IP Landscape

Daniel Cole, Jack Pendlebury, Noah Harvey, Luke Waller

Friday 2nd December, 2022

Contents

List of Figures

List of Tables

1 Patent Landscape Analysis

2 Project Overview

2.1 Project Details

2.2 Inspiration

2.3 Intended Market

2.4 Safety and Ethical Considerations

2.5 Market Competition

2.6 Design Requirements

3 HEVCS Key Constituent Parts

4 Patent Research

4.1 Under Vehicle Technology

4.2 Breakaway Connectors

4.3 Curb and Step Navigation

4.3.1 Patent 1 - Stair traversing device

Patent Number	CN108349516A
Applicants	QUANTUM ROBOTIC SYSTEMS INC
Status	Active
Application Date/Publish Date	2018-07-31 / 2021-05-11
Active Jurisdictions	CN

Table 1: Stair traversing device patent information

URL - https://worldwide.espacenet.com/patent/search/family/058762787/publication/CN108349516A?q=CN108349516A

Search Term	No. of Results
nftxt = ”carriage” AND nftxt = ”Stairs”	7038
nftxt = ”carriage” AND nftxt = ”Stairs” AND nftxt = ”assisted”	290
nftxt = ”carriage” AND nftxt = ”Stairs” AND nftxt = ”assisted” AND nftxt = ”climbing”	117
”Stairs” AND nftxt = ”assisted” AND nftxt = ”climbing” AND nftxt = ”remote controlled”	8

Table 2: Step/Curb Navigation Search Terms 1

Claims

A device for climbing stairs comprising: A carrier body for transporting a payload,Ladder Frame, A mechanism between the stepped frame and the carrier body, The mechanism is configured to move the stepped frame in relation to the carrier body in a circular path.

The HEVCS does not contain two individual parts that move in relation to each other in a circular motion. This means that this patent is not relevant to the HEVCS platform and there does not impede the patent.

The stair climbing device comprises of a main body portion and an outer hanging portion, forming an L shaped design. The HEVCS is not an L shaped design comprising of two exactly different body portions. Therefore, the HEVCS platform does not encroach on this patent.

4.3.2 Patent 2 - Improvements in or relating to first/final mile transportation

Patent Number	CN108069182A
Applicants	FORD GLOBAL TECH LLC
Status	Active
Application Date/Publish Date	2018-05-25 / 2022-03-11
Active Jurisdictions	CN, USA, DN, UK

Table 3: Improvements in or relating to first/final mile transportation patent information

URL - https://worldwide.espacenet.com/patent/search/family/062016996/publication/CN108069182A?q=CN108069182A

Search Term	No. of Results
nftxt = ”Curb Climbing”	161
nftxt = ”Curb climbing” AND nftxt = ”assisted”	20
nftxt = ”Curb climbing” AND nftxt = ”Stairs” AND nftxt = ”assisted”	11
nftxt = ”Curb climbing” AND nftxt = ”step climbing” AND nftxt = ”Stairs” AND nftxt = ”assisted” AND nftxt = ”climbing”	3

Table 4: Step/Curb Navigation Search Terms 2

Claims

A device for transporting payloads over varying terrain, the device comprises: a first round of clustering of three wheels contained in a flat configuration, a second round of clusters of three wheels contained in a planar configuration. The HEVCS will not use a cluster of three wheels to allow the platform to move up and down stairs. Therefore, this does not encroach on this patent. Given that this claim only has one independent claim, outlining the use of three clustered wheels, this patent is not being impeded by the HEVCS platform.

4.3.3 Patent 3 - ROBOTIC VEHICLE

Patent Number	WO2011152890A2
Applicants	IROBOT CORP
Status	Active
Application Date/Publish Date	2010-09-23 / 2013-03-20
Active Jurisdictions	USA, WIPO

Table 5: ROBOTIC VEHICLE patent information

URL - https://worldwide.espacenet.com/patent/search/family/044675803/publication/WO2011152890A2?q=WO2011152890A2

Search Term	No. of Results
nftxt = ”Stair climbing”	7688
nftxt = ”Stair climbing” AND nftxt = ”assisted”	788
nftxt = ”Wheeled” AND nftxt = ”Stair Climbing” AND nftxt = ”assisted”	107
nftxt = ”Stair climbing” AND nftxt = ”assisted” AND nftxt = ”platform” AND nftxt = ”wheeled” AND nftxt = ”remote controlled”	6

Table 6: Step/Curb Navigation Search Terms 3

Claims

A Robotic Device comprising a chassis having front and rear ends and supported on each right and left driven tracks. The HEVCS platform will not be driven using tracks, therefore is not in breach of the Patent. A deck assembly configured to receiver a removeable payload; and a linkage connecting the deck assembly to the chassis. The HEVCS platform will house the payload within the main chassis and not on a deck connected to a linkage. Therefor this does not impeach on the outlined patent. This means that the HEVCS platform is not into breech of this patent.

4.3.4 Patent 4 - Conveying mechanism for grandstand seat area

Patent Number	CN111976576A
Applicants	WANG JIANPING
Status	Application Withdrawn
Application Date/Publish Date	2020-11-24 / 2022-10-21
Active Jurisdictions	Not Active

Table 7: ROBOTIC VEHICLE patent information

URL - https://worldwide.espacenet.com/patent/search/family/044675803/publication/WO2011152890A2?q=WO2011152890A2

Search Term	No. of Results
nftxt = ”Stair climbing”	7688
nftxt = ”Stair climbing” AND nftxt = ”assisted”	788
nftxt = ”Wheeled” AND nftxt = ”Stair Climbing” AND nftxt = ”assisted”	107
nftxt = ”Stair climbing” AND nftxt = ”assisted” AND nftxt = ”platform” AND nftxt = ”wheeled” AND nftxt = ”remote controlled”	6

Table 8: Step/Curb Navigation Search Terms 3

Claims

A Robotic Device comprising a chassis having front and rear ends and supported on each right and left driven tracks. The HEVCS platform will not be driven using tracks, therefore is not in breach of the Patent. A deck assembly configured to receiver a removeable payload; and a linkage connecting the deck assembly to the chassis. The HEVCS platform will house the payload within the main chassis and not on a deck connected to a linkage. Therefor this does not impeach on the outlined patent. This means that the HEVCS platform is not into breech of this patent.

4.3.5 Patent 5 - REMOTE-OPERATED MULTI-DIRECTIONAL TRANSPORT VEHICLE

Patent Number	WO0246031A1
Applicants	ALLARD ERIC J
Status	Patent Expired
Application Date/National Phase	2002-06-13 / 2004-09-08
Active Jurisdictions	Patent Expired

Table 9: REMOTE-OPERATED MULTI-DIRECTIONAL TRANSPORT VEHICLE

URL - https://worldwide.espacenet.com/patent/search/family/021742047/publication/WO0246031A1?q=WO0246031A1

Search Term	No. of Results
nftxt = ”Stair climbing” OR nftxt = ”Curb Climbing”	7826
(nftxt = ”Stair climbing” OR nftxt = ”Curb Climbing”) AND (nftxt = ”assisted” OR nftxt = ”assisting”)	1331
(nftxt = ”Stair climbing” OR nftxt = ”Curb Climbing”) AND (nftxt = ”assisted” OR nftxt = ”assisting”) AND (nftxt = ”platform” OR nftxt = ”carriage”)	396
(nftxt = ”Stair climbing” OR nftxt = ”Curb Climbing”) AND (nftxt = ”assisted” OR nftxt = ”assisting”) AND (nftxt = ”platform” OR nftxt = ”carriage”) AND nftxt = ”wheeled” AND nftxt = ”remote controlled”	7

Table 10: Step/Curb Navigation Search Terms 5

Claims

A chassis containing a pair of laterally opposed front axles, a pair of lateral opposed rear axles and a pair of longitudinal intermediate axels between the front and rear axles. Given the HEVCS will not have longitudinally mounted axels and will drive by one motor on each of the wheels, the patent is not impeded by the platform. This patent is also expired meaning that even if the HEVCS platform did infringe on the patent it would not be affeced.

4.4 EV Charging

[1]

4.4.1 Search Strategy 1

References

[1] M. Moran. (Aug 2020) A third of uk homeowners don't have a driveway or garage to install a home chargepoint. [Online]. Available: https://www.transportxtra.com/publications/parking-review/news/66621/a-third-of-uk-homeowners-don-t-have-a-driveway-or-garage-to-install-a-home-chargepoint/

A Appendix 1