

CLAIMS

1. A gyro stabilizer (1) comprising;
 - a rotor (3) arranged to rotate about a spin axis (s), and
 - a stator (2), whereinthe rotor (3) and the stator (2) comprise rotor and stator assemblies (31, 21), respectively, wherein the rotor assembly (31) is arranged radially outside the stator assembly (21) with respect to the spin axis (s), wherein the rotor and/or stator assemblies (31, 21) comprises magnets with magnetic axis in the direction of the spin axis (s).
- 2 The gyro stabilizer of claim 1, wherein, the rotor/and or stator assembly magnets (31a, 21a) are stacked with alternating magnetic field directions in the direction of the spin axis (s).
- 3 The gyro stabilizer of claim 1 or 2, wherein, the rotor and/or stator assemblies (31, 21) comprises rotor and/or stator intermediate elements (31b, 21b), arranged between the rotor and/or stator magnets (31a, 21a) respectively.
- 4 The gyro stabilizer of any of the claims, wherein both the rotor and stator assemblies (31, 21) comprises magnets, wherein the magnets in the stator assembly (21) are vertically aligned with the magnets in the rotor assembly (31) and interfaces the magnets in the rotor assembly (31) with opposite magnetic field directions.
5. The gyro stabilizer of any of claims 3 to 4, wherein both the rotor and stator assemblies (31, 21) comprise intermediate elements (31b, 21b), wherein the rotor intermediate elements (31b) are vertically aligned with and interfaces corresponding stator intermediate elements (21b).
6. The gyro stabilizer of any of claims 3 to 5, wherein rotor intermediate elements (31b) are arranged closer to the stator assembly (21) than rotor magnets (31a).
7. The gyro stabilizer of any of claims 3 to 6, wherein any of the rotor and/or stator intermediate elements (31b, 21b) are made in ferromagnetic material.
8. The gyro stabilizer of any of the claims above, wherein the stator and rotor assemblies (21, 31) interfaces each other and are configured to provide layered radial magnetic field lines with alternating directions in a direction perpendicular to the radial direction.

9. The gyro stabilizer of claim 8, wherein the rotor assembly (31) comprises a layered structure of rotor magnetic field producing elements (31a) separated by rotor intermediate elements (31b) in the direction perpendicular to the radial direction.
10. The gyro stabilizer of claim 9, wherein subsequent rotor magnetic field producing elements (31a) have alternating magnetic field directions perpendicular to the radial direction.
11. The gyro stabilizer of claim 9 or 10, wherein the stator assembly (21) comprises a layered structure of stator magnetic field producing elements (21a) separated by stator intermediate elements (21b) in the direction perpendicular to the radial direction, wherein subsequent stator magnetic field producing elements (21a) have alternating magnetic field directions perpendicular to the radial direction, and interfacing stator magnetic field producing elements (21a) and rotor magnetic field producing elements (21a), both have magnetic fields perpendicular to the radial direction, but in opposite directions.
12. The gyro stabilizer of any of the claims 9 to 11 above, wherein the rotor magnetic field producing elements (31a) are permanent magnets.
13. The gyro stabilizer of any of the claims 9 to 11 above, wherein the rotor intermediate elements (31b) are made of steel.
14. The gyro stabilizer of any of the claims above, comprising a rotor axle (36, 136) and a rotor frame (34, 134), wherein the rotor frame (34, 134) interconnects and rotationally fixes the rotor assembly (31) to the rotor axle (36, 136).
15. The gyro stabilizer of any of the claims above, wherein the rotor frame (34) comprises a tubular support element (32) made in carbon fibre, arranged radially outside the rotor assembly (31), wherein the tubular support element (32) is configured to support the rotor assembly (31) in the radial direction.
16. The gyro stabilizer of any of the claims 14 or 15 above, comprising a flexible coupling element (343) between the rotor axle (36) and the rotor frame (34), configured to allow the rotor magnetic assembly (31) to pivot with regard to the rotor axle (36) and the stator assembly (21).
17. The gyro stabilizer of any of the claims 14, comprising a one-piece rotor frame (134), wherein the rotor frame (134) comprises a rotor axle portion (136), a radial support portion (132), and a disc portion (142) interconnecting the rotor axle portion (136) and the radial support portion (132).

18. The gyro stabilizer of any of the claims 17, wherein the rotor axle portion (136) is in a first related embodiment supported by a rotational bearing (135) fixed in the centre of the stator element (2), interconnecting the rotor axle (136) and the stator element (2), and allowing the rotor element (3) to spin about the spin axis (s).
19. The gyro stabilizer of any of the claims 17 or 18, wherein the one-piece rotor frame (134) is made in molded or forged steel.
20. The gyro stabilizer of any of the claims 17 to 19, wherein the radial support portion (132) extends from the periphery of the disc portion (142) in a direction perpendicularly to the disc portion, to form a cylinder.
21. The gyro stabilizer of the claim 20, the rotor assembly (31) is arranged fixed to the inner walls of the cylinder.
22. The gyro stabilizer of the claim 20, wherein the rotor (3) comprises a spacer ring (137) arranged between the rotor assembly (31) and the cylinder.