

OPINION UNDER SECTION 74A

Patent	GB 2529565
Proprietor(s)	Hangzhou Chic Intelligent Technology Co. Ltd.
Exclusive Licensee	
Requester	Wuyi Chuangxin Metal Tools Co. Ltd.
Observer(s)	
Date Opinion issued	10 November 2020

The request

1. The comptroller has been requested to issue an opinion by Maucher Jenkins, on behalf of Wuyi Chuangxin Metal Tools Co. Ltd. as to whether a product which they describe in the request would infringe GB 2529565, the Patent.
2. The Patent, GB2529565 was granted on 14 June 2016, but a corrected version C publication was also published on 21 September 2016. It is that corrected version which is currently in force.
3. The request provides a series of photographs of the Product, the "CX-01", which I shall take to be a correct representation of the Product. The reader will probably find colour versions of these photographs helpful in interpreting what follows. The request asks whether the disposal and use of the Product in the UK, or its importation, would amount to infringement of the Patent.
4. No observations have been filed on this request.

The Patent

5. The Patent was granted with a single independent claim 1, and dependent claims 2-18. For this opinion, I shall only need to consider the independent claim which reads:

1. *An electric self-balancing vehicle, comprising:*

a top cover comprising a first top cover and a second top cover disposed symmetrically and rotatable relative to each other;

a bottom cover fixed to the top cover, the bottom cover comprising a first bottom cover and a second bottom cover disposed symmetrically and

rotatable relative to each other;

an inner cover fixed between the top cover and the bottom cover, the inner cover comprising a first inner cover and a second inner cover disposed symmetrically and rotatable relative to each other;

a rotating mechanism fixed between the first inner cover and the second inner cover;

two wheels rotatably fixed at two sides of the inner cover; respectively;

two hub motors fixed in the two wheels, respectively;

a plurality of sensors disposed between the bottom cover and the inner cover;

a power supply fixed between the first bottom cover and the first inner cover;

and a controller fixed between the second bottom cover and the second inner cover, wherein the controller is electrically connected with the plurality of sensors, the power supply, and the hub motors, and the controller controls the hub motors to drive the corresponding wheels to rotate according to sensing signals transmitted by the sensors

6. The Patent relates to an electronic self-balancing vehicle. This allows a user to stand on the platform of the vehicle and whilst these were often manually controlled with an operating rod, the present invention uses sensors in the vehicle instead. This sort of somatosensory vehicle or sensor controlled vehicle uses dynamic stabilisation to maintain the balance of the vehicle as it moves forwards, backwards and stops. The construction of the vehicle is perhaps best illustrated in figure 2 (below.)
7. It is worth noting in particular the top covers 11 and 12, the inner covers 21 and 22 and the bottom covers 31 and 32, as these will become important when I turn to the questions raised in the request. The figure also shows separate pedals, 5, which directly carry the user – through holes in the top cover, 16 and mounted on the inner covers.

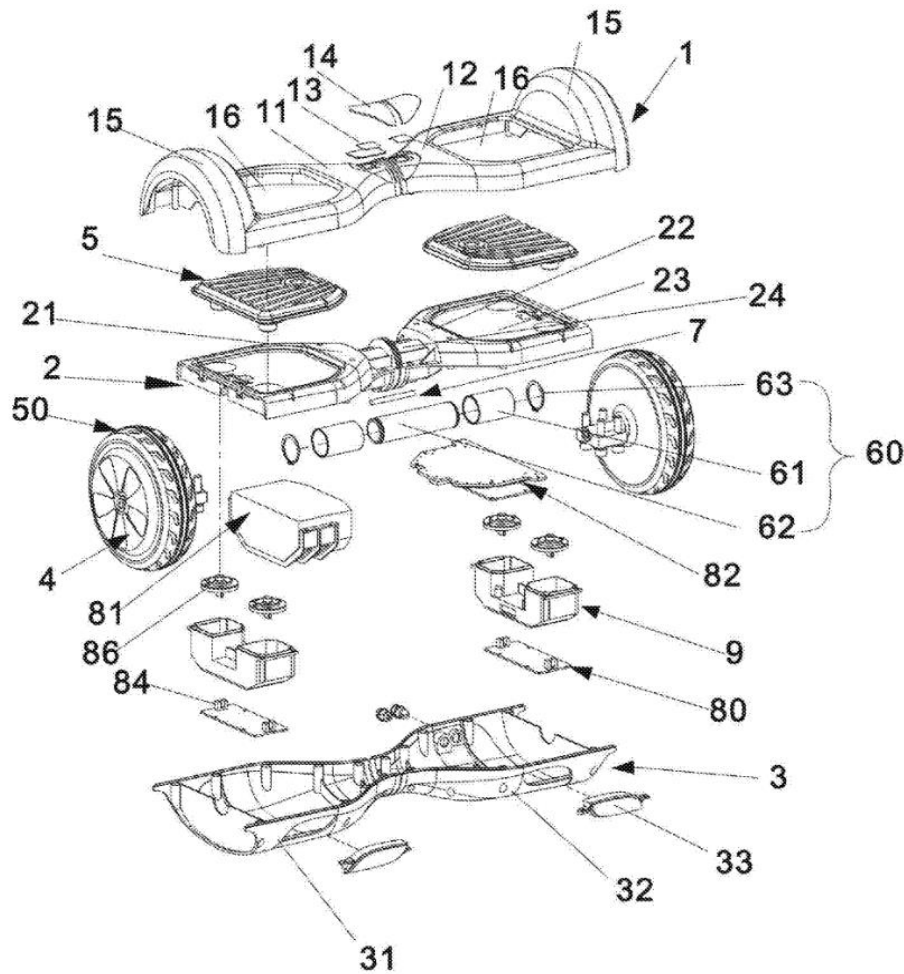


FIG. 2

Claim construction

8. Before considering the documents put forward in the request I will need to construe the claims of the Patent following the well known authority on claim construction which is *Kirin-Amgen and others v Hoechst Marion Roussel Limited and others* [2005] RPC 9. This requires that I put a purposive construction on the claims, interpret it in the light of the description and drawings as instructed by Section 125(1) and take account of the Protocol to Article 69 of the EPC. Simply put, I must decide what a person skilled in the art of somatosensory vehicle design would have understood the patentee to have used the language of the claim to mean.
9. The request sets out a number of concerns about the claim: [using a claim chart which I have included below at paragraph 22.] which I have quoted here in italics.

In feature 1.2, the terms "top cover", "a first top cover" and "a second top cover" are not clear. The latter two are interpreted to mean "a first top cover portion" and "a second top cover portion" respectively, the second top cover portion being different from the first top cover portion. The term "disposed symmetrically" does not clearly define the relative positions of the first and second top cover portions. In conjunction with the drawings (e.g., Fig. 3), this is interpreted to mean that the top cover portions are disposed symmetrically

with respect to the centre of the longitudinal axis of the vehicle. Terms "a first bottom cover" and "a second bottom cover" in feature 1.3 and terms "a first inner cover" and "a second inner cover" in feature 1.4 have the same issues and are interpreted similarly.

10. As I have noted above, in the embodiment of the Patent shown in the figure, the top cover is one that has a hole, through which the pedal can be seen, though it is mounted on an inner cover. I think it is clear in the Patent, that the top cover is therefore separate from an inner cover. The top is the riding surface and the bottom is closest to the ground when the vehicle is in use. It is perhaps not ideal that the top (and indeed the inner) cover is formed of two portions so that they may rotate relative to each other on the respective sides of the vehicle, but I think that this presents no real difficulty in construction, the two portions (or covers) for a top layer, albeit one which has a hole in it.

The word "cover" in feature 1.4 suggests that the inner cover is not merely a frame on which elements of the vehicle are mounted, but a member which covers some elements of the vehicle. In conjunction with features 1.8-1.10, it is understood that the inner cover at least covers the sensors, the power supply and the controller. Additionally, the claim does not spell out how the first and second top and bottom cover portions correspond to the first and second inner cover portions, but it is implicit from features 1.9 and 1.10 of claim 1, the description and the drawings that the first inner cover portion is aligned with the first top and bottom cover portions and the second inner cover portion is aligned with the second top and bottom cover portions. The feature should be interpreted accordingly.

11. To some extent this discussion is to import some of the point that will become relevant when I turn to discussion of the Product. It also tries to make reference to the alignment of the respective portions, again this may be that shown in figure 2, but the claim is silent on the alignment of the respective portions. I think I should hesitate before making some inferences, particularly because I do not think that this actually affects the main question which I shall actually be presented with when I turn to the product.
12. I think the inference taken here in the request that it is not a frame must be taken with some care. It seems to me that a framework, mesh or grid could provide the necessary structure for example to not allow a large object, or a foot to pass through it. Indeed, there is a hole 16 of significant size in the top cover, as shown in the figure above. I do not therefore think that the word cover here requires that it is for example a complete sheath over what is behind it, but at the same time, it must provide sufficient coverage over some elements of the vehicle.
13. Similarly, whilst in one embodiment the inner cover is aluminium provides structural strength, to bear the weight of the user, and prevent electronic elements from being extruded by the weight of the user (see final paragraph on page 7). That section goes on to suggest that in the prior art, an inner cover is not provided meaning that the internal electronic elements directly bear the weight of the user, potentially causing power outages as a result of vibrations when the vehicle is driven. I also

note what is said at the end of page 3 and again at the end of page 12: "In summary, according to the invention the inner cover is uniquely disposed between the top cover and the bottom cover of the electric balance vehicle, such that the entire structure of the electric balance vehicle is firmer, and the electronic elements inside the vehicle are protected at the same time." That paragraph goes on to state further advantages such as compactness, ease of wiring, balance, wheel size, speed and movement.

14. Ultimately, that means that I do not think that I need go further than recognising that the inner cover must be a separate part to the top cover. I think that it is also clear that this cover must be something which extends over an area, and present on both sides of the rotating mechanism.

In feature 1.5, the term "fixed between" suggests that:

- (a) there is a gap between the first inner cover portion and the second inner cover portion for accommodating and fixing the rotating mechanism, or*
- (b) the rotating mechanism is fixed onto and connects the first inner cover portion and the second inner cover portion.*

In the light of the description and drawings, feature 1.5 should be interpreted in line with option (b).

15. Again, this emphasises that the inner cover is in two parts on respective sides of the rotating mechanism. The request implies that the word "between" is sufficient to mean that the inner cover is fixed to the rotation mechanism. I again hesitate here, as it is certainly physically possible for the rotation mechanism to be located between the two inner cover portions, without being directly connected to them. I must I think also take heed of what is said on page 7 of the Patent, in lines 8-10: "the first inner cover 21 and the second inner cover 22 may be mutually separated and independent components." I do not therefore agree that the Patent requires what the requester suggests, that the rotating mechanism is the direct connection between the respective portions.

In feature 1.6, the word "at" merely specifies positions of the two wheels, but does not clearly say whether the two wheels are fixed on or to the inner cover. However, in both embodiments described in the application with reference to Figs. 1-5 and 6, the wheels are fixed on the inner cover. The application emphasizes that the inner cover "is used as the internal framework of the entire balance vehicle 100 to indirectly bear the weight of the user transferred by the pedals 5" and is made of a strong materials such as aluminium alloy (see the paragraph bridging pages 7 and 8 of the description). The top cover 1 and the bottom cover 3 are made of plastic. The application further emphasizes that a key difference between the invention and conventional electric balance vehicles (see the paragraph bridging pages 7 and 8 and the last paragraph on page 12) is that the invention uses the inner cover so as to make the entire structure of the electric vehicle firmer and to protect electronic elements inside the vehicle body. In the light of the disclosure of the application, feature 1.6 should be interpreted as the two wheels are rotatably fixed "on" the two sides (ends) of the inner cover, rather than merely fixed "at" the two sides (ends) of the inner cover.

16. This time, the request suggests that the term “at” does not require a direct connection to the two portions of the inner cover. Of course, the term “at” is different to “between” – but again I do not think that I need to come to a conclusion on this issue.

Features 1.9 and 1.10 specify that the power supply and the controller are fixed in "two half parts of the vehicle body, respectively". This is also emphasized in the description (see the 2nd paragraph on page 9 and the last paragraph on page 12) as particularly advantageous.

Additionally, although the claim recites that the electric balance vehicle "comprises" a power supply and a controller, the combination of features 1.9, 1.10 and 1.11 and the description make it clear that it is essential for the invention that the electric balance vehicle includes only one power supply and only one controller, so as to achieve results of easier assembly, convenient wiring, compact arrangement, and improved self-balancing capability. Relevant passages are reproduced below.

The power supply and the controller are disposed in two parts of the vehicle body, respectively. Therefore, one power supply and one controller can control the two hub motors simultaneously, the assembly is easier, the wiring is more convenient, and more space is saved. (The paragraph bridging pages 3 and 4, emphasis added.)

In the present invention, only one power supply 81 and one controller 82 are required to simultaneously control the two hub motors 4 so that the assembling is easier, the wiring is more convenient, and the repairing of the sold electric self-balancing vehicle 100 returned to the factory is more convenient. Moreover, the power supply 81 and the controller 82 are disposed in two half parts of the vehicle body, respectively. Thus, more space is saved, and the structure of the entire vehicle body is more compact. (The second paragraph on page 9, emphasis added.)

Therefore, one power supply and one controller can control the two hub motors simultaneously, the assembly is easier, the wiring is more convenient, and more space is saved. Meanwhile, the weights on both sides of the vehicle body are better balanced thus to improve the self-balance of the vehicle body. (The last paragraph on page 12, emphasis added.)

17. Whilst I agree that the most straightforward reading of this is that there is a single power supply on one side and a single controller on the other side, again I do not think that I need to reach a conclusion on this issue.

The Product

18. The opinion request provides a number of photographs of the Product. The key contention is that these do not show an inner cover. This is shown perhaps most clearly in figure 3. The reader may find that a colour version of this photograph is the best way to understand what is shown.



Fig. 3

19. In this figure, it seems that it is the bottom cover that is shown lying next to the main assembly, perhaps having been unscrewed. This appears to me from the picture to be a moulded plastic cover, which has a variety of studs to provide strength, or perhaps for example to provide screw recesses. As shown in this figure and figure 1, it appears that a pedal section (perhaps made of a different grippier material) is mounted as part of this top cover.
20. Since, I shall look at these later, I think it is also worth noting at this point, three things. First, the white pieces in the centre on respective sides of the point of rotation, screwed to the bottom portion, and on the right-hand side of this. Second, the three ribs connected by some cross struts to form a grid, on the right-hand side of this photograph above the battery, which happens to lie at the point where the battery and casing arrow points. Finally, the control board casings, identified with arrows on either side of the Product. This picture therefore shows the vehicle upside down, and there appears to be little between these items and the bottom cover were it to be replaced.

Infringement

21. Section 60 Patents Act 1977 governs what constitutes infringement of a patent; Section 60(1) reads:

Subject to the provision of this section, a person infringes a patent for an invention if, but only if, while the patent is in force, he does any of the following things in the United Kingdom in relation to the invention without the consent of the proprietor of the patent, that is to say -
 (a) where the invention is a product, he makes, disposes of, offers to dispose of, uses or imports the product or keeps it whether for disposal or otherwise;

(b) where the invention is a process, he uses the process or he offers it for use in the United Kingdom when he knows, or it is obvious to a reasonable person in the circumstances, that its use there without the consent of the proprietor would be an infringement of the patent;

(c) where the invention is a process, he disposes of, offers to dispose of, uses or imports any product obtained directly by means of that process or keeps any such product whether for disposal or otherwise.

22. The opinion request provides the following claim chart, in order to emphasise differences between the Product and the Patent.

No.	Features	Features present in the Product?
1.1	An electric balance vehicle, comprising:	
1.2	a top cover comprising a first top cover and a second top cover disposed symmetrically and rotatable relative to each other;	
1.3	a bottom cover fixed to the top cover, the bottom cover comprising a first bottom cover and a second bottom cover disposed symmetrically and rotatable relative to each other;	
1.4	an inner cover fixed between the top cover and the bottom cover, the inner cover comprising a first inner cover and a second inner cover disposed symmetrically and rotatable relative to each other;	No, the Product model does not include an inner cover. The wheels, the electric and electronic components (the control board and wiring) and rotating mechanism are mounted on the top cover directly.
1.5	a rotating mechanism fixed between the first inner cover and the second inner cover;	No, but the rotating mechanism is fixed on the top cover of the vehicle directly, rather than on an inner cover.
1.6	two wheels rotatably fixed at two sides of the inner cover, respectively;	No, the wheels are rotatably secured to the top cover, rather than to an inner cover.
1.7	two hub motors fixed in the two wheels, respectively;	
1.8	a plurality of sensors disposed between the bottom cover and the inner cover;	No, sensors are mounted on the control board which is disposed between the top cover and the bottom cover. No inner cover involved.
1.9	a power supply fixed between the first bottom cover and the first inner cover; and	No, no inner cover involved.
1.10	a controller fixed between the second bottom cover and the second inner cover,	No, no inner cover involved.

1.11	wherein the controller is electrically connected with the plurality of sensors, the power supply, and the hub motors, and the controller controls the hub motors to drive the corresponding wheels to rotate according to sensing signals transmitted by the sensors.	Two control boards are used in the product, installed on two top cover portions adjacent to the two wheels respectively. Each control board has a controller installed thereon and controls operation of the corresponding hub motor in response to sensing signals from sensors installed on the same control board.
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23. Ultimately, the focus of all of those distinctions is the contention that Product, the “CX-01” does not have an inner cover. I therefore return to the three features that I identified in the photograph, figure 3, can any of these be an inner cover, as required in the Patent.
24. First, the white central cover. This does not form a surround with the bottom cover for the power supply or the controller, so I do not think can be said to be the required inner cover.
25. Second, the framework cover on the right-hand side of the figure. This is not replicated on the other side, so can’t be described as an inner cover, with parts on either side of the rotation mechanism.
26. Third, the control board and casings. These casings are the best candidate for an inner cover. It lies between the top and bottom covers and appear to me to be fixed. It has two parts on either side of the rotation mechanism. The wheels are at the sides of these casings. The control circuitry is contained within it. However, it appears that the battery is contained in a separate white packaging. It may be that this extends under the control casing on the right-hand side of the photograph, but I am unable to tell from this image. However, I think that there is some help in figures 8-10 of the request, which I think show that the battery power supply does not fall within this casing. [Again the reader may wish to consult colour versions of these photographs.]

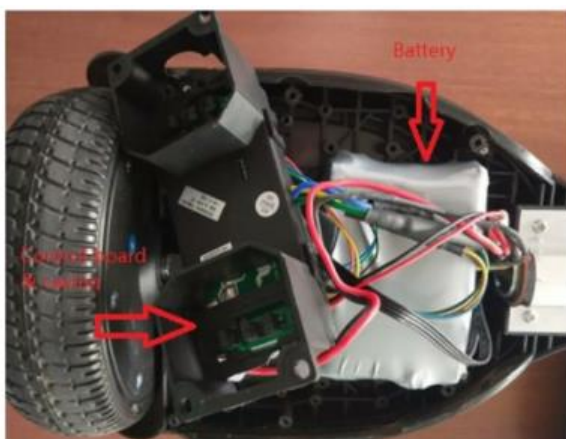


Fig. 8



Fig. 9



Fig. 10

27. The request suggests that the sensors are mounted on the control board, which I think means that it will be within the control board casing, and shows this in figure 10. Taking this as it stands means that they would fall within the casing.
28. In the request, it is suggested that the Product involves the use of two control boards. However, it seems to me that these two control boards might be argued to amount to a controller, electrically connected to the sensors, power supply, motor and providing control as required in 1.11.
29. First, however, I note that the battery power supply does not fall within, above or indeed underneath this casing. This means that the power supply is not fixed between the first bottom cover and the control board casing. That means, even if I take the control board casing to be an inner cover, the Product does not fall within the scope of this part of the claim (identified as 1.9 in the claim chart: “a power supply fixed between the first bottom cover and the first inner cover; and”).
30. Before I move on however, there is another important point to consider. The request states that the wheels, electric components and rotating mechanism are mounted on the top cover directly. Indeed, this is what is shown in figure 3. As I set out in my discussion above of the product, this means that there is little between the inner cover and the bottom cover. In the claim the plurality of sensors, the power supply

and the controller are defined as being between the bottom cover and the inner cover.

31. I must therefore conclude for these two reasons that the Product does not infringe the claim as a matter of normal interpretation.
32. However, that is not the end of the enquiry, as set out in *Actavis UK Ltd v Eli Lilly and Co.* [2017] UKSC 48, the problem of infringement is best approached by addressing two issues, each of which is to be considered through the eyes of the notional addressee of the patent in suit, i.e., the person skilled in the art. The issues are:
 - (1) does the product infringe any of the claims as a matter of normal interpretation; and, if not,
 - (2) does the product nonetheless infringe because it varies from the invention in a way or ways which is or are immaterial?
33. So I must now go on to consider this second part. Is this variation immaterial. Fortunately, that decision sets out a structured approach to making this assessment: The three questions formulated in the case *Actavis v Eli Lilly* are:
 - a. Does the variant (the Product) achieve substantially the same result in substantially the same way as the invention, i.e. the inventive concept revealed by the Patent?
 - b. Would it be obvious to the person skilled in the art, reading the Patent at the priority date, but knowing that the variant (the Product) achieves substantially the same result as the invention, that it does so in substantially the same way as the invention?
 - c. Would a reader of the Patent have concluded that the patentee intended that strict compliance with the literal meaning of the relevant claim(s) of the Patent was an essential requirement of the invention?
34. Here, the request contends that the inventive concept is the use of the inner cover to make the entire structure of the electric vehicle firmer. If I take this to be the inventive concept, then I think the answer is clear, the sort of cover shown in the request on the Product, does not provide substantial firmness to the overall structure to the vehicle. However, is it clear cut what the inventive concept of the Patent here actually is? Structural firmness is listed as one advantage, however, there are a number of other advantages noted in the Patent around compactness, ease of wiring, balance, wheel size, speed and movement. These various advantages are in reality provided by the variety of design features shown in the main embodiment of the Patent.
35. All that said, the invention is that defined in the claim, and the claim makes no reference to the strength of the various components, and I hesitate therefore to assume that the inventive concept is necessarily linked to the firmness of the vehicle components. Rather the focus of the claim is on the presence of an inner cover and the relative position of the components. As the Patent sets out, balance vehicles generally had manual controls through an operating rod. However, I do not think that the Patent really intends to suggest that it was the very first board arrangement,

without such a manual control, and indeed the search on this application, revealed earlier examples, although not ones that shared the arrangement of components required by the claim.

36. That lays emphasis in my view on the inventive concept here, being the provision of an inner cover, with a particular relationship to a series of components. As I noted above, the Patent suggests that there are a variety of advantages to this design. As I have already concluded there are several differences in the position of these components and the control board casings shown in the Product, with the battery being completely outside these control board casings and with the controller being above this cover (between it and the top cover). I do not therefore believe that there are substantial similarities between the arrangement required in the claim, and that of the Product.
37. As a result, I cannot answer these two first two questions positively, it does not seem to me that the range of advantages set out in the Patent are produced in substantially the same way, with substantially the same result, given those differences. I do not therefore believe that this amounts to an equivalent, with only immaterial differences.

Opinion

38. It is therefore my opinion that the Product, the "CX-01" as described and presented in the request would not infringe the Patent.

Application for review

39. Under section 74B and rule 98, the proprietor may, within three months of the date of issue of this opinion, apply to the comptroller for a review of the opinion.

Robert Shorthouse
Examiner

NOTE

This opinion is not based on the outcome of fully litigated proceedings. Rather, it is based on whatever material the persons requesting the opinion and filing observations have chosen to put before the Office.