent blocking over a certain deviation value from that set, recording the use time of the machine and statistical storing of possible failures or malfunctions;

- semi-lift suit made of highly resistant non-woven fabric fiber which in addition to protecting the user's clothes is capable of harmonizing and unifying the entire body surface exposed to the air flow;

- semi-rigid, enclosing helmet complete with earflaps worn by the user, which in addition to protecting him, allows supporting various technologies including an integrated 3D visor, the microphone and the earphones through which the user is connected with the operator in the control room, can listen to music or the audio of the projection of the 3D films especially designed for enhancing all flight experience sensations;

- radio alarm microsensor placed on one of the wrists or fixed to one end of the helmet, whose signal is immediately displayed on the command console in the control room.

5. A structure according to the preceding claims, characterized in that it comprises a joint inverter and variable pitch propeller/rotor system for controlling the air

flow speed, wherein the inverter is an electronic device capable of varying both the frequency of the current and reducing the power required by the starting motor and wherein the variable pitch propeller/rotor is an electromechanical mechanism, which, due to the variation of the pitch of the propeller/rotor operated also by a system of electronic inputs coming from a load cell, perfectly sets the air flow with regard to the weight of the user and the height that the user must reach, maintaining the rotation speed unaltered.

6. A structure according to claim 4, characterized in that said dynamic multiple sheets (VM) are composed of synthetic fiber with multiple high performance solar cells, wherein such application system is capable of picking up solar heat energy and transforming it into electrical energy.

7. A structure according to the preceding claims, characterized in that it is situated buried or in a reinforced concrete tank beneath the ground.

8. A structure according to the preceding claims, characterized in that in contact with the flight grate (GV), there is at least one seismic sensor adapted to detect the break point and wherein such seismic sensor in case of emergency is capable of instantaneously and automatically activating the instantaneous release piston (PR), allowing the immediate covering of the expulsion duct (CE) through the closure of the two semicircles (SC).

9. A structure according to the preceding claims, characterized in that it is completely modular and therefore adapted, once dismantled, to being packed inside a container and then transported by an articulated tractor-trailer or easily shipped.

10. A structure according to the preceding claims, characterized in that all the main component devices can be integrally mounted on a trailer truck or truck with bolster having vertical support walls actuatable by an electromechanical and/or hydraulic system, easily capable of supporting and partially or totally constituting the secondary structures of the present invention and rendering the itinerant version of said structure completely autonomous, both regarding functioning and transportability.

11. A structure according to the preceding claims, characterized in that the enclosing screen, especially designed for the projection of dynamic 3D films, has the particular feature of totally immersing the user/users and the spectators in the especially produced video simulations.

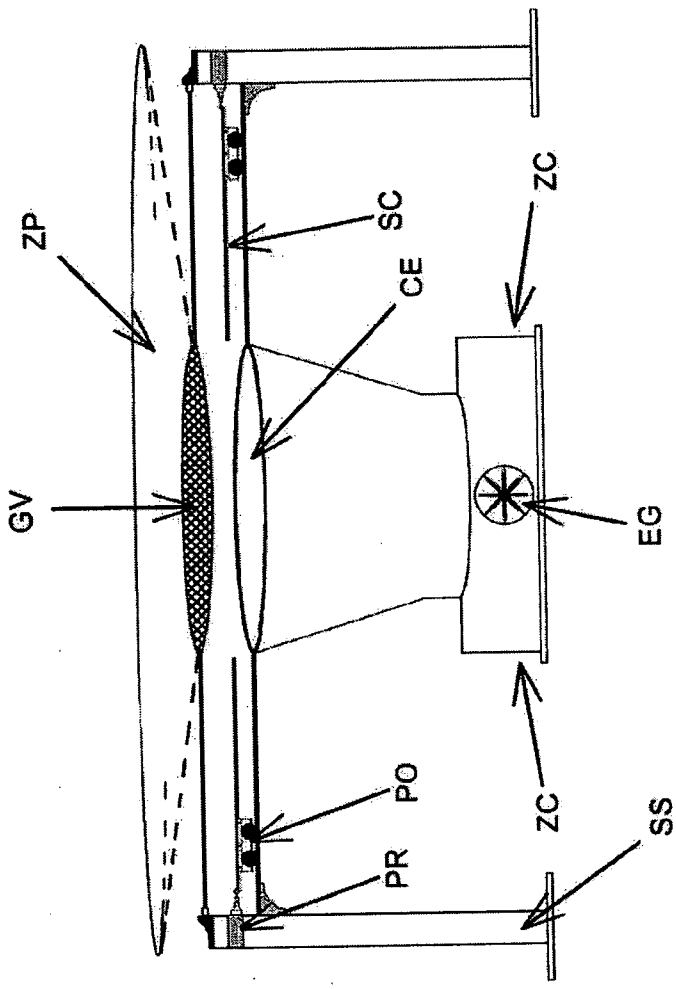

Fig. 2

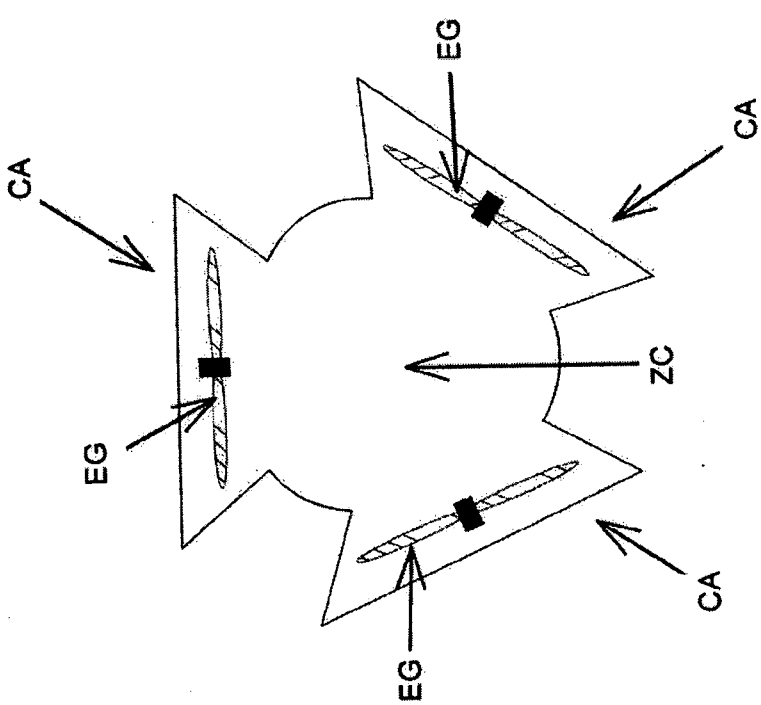

Fig. 1

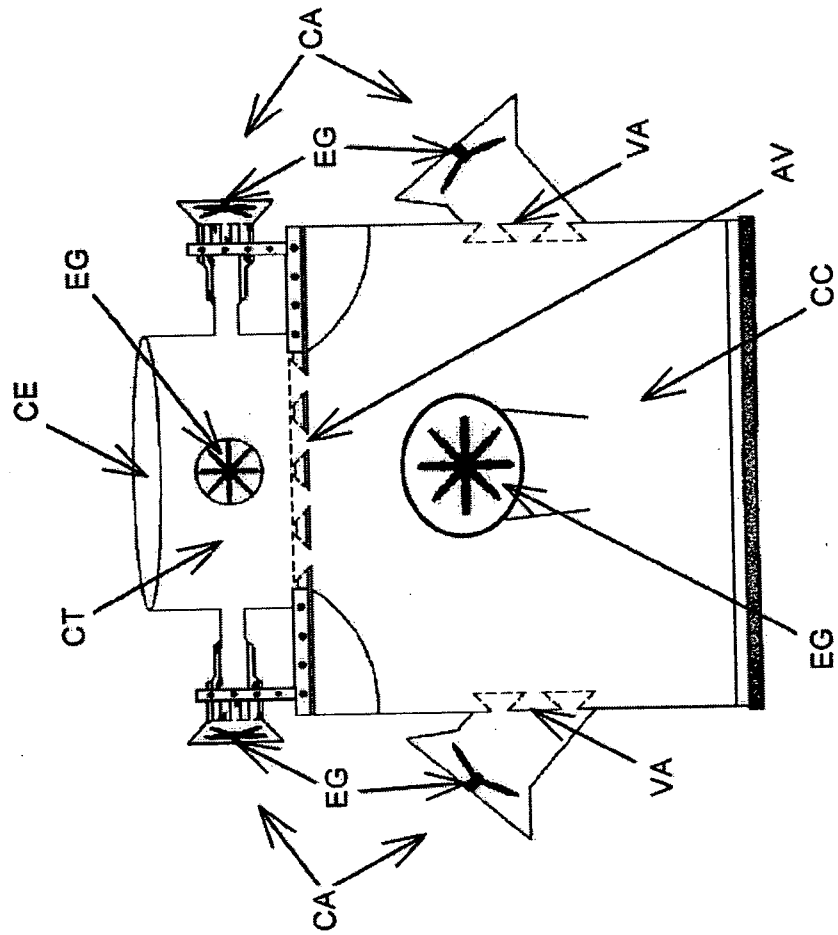

Fig. 4

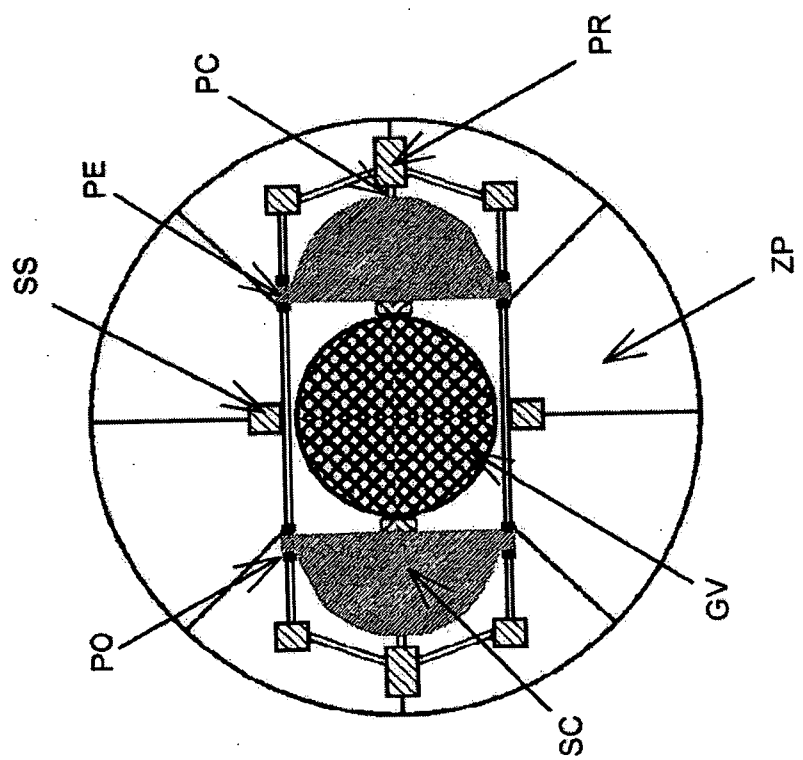

Fig. 3

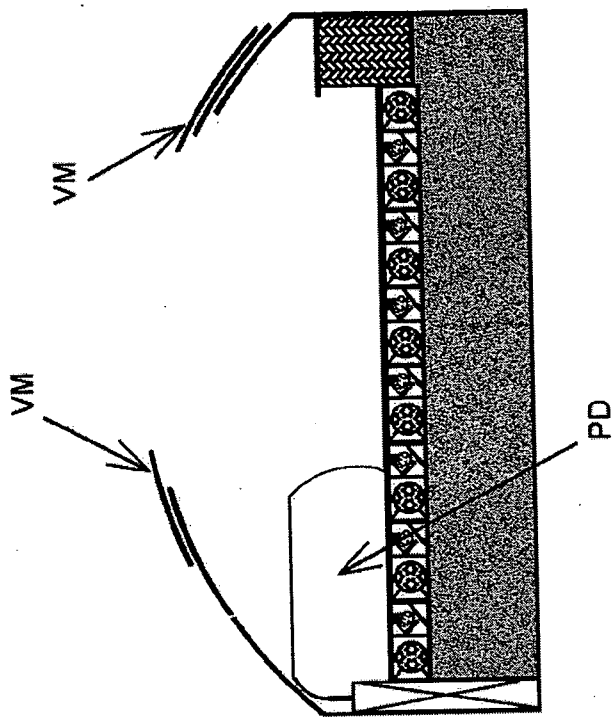

Fig. 6

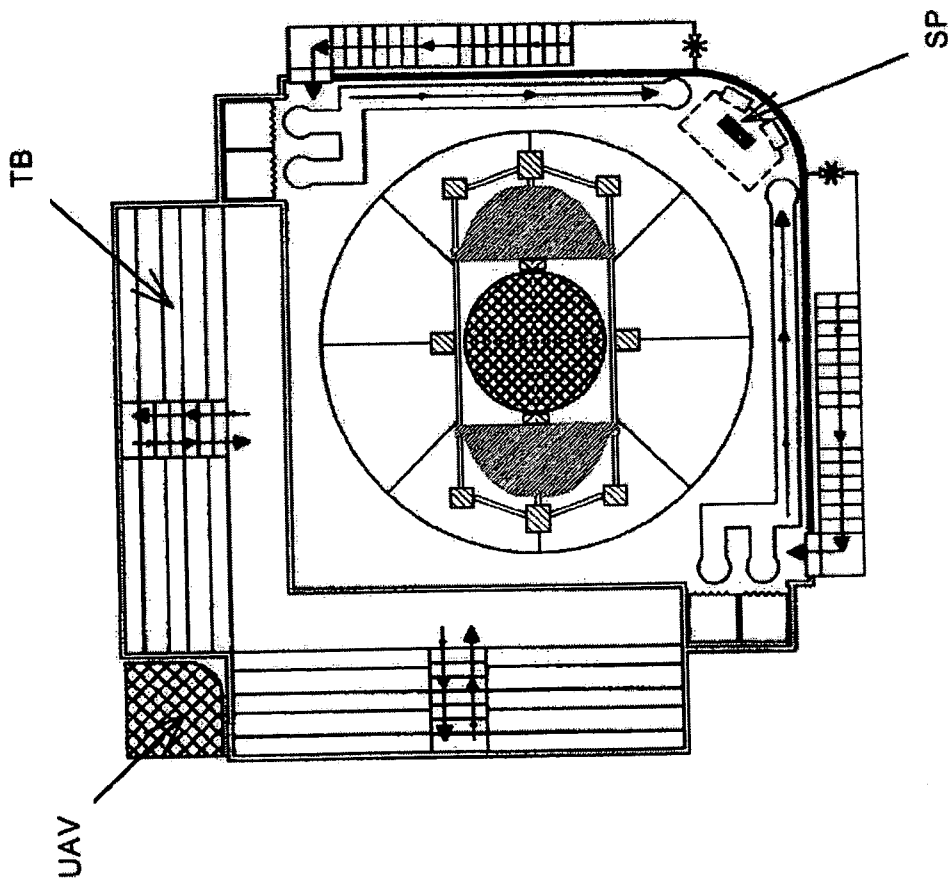

Fig. 5

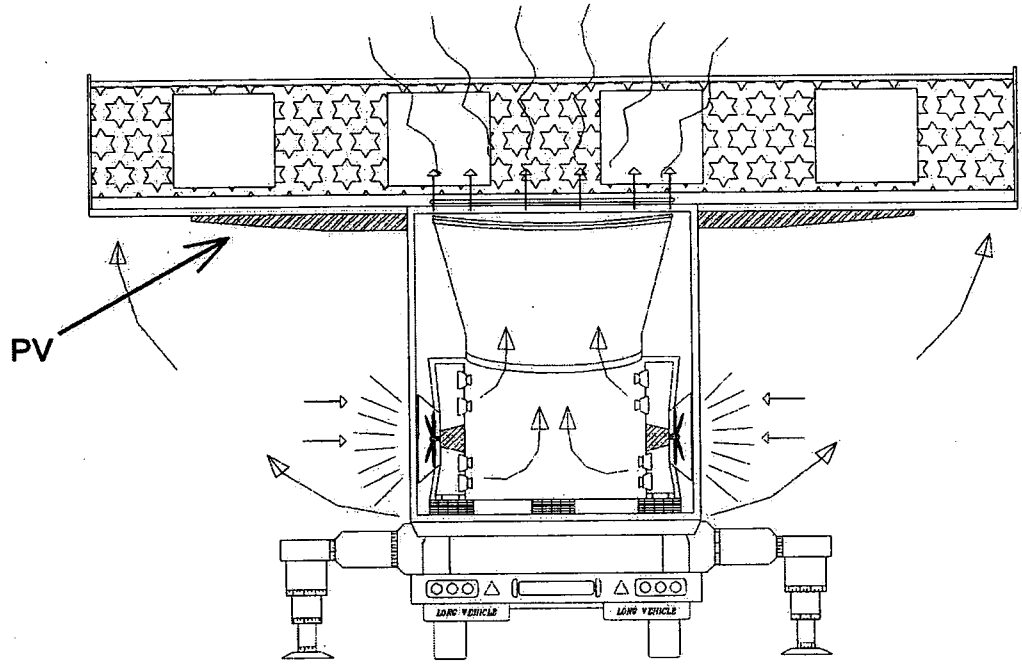

Fig. 8

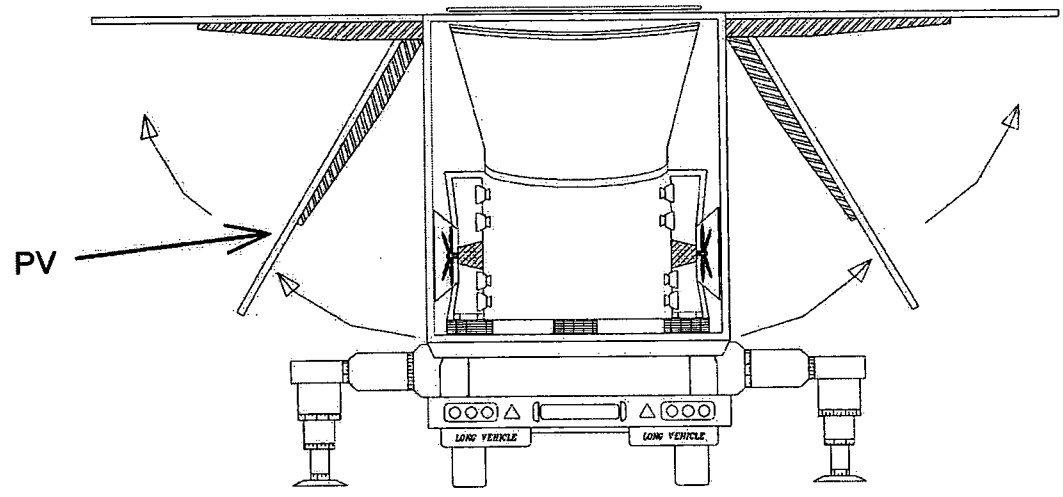

Fig. 7

INTERNATIONAL SEARCH REPORT

International application No
PCT/IT2008/000605

A. CLASSIFICATION OF SUBJECT MATTER
INV. A63G31/00

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)
A63G B64D

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 practical, search terms used)
EPO-Internal, WPI Data, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2004/115593 A1 (HATLESTAD KATHRYN W [US] ET AL) 17 June 2004 (2004-06-17) figures 1-22	1-11
A	US 5 593 352 A (METHFESSEL HARLEY A J [US] ET AL) 14 January 1997 (1997-01-14) column 8, line 19 - line 23; figures 1-7 column 9, line 36 - line 47	1-11

☐ Further documents are listed in the continuation of Box C.

☒ See patent family annex.

* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
5 February 2009	16/02/2009

Name and mailing address of the ISA/	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31–70) 340–2040, Fax: (+31–70) 340–3016	Shmonin, Vladimir

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No
PCT/IT2008/000605

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2004115593 A1	17-06-2004	NONE	
US 5593352 A	14-01-1997	NONE	