CLAIMS

1. A multidirectional wheel (100) for traversing a surface having a contour, comprising:

at least one hub (102), the at least one hub defining a first axial direction of rotation;

at least one magnet (118) having an outer face arranged to generally circumscribe the first axial direction, in which the hub is made of a magnetically inducible material which directs the flux of the at least one magnet toward the surface being traversed;

a plurality of magnetically inducible brackets (106) disposed around an entirety of an outer periphery of the at least one hub (102), each of the brackets being sized and shaped with a profile that is non-symmetric with respect to an axial plane that bisects the bracket (106) to define a wheel profile that complements the contour of the surface such that the size of an air gap between the surface and the outer face of the magnet (118), the hub (102) and the brackets (106), is reduced as compared to a wheel profile that does not complement the contour of the surface at each rotational position of the wheel (100); and

a plurality of rollers (110) supported for rotation by the plurality of brackets (106), the rollers (110) being supported by the brackets (106) for rotation in a second axial direction that is at an angle to the first axial direction,

in which at least one roller (110) contacts the surface in any rotational position of the wheel (100) as the wheel (100) traverses the surface.

2. A multidirectional wheel (100) according to Claim 1, in which the brackets (106c) are sized and shaped to define a convex wheel profile.

3. A multidirectional wheel (100) according to Claim 2, in which the brackets (106c) include a tapered portion (124).

4. A multidirectional wheel (100) according to Claim 1, in which the brackets (106b) are sized and shaped to define a flat wheel profile.

5. A multidirectional wheel (100) according to Claim 4, in which the brackets (106b) include a flat portion (122).

6. A multidirectional wheel (100) according to Claim 1, in which the brackets (106a) are sized and shaped to define a concave wheel profile.

7. A multidirectional wheel (100) according to Claim 6, in which the brackets (106a) include a protrusion portion (120).

8. A multidirectional wheel (100) according to Claim 1, in which the wheel profile complements the contour of the surface according to the following combinations:

(1) the wheel profile is convex and the surface contour is concave;

(2) the wheel profile is flat and the surface contour is flat; and

(3) the wheel profile is concave and the surface contour is convex.

9. A multidirectional wheel (100) according to Claim 1, in which the brackets (106a-c) include a mount (114) that supports the roller (110) and a protrusion (120, 122, 124).

10. A multidirectional wheel (100) according to Claim 9, in which the protrusion (120) is lobe shaped.

11. A multidirectional wheel (100) according to Claim 9, in which the protrusion (122) is flat shaped.

12. A multidirectional wheel (100) according to Claim 9, in which the protrusion (124) is taper shaped.

13. A multidirectional wheel (100) for traversing a surface having a contour, comprising:

at least one hub (102), the at least one hub (102) defining a first axial direction of rotation;

at least one magnet (118) having an outer face arranged to generally circumscribe the first axial direction, in which the hub is made of a magnetically inducible material which directs the flux of the at least one magnet toward the surface being traversed;

a plurality of magnetically inducible brackets (106) disposed around an entirety of a radial outer periphery of the at least one hub (102), the brackets (106) being sized and shaped to define a wheel profile that complements the contour of the surface such that the size of an air gap between the surface and the outer face of the magnet (118), the hub (102), and the brackets (106) is reduced as compared to a wheel profile that does not complement the contour of the surface at each rotational position of the wheel (100);

a plurality of fasteners (112) adapted to removably couple the each of the plurality of magnetically inducible brackets (106) to the radial outer periphery of the at least one hub (102); and

a plurality of rollers (110) supported for rotation by the plurality of brackets (106), the rollers (110) being supported by the brackets (106) for rotation in a second axial direction that is at an angle to the first axial direction,

in which at least one roller (110) contacts the surface in any rotational position of the wheel (100) as the wheel (100) traverses the surface, and

in which the plurality of magnetically inducible brackets (106) includes a first plurality of brackets (106a) having a first size and shape adapted for installation on the wheel (100) and complementing the contour of the surface when the contour is convex, and a second plurality of brackets (106c) interchangeable with the first plurality of brackets (106a) having a second size and shape and adapted for installation on the wheel (100) and complementing the contour of the surface when the contour is concave, the first and second plurality of brackets (106c) being removably coupled to the radial outer periphery of at least one hub (102) via the fasteners (112).

14. A multidirectional wheel (100) according to Claim 13, in which the brackets (106a) include a lobe-shaped protrusion (120).

15. A multidirectional wheel (100) according to Claim 13, in which the brackets (106c) include a taper-shaped protrusion (124).