CLAIMS

Claim 1 : A harvester, comprising;

at least one inertial body;

at least one beam;

a support to said at least one beam; and

a transducer means,

wherein

said at least one beam configures the inertial body into a pendulum structure being suspended from said support so that the beam is allowed to deform according to the kinetic state changes of the inertial body, the inertial body rotating about a center axis of the at least one beam,

said at least one beam is configured to interact with at least one transducer means that is configured to produce change in the electrical state of said transducer means responsively to the kinetic state of the inertial body and/or to the deformed state of the beam, and

the harvester coverts energy from mechanical domain to electrical domain.

Claim 2 : The harvester of claim 1, wherein said harvester comprises a torsion pendulum structure with said at least one beam for torsion deformation.

Claim 3 : The harvester of claim 2, wherein said harvester comprises two beams configured to form a torsion axis through their intermediate inertial body, with each beam suspended to the support at its own opposite side.

Claim 4 : The harvester of claim 1, wherein in said harvester the inertial body has at least three dimensions of which a length dimension in a pendulum plane of movement is aligned perpendicular to a rotary axis in the pendulum plane of the movement.

Claim 5 : The harvester of claim 1, wherein at least one of the beams is configured to operate as a bending spring and/or as a torsion spring in the pendulum structure.

Claim 6 : The harvester of claim 1, wherein a length dimension of the inertial body is longer than a length dimension of the at least one beam.

Claim 7 : The harvester of claim 1, wherein a length dimension of said at least one beam is shorter than a length dimension of the inertial body.

Claim 8 : The harvester of claim 1, wherein the support comprises a leading configuration to lead electricity through a layer of the support.

Claim 9 : The harvester of claim 8, wherein said leading configuration to lead electricity through a layer of the support comprises a galvanic lead through the support and/or a capacitor of the galvanic lead, and at least one electrode is connected to the transducer.

Claim 10 : The harvester of claim 1, wherein the harvester further comprises at least one of the following:

a module housing;

an attachment means to translatory means;

at least one overload stopper;

a contact electrode for galvanic contact;

an electrical component, a receiver and/or a transmitter circuit;

an energy storage for produced electricity; and

a transducer part further comprising a magnet, a coil, and/or a piezoelectric layer.

Claim 11 : The harvester of claim 1, wherein said transducer means comprises a piezoelectric element configured electrically responsive for bending of at least one of said beams.

Claim 12 : The harvester of claim 11, wherein the piezoelectric element comprises a piezoelectric layer on at least one surface of at least one of said beams.

Claim 13 : The harvester of claim 1, wherein at least one of said beams is lengthwise aligned in a radial direction for mounting into a tire.

Claim 14 : The harvester of claim 1, wherein an end of the said at least one beam connected to the inertial body is

farther from a center of rotation of a tire than an end of said at least one beam connected to the support.

Claim 15 : The harvester of claim 1, wherein the transducer means comprises at least one coil and at least one permanent magnet adapted for electromagnetic induction to occur when the distance and/or the angle between the magnet and the coil changes according to the inertial body movement in respect to the support.

Claim 16 : The harvester of claim 15, wherein the transducer means comprises at least one coil in the inertial body and the support has at least one permanent magnet.

Claim 17 : The harvester of claim 15, wherein the transducer means comprises at least one coil at the support and the inertial body has at least one permanent magnet.

Claim 18 : A harvester matrix, comprising at least one harvester of claim 1.

Claim 19 : A harvester matrix system, comprising at least one harvester matrix of claim 18.

Claim 20 : A harvester module, comprising at least one harvester according to claim 1.

Claim 21 : The harvester module of claim 20, comprising an attachment structure to the inner liner of a translatory means.

Claim 22 : The harvester module of claim 21, wherein said translatory means comprises a tire, wheel, conveyor belt or a foot-ware.

Claim 23 : A tire, comprising at least one harvester of claim 1.

Claim 24 : The tire of claim 23, further comprising:

a connecting means to connect a harvester-connected transmitter to a metallic part of the tire as an antenna.

Claim 25 : A foot-ware, comprising the harvester module of claim 20.

Claim 26 : The harvester of claim 1, wherein the at least one inertial body has even mass distribution.

Claim 27 : The harvester of claim 1, wherein the at least one inertial body has length-wise taken more mass located at the ends than at the middle.

Claim 28 : The harvester of claim 1, wherein the harvester further comprises a circuit configured to form a transceiver that is operable in accordance with an impulse radio-standard.

Claim 29 : The harvester of claim 1, further comprising at least one overload stopper comprising a pair of magnets adapted for a stopping function through magnetic repulsion for avoidance of direct contact of the magnetic surfaces of the stopper.

Claim 30 : The harvester of claim 1, further comprising at least one overload stopper on the inertial body.

Claim 31 : The harvester of claim 6, wherein the length dimension of the inertial body is at least 1.5 times the length dimension of the at least one beam, the length dimension of the at least one beam measured between a suspension point to the support and to the inertial body.

Claim 32 : The harvester of claim 7, wherein the length dimension of the at least one beam is at most 0.66 times the length dimension of the inertial body, the length dimension of said at least one beam measured between a suspension point to the support and to the inertial body.

Claim 33 : A tire, comprising a connecting means to connect a harvester-connected transmitter to a metallic part of the tire as an antenna, wherein the harvester-connected transmitter comprises the harvester of claim 1.

Claims

1. A harvester (12) to convert energy from mechanical domain to electrical domain, **comprising**
- at least one inertial body (6),
- at least one beam (7, 9),
- a support (8) to said at least one beam (7, 9) and
- transducer means (10, 16),

wherein said at least one beam (7, 9)
- configures the inertial body (6) into a pendulum structure being suspended from said support (8) so that the beam (7, 9) is allowed to deform according to the kinetic state changes (3), (4) of the inertial body (6),
- is/are configured to interact with at least one transducer means (10, 16) that is/are configured to produce change in the electrical state of said transducer means (10) responsively to the kinetic state of the inertial body (6) and/ or to the deformed state of the beam (7, 9).

2. The harvester of claim 1, **wherein** said harvester comprises a torsion pendulum structure with at least one beam (7, 9) for the torsion deformation.

3. The harvester of claim 2, **wherein** said harvester comprises two beams (7, 9) configured to form the torsion axis through their intermediate inertial body (6), each beam (7, 9) being suspended to the support (8) at its own opposite side.

4. The harvester of claim 1, **wherein** in said harvester the inertial body has at least three dimensions of which a length dimension (L) in the pendulum plane of movement is aligned perpendicular to the rotary axis in the pendulum plane of the movement.

5. The harvester according to any one of the previous claims, **wherein** at least one of the beams (7, 9) is configured to operate as a bending spring and/or as a torsion spring in the pendulum structure.

6. The harvester according to any one of the previous claims, **wherein** the length dimension (L) of the inertial body (6) is long when compared to the length dimension of the beam (l), i.e. said length (L) being at least 1.5 times the length (l) of the beam (7, 9) the

length (l) as measured between the suspension point to the support and to the inertial body (6).

7. The harvester according to any one of the previous claims, **wherein** the length dimension (l) of said at least one of the beams (7, 9) is short when compared to the length dimension (L) of the inertial body (6), i.e. said length (l) being at most 0.66 times the length (L) of the inertial body (6), said length (l) as measured between the suspension point to the support (8) and to the inertial body (6).

8. The harvester according to any one of the previous claims, **wherein** the support (8) comprises leading configuration to lead electricity through a layer of the support (8).

9. The harvester according to claim 8, **wherein** said leading configuration to lead electricity through a layer of the support (8) comprises a galvanic lead through the support and/or a capacitor, whose at least one electrode is connected to the transducer (10, 16).

10. The harvester according to any previous claim, **wherein** the harvester further comprises at least one of the following:
- module housing (12),
- attachment means to translatory means (15),
- at least one overload stopper (14),
- contact electrode for galvanic contact (11),
- electrical component (13), a receiver and/or a transmitter circuit (13),
- rectifier circuit,
- filter circuit to stabilize the produced electric current, voltage and/or a quantity derivable from at least one them p(13B),
- energy storage for the produced electricity, and
- a transducer (10) part further comprising magnet, coil, and/or a piezoelectric layer.

11. The harvester according to any one of the previous claims, **wherein** said transducer (10) comprises piezoelectric-element configured electrically responsive for bending of at least one of said beams (7, 9).

12. The harvester according to claim 11, **wherein** the piezoelectric element comprises piezoelectric layer on at least one surface of at least one of said beams (7, 9).

13. The harvester according to any of the previous claims, wherein at least one of said beams (7, 9) is lengthwise aligned in radial direction for mount into a tire.

14. The harvester according to any of the previous claims, **wherein** a beam (7, 9) as connected to the inertial body (6) is configured to reside for a mount further away from the center of rotation of the tire than the end connected to the harvester support.

15. The harvester of claim 1, **wherein** the transducer means (10, 16) comprises at least one coil and at least one permanent magnet adapted for electromagnetic induction to occur when the distance and/or the angle between the magnet and the coil changes according to the inertial body (6) movement in respect to the support (8).

16. The harvester according to claim 15, **wherein** in the harvester, the transducer means (10) comprises at least one coil in the inertial body (6) and the support (8) has at least one permanent magnet.

17. The harvester according to claim 15, **wherein** in the harvester, the transducer means (10) comprises at least one coil at the support (8) and the inertial body (6) has at least one permanent magnet.

18. A harvester matrix that **comprises** at least one harvester according to any of the claims 1 to 17.

19. A harvester matrix system that **comprises** at least one harvester matrix of claim 18.

20. A harvester module, **comprising** at least one harvester according to any of the claims 1 to 17.

21. A harvester module of claim 20, **comprising** attachment structure to the inner liner of a translatory means (15).

22. A harvester module of claim 20, **wherein** said translatory means (15) comprises a tire, wheel, conveyor belt or a foot-ware.

23. A tire **comprising** at least one harvester according to a previous claim. .

24. A tire **comprising** connecting means to connect harvester-connected transmitter to the metallic part of the tire as an antenna.

25. A foot-ware **comprising** a harvester module of claim 20.

26. A harvester of claim 1, **wherein** the inertial body (6) has even mass distribution.

27. A harvester of claim 1, **wherein** the inertial body (6) piece has length-wise taken more mass located at the ends than at the middle.

28. A harvester according to a claim 1 to 17, **wherein** the harvester comprises a circuit configured to form a transceiver that is operable in accordance of impulse radio-standard.

29. A harvester according to a claim 1 to 17, **wherein** at least one overload stopper (14) present, comprises a pair of magnets adapted for the stopping function via magnetic repulsion for avoidance of direct contact of the magnetic surfaces of the stopper.

30. A harvester according to a claim 1 to 17, **wherein** at least one overload stopper is on the inertial body (6).