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(54) Benævnelse: **FRITFALDSSIMULATOR**

(56) Fremdragne publikationer:
JP-A- 10 156 047
US-A- 3 484 953
US-A- 6 083 110
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DESCRIPTION

TECHNICAL FIELDS

[0001] The invention relates to a free fall simulator creating the conditions equaling the environmental conditions and air stream around the person present in the "flight chamber" in the same way as during a free fall.

BACKGROUND ARTS

[0002] Until now, there have been produced wind tunnels, both in a design which is open, energetically more demanding than the enclosed design and not enabling the all-year operation and designs which are enclosed but the position of fans in the wind tunnel upper horizontal part or the cooling by air exchange with the ambient atmosphere, presuppose high energetic demands, frequent pressure and thermal losses, great weight of the whole equipment and excessive vibrations. With the also known application of fans in a vertical position the tunnels are however equipped with the single return branch in which all the fans are installed at once, which results in most deficiencies as those of the former technical designs. These basic concepts are included e.g. within US5209702, US5655909, US5753811, US6083110, US6805558, US2006021428(A1), A63G31/00, B64D23/00, G09B9/00, nevertheless, all of them contain more or less most of the basic deficiencies distinguished, especially, by high energetic demands of the whole equipment, high construction height, pressure losses in the wind tunnel and excessive noise of the whole equipment. Last but not least, a great drawback is the necessity of a robust construction, as the equipment center of gravity is located in the upper third of the equipment. Document US-A1-2006/0025227 discloses a free fall simulator comprising: a flight chamber provided with an air supply from fans, and a wind tunnel system extending from the upper part of the flight chamber and having two separate branches for guiding an airflow; the wind tunnel system further comprising: a distributor positioned above the flight chamber, bending vanes connecting the two separate branches of the wind tunnel system below the flight chamber, a nozzle positioned below the flight chamber between the bending vanes and the flight chamber, wherein the static pressure in the flight chamber is near to the atmospheric pressure, wherein the airflow is divided into the separate branches of the wind tunnel system by the distributor, such that said airflow is again joined in the bending vanes, so as to rectify the airflow to the nozzle, and the airflow entering the nozzle thereby travels back to the flight chamber, and the wind tunnel system of the free fall simulator further includes a cooling system.

DISCLOSURE OF INVENTION

[0003] The above mentioned deficiencies are eliminated using a free fall simulator according

to claim 1. In particular, the free fall simulator is formed by the central flight chamber provided with the air supply from fans, in accordance with this invention, the substance of which consists in that the fans driving air into the flight chamber are installed in a vertical position, in separate branches located in parallel with the flight chamber. These separate branches with fans are split in the wind tunnel system already in its upper horizontal section after the flight chamber. This splitting allows also a better forming of the airflow in tunnel ducts and corners before entering to the fans due to its angular rotation. The free fall simulator is moreover equipped with the system of internal diffusers and the cooling, designed by means of the internal system with heat exchanger and auxiliary fans minimizing pressure losses in the wind tunnel, thus reducing the required input of the entire tunnel drive.

[0004] A higher efficiency when compared with the existing technical designs has been achieved also by optimization of the shape of the whole wind tunnel, thanks to which the static pressure in the flight chamber is near to the atmospheric pressure, which is more natural and causes, namely, a lower stress affecting the flight chamber walls from excess pressure. In view of the fan installation in a vertical position in separate branches the system in question is capable of achieving an overall lighter construction of the whole equipment and a reduction of vibrations arising during the operation.

[0005] The free fall simulator according to this invention has the greatest advantage in that the fans are installed in a vertical position in separate branches, which are split already in the wind tunnel upper horizontal part, the cooling system minimizes pressure losses in the wind tunnel and thus reduces the required input of the tunnel drive and increases efficiency of the whole equipment. Thanks to that a lower construction height and a lower noise of the whole equipment has been achieved. Static pressure in the flight chamber is near to the atmospheric pressure, which results in a lower stress affecting the flight chamber walls from excess pressure.

BRIEF DESCRIPTION OF DRAWINGS

[0006] The invention will be clarified more in detail by means of Fig. 1, showing the free fall simulator as a whole assembly.

MADE FOR CARRYING OUT THE INVENTION

[0007] The free fall simulator consists of the flight chamber 2, under which the net 1 of the flight chamber is installed. Air from four fans 9 passes through the flight chamber 2 from the bottom upward and enters via the distributor 4 with bending vanes, which separates the airflow to the right side and the left side, each of which is farther divided into individual ducts with separate fans 9, while changing at the same time the airflow direction from the vertical one to the horizontal one. After the distributor 4 the air flow passes via the diffuser 5, dividing a part of

the wind tunnel into separate ducts with fans, while reaching the four, fully independent ducts with fans 9. Diffuser 6 of the wind tunnel duct rectifies the air flow to the bending corner 7 with vanes. In the bending corner 7 with vanes the air flow changes its position from the horizontal one to the vertical one downward and passes via the transition 8 to the fan 9. In each of the separate ducts the diffuser 10 of the fan, which rectifies the air flow to the bending vanes 11 installed in the concrete vat 13 forming the wind tunnel lower part, is located after the fan 9. In the bending vanes 11 the movement from the vertical one to the horizontal one takes place and the cooling system 12 with heat exchanger and auxiliary fans is installed at the outlet, thanks to which the pressure losses in the wind tunnel are minimized and the input of the tunnel drive is thus reduced. The entire horizontal part is located in the concrete vat 13, forming the wind tunnel lower section. Air divided in the distributor 4 is again joined in the bending vanes 14 which connect the wind tunnel right and left sides and rectify the airflow to the nozzle 15. At the end of the whole cycle the air flow enters the nozzle 15 and back via the net 1 to the flight chamber 2.

APPLICABILITY OF THE INVENTION

[0008] The invention may be utilized both for the sporting simulation of free fall by the wide public and for the simulation of flight and behavior of various objects during their flight.

Key:

[0009]

1 net on the flight chamber floor

2 flight chamber

3 diffuser after the flight chamber

4 distributor

5 diffuser dividing into separate ducts with fans

6 diffuser of the wind tunnel duct

7 bending corner with vanes

8 transition to the fan

9 fan

10 diffuser of the fan

11 bending vanes in concrete vat, forming the wind tunnel lower section

12 cooling system with heat exchanger and auxiliary fans

13 concrete vat forming the wind tunnel lower section

14 bending vanes joining two ducts of the wind tunnel and rectifying the air flow to the nozzle

15 nozzle

REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

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- US5655909A [0002]
- US5753811A [0002]
- US6083110A [0002]
- US6805558B [0002]
- US2006021428A1 [0002]
- US20060025227A1 [0002]

Patentkrav

1. Fritfaldssimulator omfattende:

et flyvekammer (2) forsynet med en luftforsyning fra blæsere (9), og

et vindtunnelsystem, der strækker sig fra den øvre del af flyvekammeret (2) og har to separate forgreninger til at føre en luftstrøm, hvor hver af nævnte forgreninger af vindtunnelsystemet er inddelt i separate skakter; hvor vindtunnelsystemet yderligere omfatter:

en fordeler (4) positioneret over flyvekammeret (2),

bøjeskovle (14), der forbinder de to separate forgreninger af vindtunnelsystemet under flyvekammeret (2), og

en dyse (15) positioneret under flyvekammeret (2) mellem bøjeskovlene (14) og flyvekammeret (2);

hvor blæserne (9) er installeret i en vertikal position i separate skakter af vindtunnelsystemet, placeret parallelt med flyvekammeret (2), hvor det statiske tryk i flyvekammeret (2) er nær det atmosfæriske tryk,

hvor de separate skakter med blæsere (9) er delt i vindtunnelsystemet i dets øvre horisontale afsnit efter flyvekammeret (2),

hvor luftstrømmen er inddelt i de separate forgreninger af vindtunnelsystemet af fordeleren (4), således at nævnte luftstrøm igen forbindes i bøjeskovlene (14), for således at ensrette luftstrømmen til dysen (15), og luftstrømmen, som kommer ind i dysen (15), derved bevæger sig tilbage til flyvekammeret (2),

og hvor vindtunnelsystemet af fritfaldssimulatoren yderligere inkluderer et kølesystem (12) med en varmeveksler og hjælpeblæsere, hvor kølesystemet (12) er installeret ved udløbet af hver af de to separate forgreninger af vindtunnelsystemet.

2. Fritfaldssimulatoren ifølge krav 1, hvor vindtunnelsystemet yderligere omfatter et system af indre diffusorer (3, 6, 10).

DRAWINGS

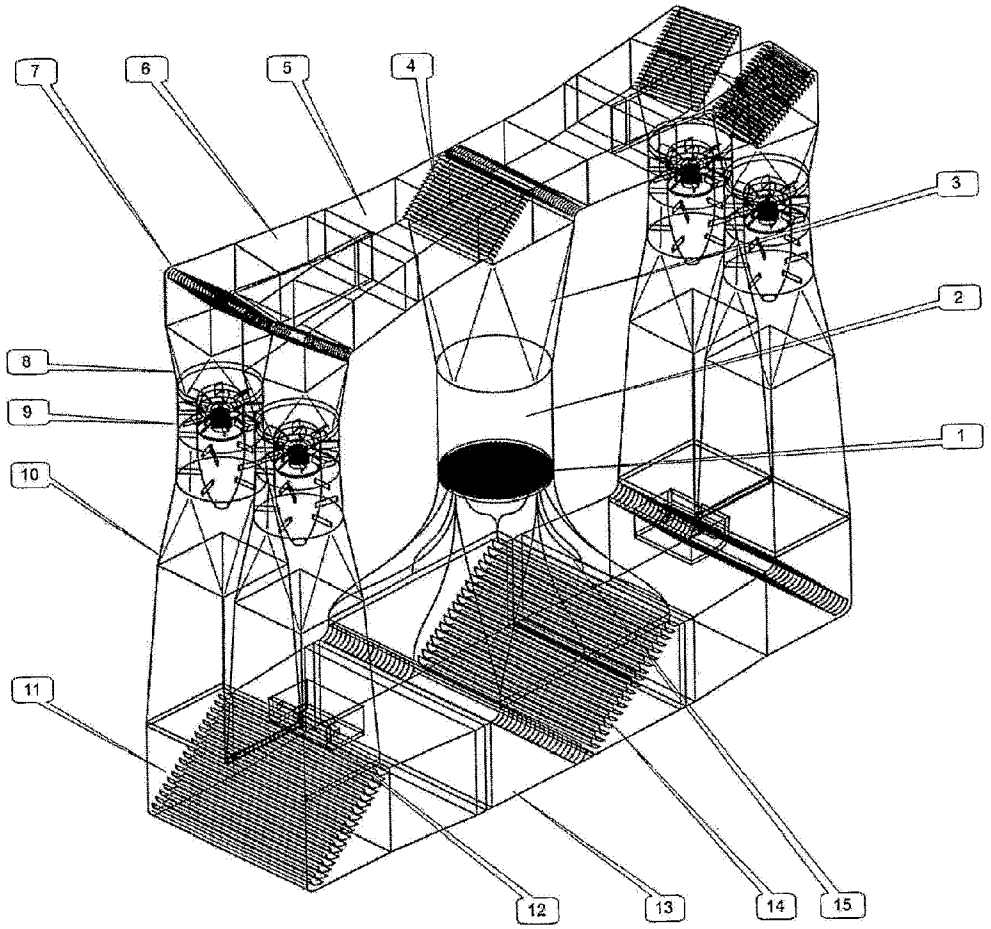

Fig. 1