

Homework 10: Patent Liability Analysis*Due: Friday, March 28, at NOON***Team Code Name: 2 Wheel Deal****Group No. 12****Team Member Completing This Homework: Jeremy Gries****e-mail Address of Team Member: jgries @ purdue.edu**

NOTE: This is the second in a series of four “professional component” homework assignments, each of which is to be completed by one team member. The completed homework will count for 20% of the individual component of the team member’s grade. The body of the report should be 3-5 pages, **not** including this cover sheet, references, attachments or appendices.

Evaluation:

SCORE	DESCRIPTION
10	<i>Excellent – among the best papers submitted for this assignment. Very few corrections needed for version submitted in Final Report.</i>
9	<i>Very good – all requirements aptly met. Minor additions/corrections needed for version submitted in Final Report.</i>
8	<i>Good – all requirements considered and addressed. Several noteworthy additions/corrections needed for version submitted in Final Report.</i>
7	<i>Average – all requirements basically met, but some revisions in content should be made for the version submitted in the Final Report.</i>
6	<i>Marginal – all requirements met at a nominal level. Significant revisions in content should be made for the version submitted in the Final Report.</i>
*	<i>Below the passing threshold – major revisions required to meet report requirements at a nominal level. Revise and resubmit.</i>

* Resubmissions are due within **one week** of the date of return, and will be awarded a score of “6” provided all report requirements have been met at a nominal level.

Comments:

Comments from the grader will be inserted here.

1.0 Introduction

The “Two Wheel Deal” is a personal transportation vehicle which balances itself automatically by rotating the wheels forward or backwards to keep its center of gravity. This is accomplished using angle and angular rate sensors. The angle sensor provides the relative angle to the horizontal ground. The rate sensor provides a means to tell if the angle is approaching the horizontal towards instability or approaching the vertical towards the stable axis. The “Two Wheel Deal” also consists of two independent motor controllers which provides a means for turning the transportation device.

With the device powered, the user will step onto the riding platform. If the user leans forward, the vehicle will accelerate forward to compensate for the change of the angle from the vertical. The similar intuition applies for the reverse motion. The user will also be able to monitor various data such as battery life, speed, and angles.

The “Two Wheel Deal” is susceptible to patent infringement because it mimics exactly the same functions as the popular and well-known modern day SEGWAY. The SEGWAY is a unique device in that only one company manufactures them, and there is not much competition in the marketplace.

2.0 Results of Patent and Product Search

The first patent that was found was Patent No.: US 6561294 “balancing Vehicle with Passive Pivotal Support.” This patent was filed on August 31, 1999, and it refers to the SEGWAY [1]. The summary of the device describes it as a balancing vehicle that supports a rider in such a manner as to allow the center of gravity of the vehicle to be varied by motion of the support. The creator of the device claims that the vehicle will: 1) Transport a human subject over a surface, 2) Provide local stability while the vehicle is powered up 3) Transport a human using motorized drives 4) Vary its position based on leaning from the rider.

All of the primary functions contained in the SEGWAY are mimicked in the “2 Wheel Deal.” One function the SEGWAY uses is the microcontroller as a means for processing information. Also, it uses five accelerometers and two gyroscopes for redundancy checking to determine the angle of the vehicle to rebalance itself. The SEGWAY has two independent motor controllers used for providing a pulsed-width modulated signal to the motors for control. Turning is accomplished by shifting the handlebars to the right or left.

The “Two Wheel Deal” was based off of the SEGWAY, so infringement is unavoidable. The “Two Wheel Deal” would have to be redesigned from the ground up for any chance at marketing this product. All four of the key claims are being performed substantially the same way.

The second patent that was similar was Patent No.: 2003-159546 “balancing Vehicle with Passive Pivotal Support.” This patent was filed on June 1, 2004, and it refers to a SONY “skate-way” device [2]. This invention is a two-wheeled vehicle that travels front, back, left, and right by a rider moving balance on a step-board. These key claims are somewhat similar to the previous patent. The inventor claims that this device can: 1) Be steered by movement of balance 2) Detect balance of rider by pressure sensors.

The primary functions of this device include detecting a user’s input by the means of analog pressure sensors. This input will travel to the controller which is responsible for interpreting the data and sending out a pulse-width modulated signal to the motor drives. Finally these motor drives control the two independent motors.

One of the functions that the “Two Wheel Deal” perform substantially the same way is that the motors are driven by motor drives. These drives are controlled using a pulsed electrical signal which is the same at the “Two Wheel Deal.” Also, primary function of the invention is a human transportation device, which serves the same purpose as the “Two Wheel Deal.”

The third patent that was similar was Patent No.: 5755452 “Electric Scooter” This patent was filed on January 31, 1996 and it refers to a scooter that has an electric motor attached [3]. This device is similar to the “Two Wheel Deal” because it is a balancing transportation vehicle with two wheels driven by an electric motor. This device has the frame of a scooter with an electric motor attached to the back wheel so that the front wheel may be steered by the user. Also four electric batteries are mounted underneath the frame so that they may be concealed. The key claim of this invention is that it is an electric scooter for powered movement over a ground surface. The primary function of this device is for the electric motor turn the back wheel so that the user may compensate for steering and balance. The function that the “Two wheel deal performs the same way is electric motor propulsion.

3.0 Analysis of Patent Liability

The “Two Wheel Deal” literally infringes upon the SEGWAY patent in every aspect. All of the functions of the SEGWAY were mimicked, and this was accomplished by researching how the SEGWAY worked. The “Two Wheel Deal” uses an accelerometer and gyroscope to detect rider balance, and the only difference is that the SEGWAY uses redundant detection. Also both vehicles use a digital microcontroller to control the motor drives which control the independent motors. The only function not performed substantially the same way would be the turning mechanism. The “Two Wheel Deal” uses an analog joystick to detect a change while the SEGWAY uses the vehicle’s shaft to determine a change.

With respect to the “skate-way” patent, I do not believe that there is any literal infringement. While the “skate-way” is a personal transportation device that requires skill to use, the “Two Wheel Deal” uses a completely different balance detection mechanism. The “skate-way” would require the user to determine the balance of the machine and shift his or her weight to keep the device balanced. This would not fall under the doctrine of equivalents. The only function performed substantially the same way would be a controller sending pulsed electrical signals to the motor drives controlling the motors. There is no difference in this respect between the two devices.

The potential for patent liability with the electric scooter should not be a problem, because there is no literal infringement. Also, infringement by the doctrine of equivalents wouldn’t apply here because the “Two Wheel Deal” uses a completely different way of balancing the vehicle as well as driving the motor.

4.0 Action Recommended

To avoid potential infringement with the SEGWAY, it would have to be re-designed from the ground up. It would be more reasonable, more time, and cost effective to buy a license for this patent or pay the inventor royalties. With respect to the “skate-way”, the only similar function would be how the controller drives the motors. Since the use of this application is wide-spread, I don’t see any infringement, literal or by the doctrine of equivalents, so I believe nothing would have to be modified on the “Two Wheel Deal.” I do not believe that any action would have to be taken because there is no infringement on the electric scooter patent.

5.0 Summary

There are three patents which resemble the “Two Wheel Deal.” These include the SEGWAY, SONY’s “skate-way”, and the electric scooter. The “Two Wheel Deal” infringes upon every aspect of the SEGWAY, and a license would have to be purchased to sell this project. There is no literal infringement with the “skate-way”, and the doctrine of equivalents would have to be stretched to apply to the “Two Wheel Deal.” Finally the electric scooter doesn’t have a patent claim that would infringe upon the “Two Wheel Deal.” Altogether, this project would not be able to be marketed and sold “as is.”

List of References

- [1] Free Patents Online Patent: 6561294 Inventor: Dean L Kamen Date Filed: Aug 31, 1999. Available <http://www.freepatentsonline.com/6561294.pdf>

- [2] Free Patents Online Patent: 5775452 Inventor: Steven J Patmont. Date Filed: Jan. 31, 1996. Available <http://www.freepatentsonline.com/5775452.pdf>

- [3] US Patent and Trademark Office Patent: 2003-159546 Inventor: Gousuke Nishikawa Date Filed: June 1, 2004. Available <http://appft1.uspto.gov/netacgi/nph-arser?Sect1=PTO1&Sect2=HITOFF&d=PG01&p=1&u=%2Fnethtml%2FPTO%2Fsrchnu.html&r=1&f=G&l=50&s1=%2220060260862%22.PGNR.&OS=DN/20060260862&RS=DN/20060260862>