Claims:

1. A motion control system for a drive train comprising:

a magnet holder having a first open end and a second open end, said first open end being coupled to a shaft of said drive train and said second open end having a cavity;

a magnetic encoder including:

a disk shaped permanent axial magnet having a first end, a second end and a continuous sidewall between said first end and second end, said disk shaped permanent axial magnet is bisected between said first end and said second end such that said continuous sidewall consists of a north pole and a south pole, said disk shaped permanent axial magnet being secured in said cavity;

a magnetic sensing element position apart from said disk shaped permanent axial magnet and facing said second open end, wherein said magnet holder and said magnetic sensing element share a longitudinal axis, and said disk shaped permanent axial magnet has a longitudinal axis running through said north pole and said south pole that is arranged at an angle between 70 to 110 with respect to said longitudinal axis of said magnet holder and said magnetic sensing element;

an optical encoder including:

a light emitting element;

a light sensing element position apart from said magnet holder and facing a surface defined between said first and second open ends; and

a plurality of markings on said surface of said magnet holder.

~~2. The motion control system according to claim 1, wherein said magnet is a permanent axial magnet having a north pole and a south pole.~~

~~3. The motion control system according to claim 2 wherein said permanent axial magnet is secured in said cavity such that a portion of said north and south poles of said permanent axial magnet are being exposed and facing said sensing element of said magnetic encoder.~~

2~~4~~. The motion control system according to claim 1~~3~~, wherein ~~said permanent axial magnet has a longitudinal axis running through said north pole and said south pole,~~ said magnet holder and said magnetic sensing element of said magnetic encoder share a longitudinal axis that is perpendicular to said longitudinal axis of said disk shaped permanent axial magnet.

3~~5~~. The motion control system according to claim 1~~2~~ wherein a portion of said cavity is adapted to mate with a portion of said disk shaped permanent axial magnet.

4~~6~~. The motion control system according to claim 1 wherein each of said plurality of markings are parallel to one another.

5~~7~~. The motion control system according to claim 4~~6~~ wherein each of said plurality of markings extends between the first and second open ends.

6~~8~~. The motion control system according to claim 1 wherein said plurality of markings are diffraction grating lines.

7~~9~~. The motion control system according to claim 1 implemented to on a picomouse.

8~~10~~. The motion control system according to claim 1 implemented to on a micromouse.

~~11. A moving object comprising:~~

~~a base having a first side, a second side, a front side and a rear side;~~

~~a first driver arranged said first side having:~~

~~a first wheel;~~

~~a second wheel;~~

~~a motor;~~

~~a gear assembly connecting said motor to said first and second wheels;~~

~~a second driver arranged on said second side, said second driver identical to said first driver;~~

~~a first motion control system coupled to a shaft of said first wheel of said first driver;~~

~~a second motion control system coupled to a shaft of said first wheel of said second driver;~~

~~a controller for controlling a movement of said moving object, wherein said first motion control system provides a feedback of said first driver to said controller and said second motion control system provides a feedback of said second driver to said controller.~~

~~12. The moving object according to claim 11 wherein said first motion control system comprising:~~

~~a magnet holder having a first open end and a second open end, said first open end being coupled to said shaft and said second open end having a cavity;~~

~~a magnetic encoder including:~~

~~a magnet secured in said cavity;~~

~~a sensing element position apart from said magnet and facing said second open end;~~

~~an optical encoder including:~~

~~a light emitting element;~~

a sensing element position apart from said magnet holder and facing a surface defined between said first and second open ends; and

a plurality of markings on said surface of said magnet holder.

13. The moving object according to claim 12, wherein said magnet is a permanent axial magnet having a north pole and a south pole.

14. The moving object according to claim 13 wherein said permanent axial magnet is secured in said cavity such that a portion of said north and south poles of said permanent axial magnet are being exposed and facing said sensing element of said magnetic encoder.

15. The moving object according to claim 14, wherein said permanent axial magnet has a longitudinal axis running through said north pole and said south pole, said magnet holder and said sensing element of said magnetic encoder share a longitudinal axis that is perpendicular to said longitudinal axis of said permanent axial magnet.

16. The moving object according to claim 13 wherein a portion of said cavity is adapted to mate with a portion of said permanent axial magnet.

17. The moving object according to claim 12 wherein each of said plurality of markings are parallel to one another.

18. The moving object according to claim 17 wherein each of said plurality of markings extends between the first and second open ends.

~~19. The moving object according to claim 12 wherein said plurality of markings are diffraction grating lines.~~

~~20. The moving object according to claim 11 wherein said base is a printed circuit board configured to communicatively connect said controller with said motor of said first and second drivers, said first motion control system and said second motion control system.~~