CLAIMS

1. A multidirectional wheel for traversing a surface, comprising:

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

a plurality of rollers disposed around an outer periphery of the at least one hub, the rollers being mounted for rotation in a second axial direction that is at an angle to the first axial direction; and

at least one magnet, the at least one magnet being mounted to the at least one hub,

in which the hub is made of a magnetically inducible material that concentrates a flux of the at least one magnet toward the surface being traversed, and

in which a plurality of magnets are each connected to a respective spoke, in which the spokes are mounted for free rotation with respect to an axle that is disposed along the first axial direction.

2. A multidirectional wheel according to Claim 1, in which the at least one magnet is mounted for free rotation with respect to the hub.

3. A multidirectional wheel according to Claim 1, in which the at least one magnet is selected from the group consisting of high temperature magnets, permanent magnets, electromagnets and any combination thereof.

4. A multidirectional wheel according to Claim 1, in which the rollers are made of magnetic inducible material to aid in flux concentration.

5. A multidirectional wheel according to Claim 4, in which the magnet is covered by a non-magnetically inducible ring.

6. A multidirectional wheel for traversing a surface, comprising:

at least two magnetically inducible bodies mounted for rotation about a first axial direction along a first axis;

one or more magnets disposed about the first axis, the magnets having poles and being oriented such that their poles are oriented along the first axial direction and face in the

same direction, the one or more magnets being mounted between the at least two magnetically inducible bodies; and

a plurality of rollers disposed around an outer periphery of each of the magnetically inducible bodies, the rollers being mounted for rotation in a second axial direction that is at an angle to the first axial direction,

in which the magnetically inducible bodies are sized, shaped and positioned to concentrate a flux of the one or more magnets toward the surface being traversed and thereby increase the attractive force between the wheel and the surface.

7. A multidirectional wheel according to Claim 6, in which the one or more magnets are either circular disk shaped or ring shaped.

8. A multidirectional wheel according to Claim 6, in which the one or more magnets are concentrically arranged about the first axis and radially spaced therefrom.

9. A multidirectional wheel according to Claim 6, in which the one or more magnets are mounted for rotation with respect to the at least two magnetically inducible bodies.

10. A multidirectional wheel according to Claim 6, in which the at least two magnetically inducible bodies are sized and shaped and the rollers are disposed thereon such that the distance between the two magnetically inducible bodies and the surface being traversed is minimized without crossing a contact circle between the roller and the surface being traversed.

11. A multidirectional wheel according to Claim 6, in which the at least two magnetically inducible bodies are removably connected and in which the at least two magnetically inducible bodies define a recess for receiving the rollers.

12. A multidirectional wheel according to Claim 6, further including one or more concentrator members of magnetically inducible material that further concentrate the flux of the one or more magnets toward the surface being traversed.

13. A multidirectional wheel according to Claim 6, in which the one or more magnets are selected from the group consisting of high temperature magnets, permanent magnets, electromagnets and any combination thereof.

14. A multidirectional wheel according to Claim 6, in which the number, size and spacing of the rollers is such that the wheel approximates a perfect circular rotation as it traverses the surface.

15. A multidirectional wheel according to Claim 6, in which the rollers are made of magnetic inducible material to aid in flux concentration.

16. A multidirectional wheel according to Claim 6, in which the magnet is covered by a non-magnetically inducible ring.

17. A multidirectional wheel according to Claim 6, in which the two bodies have at least one threaded hole to be used to detach the magnet from the bodies during disassembly of the multidirectional wheel.

18. A multidirectional wheel for traversing a surface, comprising:

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

a plurality of rollers disposed around an outer periphery of the at least one hub, the rollers being mounted for rotation in a second axial direction that is at an angle to the first axial direction; and

at least one magnet, the at least one magnet being mounted to the at least one hub,

in which the hub is made of a magnetically inducible material that concentrates a flux of the at least one magnet toward the surface being traversed, and

in which each roller includes three segmented pieces and in which the segmented pieces are sized and shaped such that the wheel approximates a perfect circular rotation as it traverses the surface.

19. A multidirectional wheel for traversing a surface, comprising:

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

a plurality of rollers disposed around an outer periphery of the at least one hub, the rollers being mounted for rotation in a second axial direction that is at an angle to the first axial direction;

a plurality of wedge-shaped mounts for connecting the rollers to the at least one hub; and

at least one magnet, the at least one magnet being mounted to the at least one hub,

in which the hub is made of a magnetically inducible material that concentrates a flux of the at least one magnet toward the surface being traversed, and

in which a plurality of magnets are each connected to a respective spoke, in which the spokes are mounted for free rotation with respect to an axle that is disposed along the first axial direction.

20. A multidirectional wheel for traversing a surface, comprising:

at least two magnetically inducible bodies mounted for rotation about a first axial direction along a first axis;

one or more magnets disposed about the first axis, the magnets having poles and being oriented such that their poles are oriented along the first axial direction and face in the same direction, the one or more magnets being mounted between the at least two magnetically inducible bodies;

a plurality of rollers disposed around an outer periphery of each of the magnetically inducible bodies, the rollers being mounted for rotation in a second axial direction that is at an angle to the first axial direction; and

a plurality of wedge-shaped mounts for connecting the rollers to the at least two magnetically inducible bodies and in which the wedge-shaped mounts are magnetically inducible,

in which the magnetically inducible bodies concentrate a flux of the one or more magnets toward the surface being traversed.