Patents Act 1977 **Opinion Number** **28/22**

OPINION UNDER SECTION 74A

Patent	EP 3213911 B
Proprietor(s)	TotalSim Ltd
Exclusive Licensee	
Requester	TotalSim Ltd
Observer(s)	
Date Opinion issued	16 February 2023

The Request

1. The comptroller has been requested by 3C IP Ltd on behalf of their client TotalSim Ltd ("the Requester") to issue an opinion regarding the validity of EP3213911 ("the Patent"). TotalSim Ltd is the proprietor of the Patent and therefore the Requester is seeking assurance regarding the validity of their own Patent.

2. The Patent entitled 'Improvements in or relating to fabrics' was filed on 2 March 2017 with an earlier priority date of 3 March 2016. The Patent was granted on 29 May 2019 and remains in force in the UK.

3. The request was filed on 21 November 2022. There were no observations or observations in reply.

Basis of the Opinion

4. The Requester has cited seven documents D1-D7. D1-D3 were provided to the Requester by Tour Racing Ltd ("TRL"), an interested party, who according to the Requester contend that the Patent is invalid based on sufficiency and novelty/inventive step. The documents are:

   D1: Saeter, C. (2012) 'Experimental investigation on cylinders with tailored surface structure using dynamic and static force measurements' [University Thesis, Norwegian University of Science and Technology]

   D2: Saeter, C (2013) 'Development of a low drag suit for sprint races' [University Thesis, Norwegian University of Science and Technology]

   D3: Egeland, K., et al (2014) 'Development of a low drag suit for 100m dash

competitions' [Project Report, Norwegian University of Science and Technology]

D4: Patent document: US 2014/0059734 A1

D5: Patent document: EP 0354022 A2

D6: Agreement dated 21 May 2013 between Adidas AG and NTNU Trondheim Norwegian University of Science and Technology.

D7: Summary of Master Theses 2013; Department of Energy and Process Engineering; NTNU; page 108

5. The Requester acknowledges that D4 was cited during prosecution of a corresponding US patent application and D5 was cited during EPO prosecution of the Patent. In particular, D5 was cited as category "X" in the European search report and related search opinion. An opinion request must raise a new question and not just repeat arguments already considered pre-grant. As such, I do not consider D5, when considered alone for novelty or inventive step, raises a new question as this will have been covered already pre-grant. As very little argument has been provided by the Requester regarding the possible combination of D5 with any of the remaining prior art they have cited, I will also not consider D5 in this regard. In contrast, D4 does not seem to have been considered during prosecution of the Patent and therefore I will consider it here.

6. D2 is a master's thesis. The cover page states it has a submission date of June 2013. According to the Requestor, TRL contend that D2 was publicly available before the priority date of the Patent of 3 March 2016. The Requester submits that documents D6 and D7 suggest D2 remained a confidential document at this time. The Requester agrees with TRL that D6, an agreement dated 21 May 2013 between Adidas AG and NTNU Trondheim Norwegian University of Science and Technology, relates to D2. However, the Requester asserts that it is clear from the agreement that confidential information relating to the project is to remain confidential for a period of five years from 1 July 2013 (the date of expiry/termination of the agreement) i.e. until at least 1 July 2018 which is after the priority date of the Patent. The Requester states that TRL contest that section 7(a) (regarding publication) would allow for D2 to have been published 18 months after 1 July 2013; the Requester submits, however, that this section relates to more restrictive details rather than the confidential information discussed previously. The Requester also refers to D7, which is a summary of NTNU Master Theses 2013, which states that the master thesis in question is "*confidential for 3 years*" presumably from the submission date of June 2013, ending therefore in June 2016. Finally, the Requester asserts that running the URL for the thesis through the internet archive, the Wayback machine, gives a date in January 2022, suggesting that the document D2 was not publicly available until after the priority date of the Patent.

7. In response, I agree that there is some ambiguity regarding whether D2 was made available to the public before the priority date of the Patent. There was clearly a confidentiality agreement in place between Adidas and NTNU, potentially preventing publication until July 2018, and therefore the thesis submission date of June 2013 is unlikely to be the publication date. It is not possible for me to determine definitively whether D2 was published before 3 March 2016 although from the evidence I have

here it seems more likely that it was not. While recognising that there is a question over whether D2 was made available to the public before 3 March 2016, this is not conclusive. Thus, I cannot ignore or exclude D2 from my consideration. I will consider if the disclosure in this document is relevant to the validity of the Patent and return to the issue of the publication date if necessary.

8. The proposed publication dates of D1 and D3 (2012 and 2014 respectively) do not appear to be in dispute. I will therefore assume here that these documents were published before the priority date of the Patent.

9. The Requester states that "*TRL contend that the invention as claimed is insufficiently disclosed*". The Requester also states: "*We submit that the invention is disclosed clearly and completely enough for it to be performed by a person skilled in the art. We therefore request an opinion of the same*." No arguments have been provided in the request either from TRL regarding why the invention is insufficiently disclosed or from the Requester regarding why the opposite may be true. An opinion must set out fully the question to be considered in the opinion including arguments or submissions on that question in sufficient detail to enable the examiner to form an opinion. Therefore, in the absence of any supporting arguments, I cannot consider the question of sufficiency in this opinion.

The Patent

10. The Patent relates to a composite fabric for use in clothing garments for sportspersons. The Patent notes that aerodynamic drag of moving bodies is a significant source of energy loss. The composite fabric 10 of the Patent includes a textile support layer 12 on which is arranged a plurality of discrete support members 14 forming a plurality of spaced support formations 18. Pairs of support formations 18 have a flexible membrane portion 20a-20o extending between them. (See Fig. 1 reproduced below.) Each membrane portion is arranged to move between a passive configuration and an active configuration in response to a change in the flow characteristics of the fluid flow 24 passing over. In its passive configuration, each membrane portion is essentially taught or flat between pairs of support formations. In its active configuration, each membrane portion adopts a convex form, a concave form or oscillates between the two (paragraphs [0041]-[0048] and Figs 2a-2c.) The Patent explains that such an ability to vary in real time which individual membrane portion 20a-20o (or group of membrane portions) moves into its active configuration permits the composite fabric 10 to exhibit a low drag coefficient irrespective of the orientation of the support members 14 relative to the direction of fluid flow 24 (paragraph [0052]).

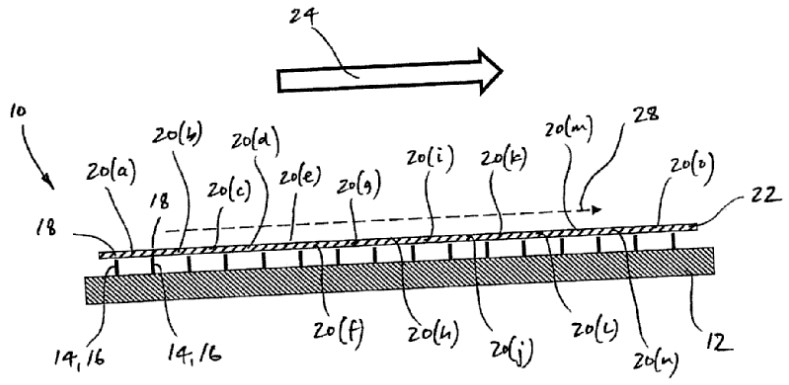

Figure 1

11. The Patent has 10 claims including one independent claim, claim 1, which reads as follows with the features separated out as defined by Requester:

1	A composite fabric (10), for use in clothing garments for sportspersons, comprising:
2	a textile support layer (12) having one or more support members (14) arranged thereupon,
3	the or each support member (14) defining a plurality of mutually spaced support formations (18)
4	respective pairs of support formations (18) having a flexible membrane portion extending therebetween,
5	each flexible membrane portion (20a-20o) being selectively moveable between a passive configuration in which it leaves unchanged a fluid flow (24) passing thereover and an active configuration in which it initiates turbulent flow in a fluid flow (24) passing thereover;
6	wherein the or each flexible membrane portion (20a-20o) adopts an active configuration varying during use of the composite fabric (10) whereby the composite fabric (10) exhibits a reduced overall drag coefficient that is

	omnidirectional.

Novelty and Inventive step – the law

12. The Requester asserts that claim 1 of the Patent is novel and involves an inventive step in light of a number of disclosures. Section 1(1)(a) and (b) of the Patents Act 1977 reads:

> *1(1) A patent may be granted only for an invention in respect of which the following conditions are satisfied, that is to say –*
> *(a) the invention is new;*
> *(b) it involves an inventive step;*

13. The relevant provisions in relation to novelty are found in section 2(1) and section 2(2) which read:

> *2(1) An invention shall be taken to be new if it does not form part of the state of the art.*
>
> *2(2) The state of the art in the case of an invention shall be taken to comprise all matter (whether a product, a process, information about either, or anything else) which has at any time before the priority date of that invention been made available to the public (whether in the United Kingdom or elsewhere) by written or oral description, by use or in any other way.*

14. The provisions in relation to inventive step are found in section 3 which states:

> *3. An invention shall be taken to involve an inventive step if it is not obvious to a person skilled in the art, having regard to any matter which forms part of the state of the art by virtue only of section 2(2) above (and disregarding section 2(3) above).*

15. The Court of Appeal in *Windsurfing*[1] formulated a four-step approach for assessing whether an invention is obvious to a person skilled in the art. This approach was restated and elaborated upon by the Court of Appeal in *Pozzoli*.[2] Here, Jacob LJ reformulated the *Windsurfing* approach as follows:

> *(1)(a) Identify the notional "person skilled in the art"*
> *(1)(b) Identify the relevant common general knowledge of that person;*
> *(2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;*
> *(3) Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed;*
> *(4) Viewed without any knowledge of the alleged invention as claimed, do those differences constitute steps which would have been obvious to the*

[1] Windsurfing International Inc. v Tabur Marine (Great Britain) Ltd, [1985] RPC 59
[2] Pozzoli SPA v BDMO SA [2007] EWCA Civ 588

person skilled in the art or do they require any degree of invention?

Construction of claim 1

16. When considering the validity of the claims of the Patent I will need to construe them. This means interpreting the claim in the light of the description and drawings as instructed by Section 125(1). In doing so, I must interpret the claim in context through the eyes of the person skilled in the art. Ultimately the question is what the person skilled in the art would have understood the patentee to be using the language of the claim to mean. This approach has been confirmed in the recent decisions of the High Court in *Mylan v Yeda*[3] and the Court of Appeal in *Actavis v ICOS*[4].

17. The Requester asserts that the person skilled in the art is "*a designer or manufacturer of fabrics for use in clothing garments for use in sports where the clothing is subject to an air flow and therefore provides an aerodynamic impact on performance, in use*." I agree with this assessment.

18. The Requester has detailed how each term in claim 1 should be construed. I will interpret the key terms here.

19. The 'support member(s)' of feature 3 are defined in paragraphs [0030] and [0031] of the Patent. Each support member 14 is an elongate straight ridge or instead an elongate, curved ridge or a respective pillar or other support structure such as a lattice. The support members 14 define a plurality of mutually spaced support formations 18 (paragraph [0034]).

20. In feature 4, pairs of adjacent support formations 18 have a flexible membrane portion 20a-20o extending therebetween. The membrane portions may be individual portions, or all formed from a single unitary membrane. (See paragraphs [0036], [0037].)

21. Feature 5 requires "*each flexible membrane portion being selectively moveable between a passive configuration in which it leaves unchanged a fluid flow passing thereover and an active configuration in which it initiates turbulent flow in a fluid flow passing thereover*." From paragraph [0041] each membrane portion when in its passive configuration lies essentially taught between the corresponding pair of support formations 18. The skilled person would understand from this and Fig. 1 that the membrane portions in the passive configuration are essentially planar and therefore do not disturb the fluid flow. In contrast, in its active configuration, each membrane portion adopts a convex form (30, Fig. 2(a)), a concave form (32, Fig, 2(b)), or oscillates between the convex and concave forms. See Figures 2(a), 2(b) reproduced below. The Patent explains (paragraphs [0042] – [0049]) that in this way each membrane portion is able to create a perturbation in the flow path of the fluid flow.

[3] Generics UK Ltd (t/a Mylan) v Yeda Research and Dev. Co. Ltd & Anor [2017] EWHC 2629 (Pat)
[4] Actavis Group PTC EHF v ICOS Corporation & Ors [2017] EWCA Civ 1671

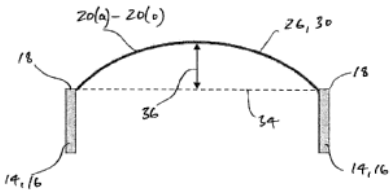

Figure 2(a)

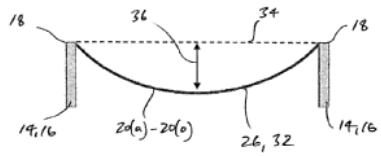

Figure 2(b)

22. Finally, feature 6 requires "*wherein the or each flexible membrane portion (20a-20o) adopts an active configuration varying during use of the composite fabric (10) whereby the composite fabric (10) exhibits a reduced overall drag coefficient that is omnidirectional*". Paragraph [0051] explains that the individual membrane portions or group of membrane portions can move to their active configuration according to the characteristics of the fluid flow passing immediately over the or each membrane portion. Further from paragraphs [0006],[0052], [0053], in use the real time varying nature of the membrane portions allows different areas of the fabric to experience reduced drag at different fluid flow speeds irrespective of the orientation of the support members relative to the direction of the fluid flow. Therefore, the Patent explains, the lower overall drag coefficient of the composite fabric is omnidirectional. The Requester explains that feature 6 "*should be interpreted to mean the flexible membrane portions deviating away from the passive configuration vary in use, dependent on variations in fluid flow characteristics*". I agree that the skilled person would interpret feature 6 in this way.

Whether claim 1 is novel in light of the disclosures cited by the Requester

23. The Requester provides arguments regarding the novelty of claim 1 with respect to each of documents D1-D4. I will deal with each document in turn.

24. D1 is a university thesis that describes a study to understand how different textiles with modified underlayer affect the aerodynamics of a cylindrical model, representing for example a garment on an athlete's limb. During the experiments a cylinder was covered with rubber strips and different fabrics were placed on top of the strips as illustrated in Figure 5, reproduced below. The strips were attached to the cylinder in the axial direction with an equal distance between strips. The cylinder was placed in a wind tunnel and drag measurements performed.

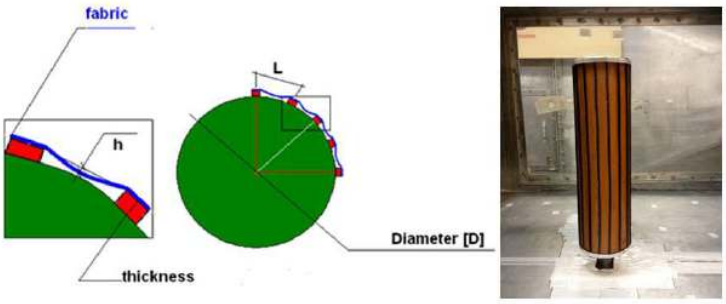

Figure 5 Concept for the strips attached to the cylinder and 16 strips, with equal distance between the strips

25. Regarding the features of claim 1 of the Patent, D1 does not disclose a *composite* fabric as the textile is simply placed on top of the rubber strips (although this is clearly *simulating* such a fabric) and therefore does not meet feature 1. The rubber strips can be seen as the required support members defining the mutually spaced support formations of feature 3. I agree with the Requester that D1 does not disclose a textile support layer as the rubber strips are placed directly on the cylinder and therefore feature 2 is not met. The fabric meets the terms of the flexible membrane of feature 4, extending between the rubber strips. Regarding the final two features 5 and 6, it appears that the fabric portions adopt a concave configuration between the rubber strips as can be seen in Figure 5. According to D1 (see for example the conclusion on page 12), the combination of fabric and rubber strips creates a 'macrostructure' that can cause changes in the total roughness and influence the 'flow transition' and therefore drag. However, there is no suggestion, that the fabric (membrane) portions are selectively moveable between a passive and active configuration and no indication that they would operate in this way. Therefore, in my view D1 discloses features 3 and 4 but does not disclose features 1, 2, 5 and 6.

26. D2 is a master's thesis which according to the abstract is a follow up to the project thesis presented by the same author in D1. Here, the author aims to design a custom suit to reduce the drag on a 100m sprinter. Rubber strips of different thickness and width were placed on different types of cylinders and combined with two different types of overlaying fabric. Aerodynamic drag measurements were carried out in a wind tunnel. A similar figure to Fig. 5 in D1 (reproduced above) was included to illustrate the general concept. Suits were made up by their collaborators Adidas and tested on full mannequins. In one configuration, suit A2, a combination of strips and dots were incorporated on the inside surface of a plain suit. Page 13 of D2 explains that the strips and dots work as an underlayer and allow the fabric to form a macrostructure which results in a drop in drag coefficient.

27. Considering again the features of claim 1, and in particular regarding the suit A2, D2 discloses a composite fabric consisting of the plain suit and underlying strips and dots. This meets the terms of feature 1. The strips meet the terms of the required support members and support formations and therefore feature 3 is known. However, there is no textile support layer as the strips are placed directly on the mannequin surface and so this does not meet feature 2. The plain suit will result in a flexible membrane extending between the strips, meeting feature 4. Regarding

features 5 and 6, again there is no suggestion in D2 that the fabric (membrane) portions are selectively moveable between a passive and active configuration and no indication that they would operate in this way. Therefore, in my view D2 discloses features 1, 3 and 4 but does not disclose features 2, 5 and 6. In light of this, I do not need to consider further the issue of the date when this disclosure was made available to the public.

28. D3 is an NTNU project report. The work was "*done to develop a new and better sprint suit prototype for Adidas*" with the aim "*to reduce the drag forces working on a 100m sprinter*". A real sized mannequin and two different wind tunnels were used for analysis where the aerodynamic drag force was measured. Strips were placed outside and underneath the suit to break up the laminar flow around the athlete. It was found that it "*is possible to make a low drag suit with an optimised configuration of strips attached under the fabric of the sprint suit*". This disclosure is very similar to that of D2. Therefore, again in my view D3 discloses features 1, 3 and 4 but does not disclose features 2, 5 and 6.

29. D4 is US patent document US 2014/0059734 A1, which was published in March 2014, before the priority date of the Patent.

30. D4 discloses an article of apparel, such as any garment, footwear or accessory, capable of conforming to various body shapes. The article comprises at least one portion 18 that includes an auxetic arrangement 14 ([0060]). The term "*auxetic*" is explained to be a material or structure that when stretched becomes thicker (as opposed to thinner) in a direction perpendicular to an applied force ([0056]). The auxetic arrangement 14 comprises a base layer 22 with an upper auxetic layer 20. The auxetic layer 20 comprises a plurality of interconnected segments 24 that provide a repeating pattern of cells 26 (see Fig. 2A reproduced below) with a void 28 in the centre of each cell ([0061]). In one embodiment, seen in cross-section in Fig. 2F (also reproduced below), the auxetic arrangement has an additional outer elastic layer 32 ([0070]). The Requester refers to a further embodiment in Fig. 2G where the outer elastic layer 32 is connected directly to the inner base layer 22 in the voids of the auxetic layer ([0071]). Fig 2G is also reproduced below.

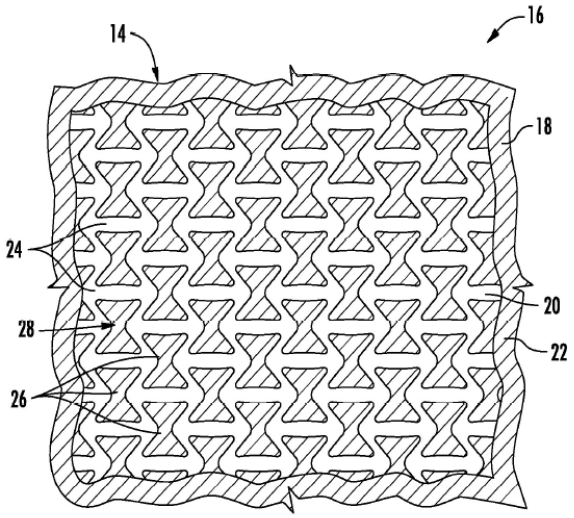

FIG. 2A

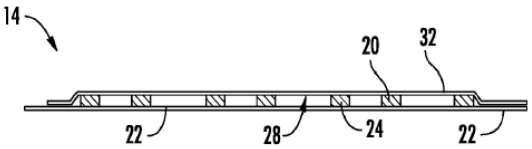

FIG. 2F

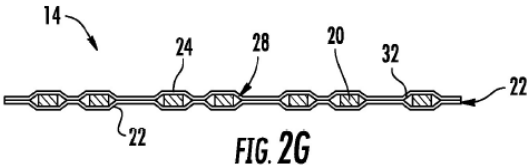

FIG. 2G

31. Referring to the features of claim 1, D4 (particularly the embodiment illustrated in Fig. 2F) discloses features 1-4 where the base layer 22 forms the required support layer; the auxetic layer 20 creates the required support members and mutually spaced support formations; and the elastic layer 32 forms the required flexible membrane.

32. The Requester argues that D4 does not disclose features 5 and 6 regarding the flexible membrane being selectively moveable between a passive and active configuration and the composite fabric thereby exhibiting a reduced overall drag coefficient. I agree with the Requester that D4 does not disclose or teach any subject matter regarding aerodynamic properties of the articles. Moreover, paragraph [0070] of D4 explains that the outer elastic layer 32 provides additional resistance to expansion and contraction of the auxetic layer; the outer elastic layer 32 also provides additional resiliency to the arrangement and urges the auxetic layer 20 back to its static shape once a stretching force is removed. It is not apparent that the elastic layer 32 when stretched to conform to a particular body shape will be able to move between an active and passive configuration in the presence of a fluid flow and no suggestion in D4 that it would so. I agree with the Requester that there is not sufficient disclosure in D4 for the skilled person to conclude that the arrangement in Fig. 2F meets the terms of features 5-6. The embodiment of Fig. 2G, where the outer elastic layer 32 is connected in the voids to the inner base layer 22, presumably further restricting movement, is even further from the required set-up. Therefore claim 1 is novel in light of D4.

33. Therefore, I consider claim 1 of the Patent to be novel in light of all documents D1-D4.

Whether claim 1 involves an inventive step

34. The Requester also submits that claim 1 involves an inventive step in light of these disclosures. In order to consider whether claim 1 is obvious, I will consider the four Windsurfing/Pozzoli steps outlined above.

35. Regarding step 1, I have already identified the person skilled in the art. The Requester asserts that the "*common general knowledge may include the effect of a fixed surface roughness being used to induce turbulent flow, such as the dimpled surface on golf balls*". I agree this would be part of the common general knowledge. Also included more generally would be an understanding of the aerodynamic properties of materials and related structures.

36. Regarding step 2, the inventive concept is as set out in claim 1 and as construed in paragraphs 16-22 above.

37. Regarding steps 3 and 4, I will first consider disclosures D1-D3 together. The difference between these disclosures and the inventive concept of claim 1 is features 2, 5 and 6. Specifically, D1-D3 do not disclose a textile support layer. They also do not disclose an arrangement where each flexible membrane portion is selectively moveable between a passive and active configuration and adopts an active configuration varying during use of the fabric whereby the fabric exhibits a reduced overall drag coefficient that is omnidirectional. Furthermore, I consider that D1 also does not meet feature 1 as it discloses a simulation of a composite fabric rather than a composite fabric *per se.*

38. The Requester explains that for the inventive concept, "*The textile support layer having one or more support members arranged thereupon and support formations having a flexible membrane portion extending therebetween allows the two textile layers to be individually configured, such as being tensioned independently*". They explain further that this "*allows the composite fabric to reduce the overall drag coefficient around different body parts and at different flow speeds, in use*." The Requester continues, "*By selectively adopting an active configuration, turbulent fluid flow can be initiated in different regions of the fabric at different flow speeds and in different fluid flow directions, and therefore reduce the drag at different fluid flow speeds*".

39. In contrast, the Requester asserts that D1-D3 "*are all directed towards selecting a fixed surface roughness provided by rubber strips and other means … to achieve a drag reduction at a very narrow range of air flow speeds and in a single specific air flow direction.*" The Requester notes further that each of D1-D3 "*are directed towards providing fixed roughness characteristics to induce turbulence at specific Reynolds numbers relating to specific fluid flow speeds in a similar way to which the fixed dimples on a golf ball induce turbulence*".

40. In response, I agree that D1-D3 are directed towards reducing aerodynamic drag at a narrow range of speeds typical of sprinters in a 100m race. D3 notes in the preface that placing strips outside and underneath a sprint-suit will "*break up the laminar flow around the athlete*". In the theory section of D3 the author explains that a "*similar case is represented by the well-known dimpled surface on golf balls*". They explain further that 'creating a regular wavy structure' with rubber strips under a textile creates a 'rough fabric' which can result in a large reduction in the drag coefficient. This seems very different to the arrangement in the Patent where the membrane in use, rather than simply forming a rough surface, moves from a passive configuration where it is planar in form to an active configuration where it adopts a convex and/or concave shape. There is no disclosure or suggestion that the overlaying fabric (membrane) in D1-D3 moves in this way or even that it moves at all. Further, there is

no suggestion in D1-D3 of an additional fabric support layer or how such a support layer could be included. The skilled person would not be able to arrive at the inventive concept from the teaching of D1-D3 without using any inventive ingenuity as this would require a significant re-design of the composite fabric involved. It is my view, therefore, that claim 1 involves an inventive step in light of any of D1-D3 and common general knowledge.

41. I will now move onto D4. Steps 1 and 2 are the same as for D1-D3. Regarding step 3, the difference between the disclosure in D4 and the inventive concept of claim 1 is that D4 does not meet the terms of features 5 and 6. Specifically, it is not clear that the elastic layer 32 when stretched to conform to a particular body shape will be able to move between an active and passive configuration in the presence of a fluid flow to reduce drag.

42. Regarding step 4, the Requester points out that "*D4 is not directed towards the aerodynamics of clothing for sportspersons, but rather simply the fit of any number of garments or accessories*." I agree that this is an accurate assessment from D4. Paragraph [0005] of D4 states that "*it would be desirable to provide a garment or other article of apparel capable of conforming to various body shapes within a given size range*". As outlined above, paragraph [0070] of D4 explains that the outer elastic layer 32 provides additional resistance to expansion and contraction of the auxetic layer and also provides additional resiliency to the arrangement once a stretching force is removed. Therefore, it seems that the outer elastic layer in D4 performs a very different function to the membrane portions of the Patent. There is no suggestion in D4 that the outer elastic layer moves between an active and passive configuration or that it adopts an active configuration varying during use of the fabric, or even that it moves at all. The skilled person would see no teaching in D4 for the fabric to operate in this way and no suggestion on how such a fabric could be constructed. Therefore, I consider claim 1 to involve an inventive step in light of D4 and common general knowledge.

43. I agree with the Requester that the skilled person would not be motivated to combine the teachings of D4 with that in D1-D3 as they describe very different technical arrangements solving different problems. Even if they were to combine them, the important features 5 and 6 of claim 1 would not be satisfied. Therefore, in my view claim 1 also involves an inventive step in this regard.

44. I therefore consider claim 1 to involve an inventive step in light of the cited disclosures.

45. There have been no arguments regarding the dependent claims with respect to novelty or inventive step and so I have not considered them here. In any case I consider claim 1 to be valid and therefore claims 2-10, dependent on claim 1, will also be valid.

Opinion

46. It is my opinion that independent claim 1 of the Patent is both novel and involves an inventive step in light of the disclosures provided by the Requester.

Susan Dewar
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.