Claims

1. A building structure (1) comprising:

a stationary core (2) extending upright through and supporting weight of one or more rotable stories (3) of the building structure (1), each story (3) comprising one or more floor units (4),

said story (3) forming an outer peripheral portion (5) which defines an outer surface (6) of the story (3), and an inner support portion (7) through which the story (3) is supported by the core (2) via an interface (8) along an external perimeter of the core (2),

wherein a horizontal cross-section of the core (2) has a substantially circular said external perimeter at the interface (8), the interface (8) and the inner support portion (7) of the story (3) hence being both of substantially annular shape,

wherein said story (3) is stiffened by a space frame (9) extending from the inner support portion (7) to the outer peripheral portion (5) and making the story (3) a self-supporting rigid body cantilevered off the core (2) and structurally independent of all other stories (3),

wherein the story (3) transmits gravity-induced loads to the core (2) via the interface (8) only by means of vertical forces,

wherein the space frame (9) comprises a truss-shaped, lightweight rigid structure constructed from interlocking struts (15) in a geometric pattern, the space frame (9) has an upper and a lower membrane (10, 11), each membrane (10, 11) having a number of substantially radial ribs (12) and substantially circumferential ribs (13) intersecting each other in nodes (14) of said space frame (9), all the nodes (14), from which the struts (15) extend, are placed at the intersection of one of said substantially radial ribs (12) and one of said substantially circumferential ribs (13), and horizontal gravity-induced loads are self-balanced within the ribs (12, 13) and in the membranes (10, 11),

wherein a separation device (18) located between two of the stories (3) separates an external environment (19) of the building structure, which is in contact with all atmospheric elements, from an internal environment (20) of the building structure, which is in contact with the space frame (9) and the interface (8).

2. The building structure (1) according to claim 1, wherein the separation device (18) comprises a brush (22) extending substantially circumferentially around a vertical axis (21) of a respective section of the supporting core (2).

3. The building structure (1) according to claim 1, wherein the separation device (18)

comprises a liquid seal (23) extending substantially circumferentially around a vertical axis (21) of the respective section of the supporting core (2), and comprising a trough (24) containing a liquid, and a separation lip or wall or sheet (25) projecting into the trough (24) and being immersed in said liquid, wherein the trough (24) is fixed to one story (3) or to the core (2), and the separation lip or wall or sheet (25) is fixed to a vertically neighboring story (3), or vice versa.

4. The building structure (1) according to claim 1, comprising a plurality of lifting jacks (43) for temporary vertical displacement of an entirety of the story (3), or only part of the story (3), with respect to the core (2), from a predetermined operating position to a maintenance position, which allows at least one of (i) access to and maintenance or (ii) replacement of items present in the internal environment (20).

5. The building structure (1) according to claim 1, wherein horizontal surfaces of the separation device (18) are covered with damping layers made of shock absorbing material forming a damper during extreme events.

6. The building structure (1) according to claim 5, wherein the extreme events are earthquakes.

7. The building structure (1) according to claim 1, wherein the interface (8) between the inner substantially annular support portion (7) of the story (3) and the core (2) comprises a device enabling a rotatable coupling of said inner annular support portion (7) of the story (3) to said stationary core (2), thus enabling the story (3) to rotate about the stationary core (2), independently of any of the other stories (3), in a substantially horizontal story (3) rotation plane (35).

8. The building structure (1) according to claim 7, wherein the interface (8) between the inner support portion (7) of the story (3) and the core (2) comprises rolling track means (32) having an annular rolling track (33) extending substantially circumferentially around the stationary core (2) and fixed to one of the stationary core (2) and the inner support portion (7) of the story (3), and a plurality of rolling elements or wheels (34) held by the other one of said stationary core (2) and the inner support portion (7) of the story (3), and rollably engaging the annular rolling track (33).

9. The building structure (1) according to claim 8, wherein the rolling track means (32) comprise a rail-wheel assembly having a single substantially annular rail (38) forming the rolling track (33), and a plurality of wheels (34) arranged to abut on the single rail (38) and adapted to roll along the single rail (38) to enable the rotation of the rotatable story (3) about the stationary core (2).

10. The building structure (1) according to any of claim 8, wherein one or more of the wheels (34) are supported on an eccentric portion (45) of a rotatably adjustable wheel axle (46) which is configured to be turned:
in a working position in which the eccentric portion (45), together with the wheel (34), is turned vertically towards the rail (38),
in a maintenance position in which the eccentric portion (45), together with the wheel (34), is turned vertically away from the rail (38), thereby detaching the individual wheel (34) from the rail (38) for the purpose of at least one of maintenance or replacement.

11. The building structure (1) according to any of claim 7, comprising drive means (39) to impart a rotational motion to the rotatable story (3) about the stationary core (2).

12. The building structure (1) according to claim 11, wherein the drive means (39) comprise one or more motors (40) associated to said rotatable story (3), said motors (40) being positioned along a circumference of the stationary core (2) and configured to impart a motion to one or more drive members (41) connected to one of the stationary core (2) and the rotatable story (3), said drive members (41) engaging one or more corresponding driven members (42) connected to the other one of the stationary core (2) and the rotatable story (3), to rotate the story (3) about the stationary core (2).

13. The building structure (1) according to claim 12, wherein:
the drive member (41) comprises either a friction wheel or a toothed ring,
the driven member (42) extends circumferentially around the stationary core (2) and comprises either an annular friction track having a steel or tarmac or concrete surface or an annular toothed surface.

14. The building structure (1) according to claim 12, wherein the drive member (41) imparts a motion to the driven member (42) via meshing gears or via pulley-belt transmissions.