

**IN THE HIGH COURT OF JUSTICE**  
**BUSINESS AND PROPERTY COURTS OF ENGLAND AND WALES**  
**INTELLECTUAL PROPERTY LIST (Ch D)**  
**INTELLECTUAL PROPERTY ENTERPRISE COURT (ChD)**

Rolls Building  
New Fetter Lane  
London

Neutral Citation Number: [2024] EWHC 3247 (Ch)  
Date: 16 December 2024

**Before:**

**HER HONOUR JUDGE MELISSA CLARKE**  
**sitting as a Judge of the High Court**

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**B E T W E E N :**

Claim No: IP-2022-000110

**KOHLER MIRA LIMITED**

**Claimant**

**- and -**

**NORCROS GROUP (HOLDINGS) LIMITED**

**Defendant**

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**Mr Douglas Campbell KC and Mr Thomas Lunt** (instructed by **Mills & Reeve LLP**) for the  
**Claimant**

**Dr Brian Nicholson KC and Dr David Ivison** (instructed by **Shakespeare Martineau**) for the  
**Defendant**

Trial dates: 8 and 9 July 2024

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**JUDGMENT**

**Her Honour Judge Melissa Clarke:**

**A. INTRODUCTION**

1. This is judgment on liability only in a claim by the Claimant (“**Mira**”) for infringement of a UK patent GB 2,466,504 (the “**Patent**”), which relates to technology in “ablutionary installations”, such as bathroom showers. The Patent’s filing date is 24 December 2008, which is also the priority date (“**Priority Date**”). It was granted on 10 July 2013. Both Mira and the Defendant (“**Triton**”) are UK registered companies which are well-known and long-established shower manufacturers.
2. Mira is represented by Mr Douglas Campbell, King’s Counsel, and Mr Thomas Lunt. Triton is represented by Dr Brian Nicholson, King’s Counsel, and Dr David Ivison. I am grateful to Leading Counsel for allowing Mr Lunt and Dr Ivison to address me in submissions on insufficiency. I am grateful to all counsel for the high quality of their written and oral submissions and the assistance they have given the Court.
3. There is no real dispute that at the Priority Date, and today, shower technology divides into two clear category types, “mixer” showers and “electric” or “instantaneously heated” showers:
  - i) Mixer showers take in water from two inlets, a hot water supply and a cold water supply, mix them, and deliver a flow of water at the desired temperature through an outlet. That desired temperature is achieved by varying the mix. The cold water supply is typically from mains water, but the hot water supply might come from a combination boiler or a hot water storage cylinder.
  - ii) Electric showers (or more accurately, instantaneously heated showers) take in water from only one inlet, which is a cold water supply, heat the cold water with an instantaneous water heater by passing it over a heating element, and deliver a flow of water at the desired temperature through an outlet. The desired temperature is achieved by increasing or decreasing the flow rate of the inlet water, and thereby decreasing or increasing the length of time for

which the water is in contact with the heating element, so varying the temperature to which it is heated.

4. Although I have described both types of showers as delivering a flow of water at the desired temperature through an outlet, typically an overhead spray outlet, it is common ground that at the Priority Date mixer showers were commonly available in the market with two outlets or more, as well as with one. For example, there were at that time (and still are) many mixer showers on the market which enable a user to choose to have water delivered either out of an overhead spray outlet, or out of a handheld spray outlet. The user diverts the flow to their outlet of choice using some sort of handle, or knob, or button, which operates a diverter valve within the mechanism of the mixer shower. However, at trial both parties' experts agreed that at the Priority Date, electric showers available on the UK market only allowed for a single outlet. There was no commercially available dual-outlet electric shower products.
5. There was at least one reason for this, and that was that there is a particular safety risk arising from the use of an instantaneous water heater in electric showers, which does not arise in mixer showers. A mixer shower is basically mechanical (albeit it can be electronically controlled). The diverter valve simply diverts the flow of water from one outlet to another, and it does not really matter if in the process of switching the flow of water within the mixer shower is impeded or reduced in some way. However, in an instantaneously heated/electric shower, if the flow of water is impeded or reduced so that it passes significantly more slowly over the heating element, and so spends more time in contact with it, the water will be heated to a higher temperature than expected, including, potentially, to boiling point. That means that the water that exits the spray outlet will be significantly higher than expected, and if the water in the unit turns to steam, there is also a risk of rupture of the unit. Both lead to a real risk of scalding of the user.
6. Triton's expert in his initial report suggested there were also what he called "*commercial barriers*" to the development of dual-outlet electric showers at the Priority Date, but there was nothing remaining of this following cross-examination. I will come back to that.

7. Mira’s case is that the Patent discloses a dual-outlet electric shower, identifies the safety risks I have described, describes how the problem arises, and proposes and claims a novel and inventive solution. The claims of the Patent which Mira asserts are independently valid (without admission as to the validity of any of the other 16 claims of the Patent) are claims 1, 4 (as dependant on claim 1) and 17 (also dependant on claim 1) (the “**Relevant Claims**”).
8. Claim 1 has been split into the following integers:

<b>Claim</b>	<b>Integer</b>	
1	a	An instantaneous water heater having
	b	a heater tank to heat water flowing through the tank, and
	c	a diverter valve downstream of the heater tank to select at least one outlet from at least two outlets and direct water from the heater tank to the selected at least one outlet,
	d	wherein the diverter valve is configured so that the flow rate is substantially unchanged during changeover from one or more selected outlets to another selected one or more outlets.

9. Claim 4 is “*An instantaneous water heater according to any preceding claim wherein the diverter valve cannot be positioned to prevent water flow*”.
10. Claim 17 is “*An instantaneous water heater according to claim 1 wherein there are more than two outlets with the diverter valve directing water to each outlet individually or to a combination of two or more outlets simultaneously.*”
11. Mira’s case is that certain of Triton’s electric shower units (the “**DuElec Range**” and each of them) infringe claims 1 and 4 of the Patent.
12. Triton has described the DuElec Range products alleged to have infringed within Triton’s Product Description and there is no dispute about their operation. Triton denies infringement of the Patent on either the normal construction or on the doctrine of equivalence. Triton counterclaims for revocation of the Patent on the grounds of lack of novelty, obviousness, and insufficiency. It also relies on a so-called “*Formstein*” defence: i.e that if it establishes obviousness in light of the

common general knowledge alone but the Patent is not invalid, then Mira is not entitled to rely on the doctrine of equivalence to establish infringement.

## **B. ISSUES**

13. The issues identified in the list of issues attached to the directions made by His Honour Judge Hacon at a second case management conference on 30 October 2023 are as follows:

### *Patent validity*

1. Are the Relevant Claims of the Patent novel over UK Patent Application No 2,274,985A (“**Deeley**”)?
2. Are the Relevant Claims of the Patent inventive over: (i) Deeley in conjunction with the common general knowledge; and (ii) the common general knowledge?
3. Are the Relevant Claims of the Patent invalid for lack of sufficiency as pleaded in paragraph 17 of the Amended Defence and Counterclaim?

### *Patent infringement*

4. Do the products of the DuElec Range (and each of them) fall within the scope of protection of the claims 1 and/or 4 of the Patent (whether on the basis of normal construction or by reason of equivalence)?
14. For the purposes of Issues 1 and 2, Triton reads Deeley with a cross-reference to UK Patent No 2,219,497B (“**McMaster-Christie**”), cited within Deeley.

## **C. THE WITNESSES**

15. As is usual in IPEC, the pleadings were signed by directors of the parties and stand as evidence. There is no disputed evidence of fact and so the directors did not produce witness statements and were not called to give evidence at trial.

### *Mira’s expert*

16. Mira relies on the expert evidence of Mr Keith Mills. Mr Mills filed two expert reports dated 15 March 2024 and 26 April 2024, attended Court and was cross-examined.

17. Mr Mills is a product approvals consultant operating through his own firm since 2020. He obtained a degree in electrical and electronic engineering in 1989, and worked firstly as a development engineer at a telecoms equipment supplier, GPT Ltd, and then as a hardware development team leader there, before moving to Marconi plc in 2000 where he continued to develop hardware systems for IP telephony. He moved to Ericsson Ltd in 2006 as a functional test engineer for optical network systems, and then as an approvals engineer for optical network products. In 2010 he moved to the Bristan Group as a senior engineer. Bristan is a UK company engaged in the design and manufacture of showers. Mr Mills initially worked on product compliance of a new electric shower range. From 2012 he was responsible for development of new products, including a new electric shower range, a new care electric shower and a digital mixer shower, overseeing development teams that included mechanical and electronic engineers. He left Bristan in November 2019.
  
18. Mr Mills' experience as an engineer working in the arena of showers, therefore, post-dates the Priority Date by about 18 months. However, he said in his first report and in oral evidence that he became aware of the general range and products of electric showers in the market in 2010, which included products which had been launched in the years running up to 2010, and so he was aware through his direct experience starting in 2010 of products that had also been on the market at the Priority Date. Mr Mills also says that since he set up his own consultancy he has worked with manufacturers of electric showers, including Mira, between January and May 2021, and so has maintained his awareness of the shower market and product offerings and standards. He says he undertook a review of the electric shower market, and products which were available on the UK market in 2008, for the purpose of preparing his first report. I accept the submission of Mr Campbell for Mira that the shower industry in 2008 was not a fast moving one, and was one in which both the standards and the type of the products in the market had not changed for many years, and I did not understand either expert witness to suggest otherwise. I am satisfied that although Mr Mills only worked in the shower industry from 2010 he gained sufficient knowledge then, checked by his later reading to prepare for this trial, to be both secure and credible in his understanding of what was the common general knowledge at the Priority Date.

19. Dr Nicholson for Triton accepted in closing that Mr Mills was a good witness. I also found Mr Mills to be a very good witness, careful credible and reliable, and I am satisfied that if he did not know if something was within the common general knowledge at the Priority Date or not, he would have said so.
20. Mr Mills sets out in his first report that when he was instructed to act for Mira, he was first asked to describe the common general knowledge in relation to showers at the Priority Date. He was then provided with Deeley, and from that located a copy of McMaster-Christie himself. He confirmed in cross-examination that he was not provided with McMaster-Christie by Mira's solicitors. He discussed Deeley and McMaster-Christie with Mira's solicitors and was subsequently provided with copies of the Patent, Triton's Product Description, relevant safety standard BS EN 60335-3-35:2002 and A2:2011 (incorporating corrigendum December 2005 and April 2007), the pleadings and the case management order. This is, in my judgment, the proper way for an expert to go about his task.
21. Dr Ivison in his closing note on novelty and obviousness criticised Mr Mills as having a legally incorrect approach to Deeley, namely that because Deeley is concerned with a mixer shower, the skilled person would by definition be interested in creating a mixer shower when they read it. He relies on the following question and answer in cross-examination of Mr Mills by Dr Nicholson:

*Q. But once the skilled person has been given that idea, it is not going to be technically difficult for the skilled person to apply their routine engineering skills of a shower designer to work through all the pieces?*

*A. It depends what product they are trying to make. If you pick up Deeley, it is because you are interested in a mixer shower. So if an engineer or a skilled person who is working on a mixer shower is then challenged to incorporate an electric shower or an electric heating element into it, I do not think that would be routine for them at all. It radically changes the product concept.*

22. Dr Ivison submits that this is the wrong way round, and it is the subject matter of the Patent under consideration (which it is not disputed is an electric shower) which determines the technical area in which the skilled addressee is deemed to have an

interest in, not the content of the prior art, so it is “*appropriate to suppose that the skilled person starts with an interest in electric showers when they are given (and read with interest) the Deeley prior art, and it is entirely inappropriate to assume they have a fixed interest in mixer showers*”.

23. I think this criticism is a little unfair. Mr Mills looked at this from both directions, in answer to questions in cross examination, and I think this is why he said in the quoted answer above “*It depends what product they are trying to make*”. He also said “*The skilled person working in the shower industry when picking up the Patent would only be thinking of an electric shower... would only be thinking about electric showers. I don’t think he would consider the wider use. Not thinking about the wider aspects. They would note it [Deeley], but it would not be of any interest to them*”. The point he was trying to make, I believe, was that the skilled person thinking of electric showers would note *Deeley* but it would not be of interest to them, whereas *Deeley* would be of interest to an engineer working on mixer showers, but if challenged to incorporate an electric shower into it, that would not be routine and it would be, effectively, asking them to produce a different product. He was clear that “*To me, Deeley teaches a mixer shower. It doesn’t teach an electric shower*”.

#### *Triton’s expert*

24. Triton relies on the expert evidence of Mr Noel Murray. Mr Murray filed two expert reports dated 3 April 2024 and 8 May 2024, attended Court and was cross-examined.
25. Mr Murray trained as a Mechanical Engineer. He obtained a BTEC ONC and then a BTEC HNC in mechanical engineering, followed by a PgDip in Engineering Business Management and an MSc in Engineering Business Management, both from the University of Warwick. He worked in the shower industry at Triton from 1989 to 1995, originally as a Senior Design Engineer and later he was promoted to Design Manager. He could not remember when this promotion came, in cross-examination. He said he worked on the development of instantaneous electric showers throughout his time there, but in cross-examination said that he had only personally designed one electric shower. He then worked as a Mechanical Design Manager at Valeo Electronics (which made electronic assemblies for automotive manufacturers) before



moving to Xpelair/GDA Applied Energy Ltd in 1997. He worked on ventilation products there until 1999 when he also briefly became responsible for Redring Showers and water heating development, before becoming Design Director of Laundry Products in January 2000. He was promoted to Technical Director in March 2001 where he remained until 2014, after which he started up his own management/ business consultancy where he remains director and shareholder.

26. Mr Murray stated in his initial report that he had read Deeley, McMaster-Christie, the Patent and the parties' statements of case, and that at the stage of his initial instructions he had not been shown a copy of the Patent "*and was only informed that the field of art relevant to the Patent related to shower products with multiple outlets*". In cross-examination he said he was told that Triton was attacking the validity of the Patent, the case was about multiple outlet electric showers, and he assumed that meant the relevant products included a diverter valve. He said that Triton's solicitors had provided him with both Deeley and McMaster-Christie and that he read them with a particular focus on the fact that Deeley had shown multiple outlets and a diverter valve, and that if he had not been told about the importance of multiple outlets and a diverter valve he would not have focused on these elements, but simply read the patents. He also confirmed that he had read Deeley in the knowledge that he had already been given a copy of McMaster-Christie, and that caused him to focus on the reference in Deeley to McMaster-Christie. Mr Murray said if McMaster-Christie had not been provided to him, he would have obtained a copy of it from the reference in Deeley. However, I am satisfied on the balance of probabilities that he did not obtain copies of the other patents cross-referenced in Deeley (he could not remember when cross-examined on the point but if he had it is likely in my judgment that he would have remembered that all of them were authored either by Deeley or McMaster Christie) and so I cannot be satisfied that he would have considered McMaster-Christie if he had not been directed to it by Triton's solicitors. Mira criticises Mr Murray's approach to his task and submits that I cannot be sure to what extent hindsight has played a role in his analysis of the prior art. I accept this as a fair criticism.
27. There are a few other areas in which Mr Campbell for Mira criticised Mr Murray in closing, and which he uses to support his submission that Mr Murray was not a

witness who was doing his best to give the court unbiased assistance about the state of the art at the Priority Date. The first is in relation to his evidence of the common general knowledge in which Mr Murray said at paragraph 76 of his first report that:

“Steps which were taken in the design process of an electric shower product to avoid the risks of unintentional flow restrictions included:

(a) flexible hoses used in electric showers almost always consist of a flexible plastic tube protected by flexible metal shielding to prevent the hose inside from becoming kinked; and

(b) Where the shower head was to have an adjustable spray pattern it had to be designed so that it was never possible to position the adjuster in such a way that the flow of water was obstructed. Some shower heads might obstruct the flow during adjustment or even have a dedicated button to temporarily cut off the flow (e.g. to allow the user to apply soap or shampoo without the water running) – if these kinds of showerheads are sold as separate items they will be prominently marked as not being suitable for use with electric showers.” (Mr Murray’s emphasis).

28. Mr Murray accepted in cross-examination:

- i) in relation to paragraph 76(a), this applied equally to mixer showers and so should be deleted as it was not a step in the design process of an electric shower; and
- ii) in relation to paragraph 76(b), the second half of the second sentence was not true at the time of the Priority Date. He accepted that the Bathroom Manufacturers’ Association had written a report as late as 29 January 2024 cautioning that such shower handsets, with a push-button stop, were being sold without any warning that they were not suitable for use with electric showers. Mr Murray said that he had read that report shortly after it came out but could not answer why he had made that mistake in paragraph 76(b), drafted in April 2024. He accepted that this was also likely to have been a problem at the Priority Date and agreed that sentence should also be deleted from his report.

29. The second is what Mr Campbell characterises as Mr Murray’s failure to acknowledge in either of his reports the fact that there were no dual-outlet electric showers on the UK market at the Priority Date either in his first report or in his reply report, despite Mr Mills having made that point explicitly in his first report. Mr Campbell put it to Mr Murray in cross-examination, in somewhat different terms, that a fair expert would have acknowledged this fact, and that Mr Murray had sought to avoid making that admission, which he had finally only made in oral evidence. Mr Murray responded that he only covered within his reports what was within the common general knowledge, not what was not. I do consider that Mr Murray’s failure to acknowledge that there were no dual-outlet electric showers on the UK market at the Priority Date was a surprising omission given the subject matter of the Patent, and that this is particularly so given what he said at paragraph 86 of his first report, which is the subject of the third main criticism made by Mr Campbell in closing for Mira.
30. In paragraph 86, Mr Murray opined that “*there were (and are) certain commercial barriers to selling electric showers with multiple outlets*” (despite not explicitly acknowledging that there were, in fact, no such products on the market in the UK at the Priority Date). Both of the “*commercial barriers*” he identified, he resiled from in cross-examination:
- i) At paragraph 86(a) he opined that electric showers had been generally viewed as occupying the budget end of the market, and were inherently less desirable than mixer showers, so there was less focus on adding new features such as multiple outlets, which carry extra cost. I note that Mira’s expert Mr Mills acknowledged in cross-examination that electric showers were less desirable than mixer showers historically, and I accept that evidence. However, Mr Mills also noted that there had always been a luxury end of the electric shower market, and Mr Murray agreed with that in his cross-examination. I am satisfied that was, therefore, not a true commercial barrier to a multiple-outlet electric shower at the time of the Priority Date; and
  - ii) At paragraph 86(b) he opined that “*The flow rate limitation which is inherent in a domestic electric shower has made them less readily marketable to the*

*luxury end of the shower market, where a high flow rate is expected and where multiple outlet products are typically to be found*". Mr Murray clarified in cross-examination that he was referring to the fact that the maximum power which can be delivered to an electric shower is 10.8kw, but accepted that is still a limitation today, and so agreed that it could not explain why we have dual- or multiple-outlet electric showers on the UK market today, but such showers did not exist on that market at the Priority Date.

31. Mr Campbell put it to Mr Murray that in this paragraph he was seeking to make excuses as to why there were no dual-outlet electric showers on the UK market at the Priority Date albeit without explicitly acknowledging that there were not, and Mr Murray denied it. However, in answer to a question from the bench, Mr Murray agreed that there was nothing about the UK market at the Priority Date which would lead him to suspect that a dual-outlet electric shower would have a different reception in the marketplace than it did when it was eventually launched a few years later.
32. Mira's third criticism of Mr Murray is his evidence at para 126 of his report that Deeley discloses two "*distinct concepts*", being (a) a shower unit with multiple outlets and a diverter valve and (b) a control unit for such installations. When he was asked about this in cross-examination, he was not able to remember what those two distinct concepts were, and asked to look at his report. Mr Campbell did not allow him to do so, but put it to him that he could not remember them either because he did not write those paragraphs in the first place or because he had forgotten what they were. He denied both, but although he was given time to remember what these two distinct concepts were, and was asked again if he could remember them after being taken through Deeley, he could not. Mr Campbell submits for Mira that it is more likely than not that he couldn't remember them because it was not really his understanding that Deeley did disclose two distinct concepts but rather it was an idea introduced by Triton's solicitors. I have no evidence on that latter point, but the fact that Mr Murray couldn't remember what those two distinct concepts were undermines the whole idea that the second, (b), disclosure exists, in my judgment.

33. Finally, Mira criticises Mr Murray for initially resisting the proposition put to him by Mr Campbell that McMaster-Christie was not part of the common general knowledge at the Priority Date. Mr Murray said that the common general knowledge “*potentially includes*” “*relevant*” patents which are published at the time, (although as Mr Campbell quite correctly submits, it cannot be known what prior art is relevant to a patent until you know what the patent is), before accepting that it was not part of the common general knowledge for the skilled addressee in this case.
34. All in all, the concerns which I have summarised above and elsewhere in this judgment including about Mr Murray’s approach to his task as expert, his confusion over the proper approach to what prior art was and was not in the common general knowledge, the number of assertions he made which he was forced to resile from as incorrect, and his failure to acknowledge a key, now accepted, fact that there were no multi-outlet electric showers on the UK market at the Priority Date means that where the parties remain in dispute I generally prefer the evidence of Mr Mills.

#### **D. THE SKILLED ADDRESSEE**

35. The identity of the skilled addressee is agreed in the pleadings (identified at para 14 of the Defence and Counterclaim, admitted in para 7 of the Amended Reply to Defence and Counterclaim) to be “*an engineer engaged in the design and manufacture of showers*”.
36. I am satisfied that Mr Mills adopts this skilled addressee in his report. He states that the Patent addresses “*the problem of providing an improved electric shower*”, and that the field in which the problem lay was “*“engineering of showers” in a general sense rather than the engineering of any specific type of shower*”, as he says that it is common for engineers to work on both mixer and electric showers during the course of their career, even if they work on only one type of shower at any one time. I accept that latter point.
37. Mr Murray records that he was informed that the skilled person “*is (or includes) an engineer engaged in the design and manufacture of showers*” but this is not the agreed pleaded position, which is that the skilled person is such an engineer. This misinformation may explain why he believes that the Patent is addressed to “*a*

*design manager, who would be responsible for overseeing the project and managing teams working on different aspects of the product*”, and this appears to be his skilled addressee against which he has carried out his task as expert. However, this is not the pleaded position of the parties and Mr Mills disagrees with Mr Murray, saying that “*a design manager would not be involved in the day-to-day design and development work in producing a new shower. Instead, they would occupy more of a managerial role*”. I hold the parties to their agreed pleaded position that the skilled addressee is an engineer engaged in the design and manufacture of showers.

#### **E. THE COMMON GENERAL KNOWLEDGE**

38. There is no dispute on the relevant law. Mira directs me to the review of the law as to common general knowledge of Arnold J, as he then was, in *KCI Licensing Inc v Smith & Nephew plc* [2010] EWHC 1487 (Pat), [2010] FSR 31 at [105] – [115], approved by the Court of Appeal on appeal of that judgment at [2010] EWCA Civ 1260, [2011] FSR 8 and [6]. The common general knowledge of the skilled addressee is all that knowledge which is generally known and generally regarded as a good basis for further action by the bulk of those engaged in a particular art, and includes all that material in the field of art in which the skilled addressee is working which they know exists, which they would refer to as a matter of course if they cannot remember it, and which they understand is generally regarded as sufficiently reliable to use as a foundation for further work.
39. Each of Mr Mills and Mr Murray addressed the common general knowledge at the Priority Date in some detail in their initial report. Mr Mills deals with it from paragraphs 21 to 49, and addresses Triton’s pleaded case on the point from paragraphs 50 to 58. Mr Murray addresses the common general knowledge at the Priority Date over 14 pages, from paragraphs 36 to 87.
40. I have already identified some of the issues with Mr Murray’s understanding and description of the common general knowledge at the Priority Date. In general I found Mr Mills’ summary to be more precise, comprehensive and accurate. I summarise below what I accept from both experts to be the common general knowledge at the time, although I rely more heavily on Mr Mills’ evidence.

41. There were different types of showers on the UK market. Mr Mills identified 4 different types, standard mixer, digital or electronic mixer, power (by which he meant pumped mixer) and electric or instantaneously heated showers, but made clear that the first three all fall into the mixer category, and electric showers fell into a “*separate class*”. Mr Murray also split the market into two main categories, mixer and electric showers. The experts agree that single outlet electric showers were available on the market since the 1970s. They also agree that in relation to both mixer showers and electric showers, controlling shower temperature was, at a general level, a key goal.
42. In relation to mixer showers at the Priority Date:
- i) They had both hot water and cold water feeds and combined them in proportions which could be varied by the user to reach the desired temperature for showering;
  - ii) The hot water feed could come from a combi boiler under high pressure or a hot water cylinder under low pressure;
  - iii) The cold water feed could come under high pressure from the water mains or under low pressure from a header tank;
  - iv) The hot water feed was typically supplied from such sources at a temperature in a range of 50 – 65C (for a hot water cylinder) or 60 – 70C (for a combi boiler), but this could vary, although it cannot approach boiling temperatures;
  - v) The cold water feed could also vary in temperature by about 20C depending on the season and weather;
  - vi) The method of user variation of the temperature could be mechanical or digital (electronic);
  - vii) If mechanical, they would typically be operated by the user rotating a knob or handle to adjust the ratio of water coming from each of the hot water and cold water inlets;

- viii) A simple mechanical mixer shower would not have a thermostat, and so if, in use, the water pressure or temperature of either or both of the hot water or cold water inlet changed, the temperature of the mixed water would vary;
  - ix) There were also mechanical mixer showers on the market which contained a thermostat, intended to maintain a more stable temperature of the mixed water in use;
  - x) Digital (electronic) mixer showers would be operated by the user controlling an electronic valve by selecting a desired temperature on an electronic control panel which drives the valve by an electric motor. Commonly these would have sensors which monitored the temperature and flow rate of the inlets and/or outlet, and adjust the valve in response to any fluctuations in the inlet feed, to maintain a stable outlet temperature (and sometimes flow) as selected by the user. I accept Mr Mills' evidence that at the Priority Date there were relatively few digital mixer showers on the market;
  - xi) There were power showers which incorporated an electrical pump downstream of the mixer valve, to pressurise the water after it has been mixed, into either a mechanical mixer shower or a digital mixer shower. I accept Mr Mills' evidence that at the Priority Date these were typically marketed as their own class of showers to the UK Market, but were a class of mixer showers;
  - xii) Dual-outlet mixer showers were commonly available on the market in the UK;
  - xiii) At least some of the diverter valves incorporated into mainstream mixer shower products at the Priority Date would have affected the flow rate during changeover, including the Mira Montpellier mixer shower.
43. In respect of electric showers at the Priority Date:
- i) These had a cold water feed only;
  - ii) The feed was typically a high pressure supply from mains water, but some electric showers used a low pressure supply from e.g. a header tank and contained a pump to pressurise the water;



- iii) The main components were an instantaneous water heater, an inlet solenoid valve, a flow stabilisation valve which was present in the vast majority of electric showers at the Priority Date, a thermal cut-out, and the outlet which was typically a hose and spray head;
- iv) The instantaneous water heater typically comprised insulated resistive electric heating elements (with a typical power rating of around 8.5-10.5kW shared, typically, between two elements) which the cold water passes over and becomes heated;
- v) The elements of the heater are heated to a temperature well above the boiling point of water, typically in excess of 200C;
- vi) The user would typically vary the output water temperature by operating a knob which set whether one or both heating elements was energised, and this would vary the temperature to which the water is heated;
- vii) The solenoid valve was used to switch the supply of water to the device on or off. When powered up, the solenoid would become energised and cause the valve to open, allowing water to flow through the device;
- viii) Any flow stabilisation valve would be located upstream and towards the cold-water inlet. Those typically comprised an O-ring regulator which would expand under pressure and reduce the effective size of the inlet pipe, constricting and reducing the water flow (and vice versa). The purpose was to maintain a roughly constant water flow into the electric shower, even if, for example, water pressure reduced because of a tap or other water-drawing device being switched on in the house;
- ix) The flow stabilisation valve also enabled the user to adjust the outlet temperature because the O-ring regulator could be tightened or loosened by use of a knob on the external housing of the shower;
- x) The thermal cut-out device was an electromechanical device which would cut the power in response to temperatures exceeding a pre-defined threshold. Some would have an automatic reset, which would reconnect the circuit when

the temperature decreased, or the shower was turned off. Some would have a second stage cut-out where if temperatures exceeded a second, higher, threshold the device would deform beyond recovery, and the shower would become non-functional until an engineer replaced the thermal cut-out device within the electric shower. The first threshold would be set at or about the comfort level for the user and align with current safety standards (around 55C). The second threshold would be far above scalding temperature, at 80C or above;

- xi) On the UK market, electric showers only had a single outlet;
  - xii) Handheld shower heads with stop-start buttons that could entirely stop flow were sold on the UK market in 2008 and at that time probably were without appropriate warnings on them that they should not be used with electric showers, as continued to be the case even up to 2024.
44. The experts agree that there were (and remain) three main factors affecting the outlet temperature of an electric shower:
- i) The inlet temperature, which may vary significantly (10-15C) between summer and winter, which will vary the amount of heating required to achieve the same desired outlet temperature;
  - ii) The power of the electric shower, which at the Priority Date was typically about 8.5-10.5kW at a nominal 240V domestic electricity supply; and
  - iii) The flow rate of water over the heating elements, controlled by the user via the flow stabilisation valve, and this link between flow rate and temperature had been widely appreciated for as long as electric showers had been in mainstream use.
45. They further agree that it was within the common general knowledge that a reduction in water flow rate could be undesirable and this could be caused by a blocked outlet or a kinked hose, but there was a dispute between the experts about whether this preference for avoiding flow restriction was known to relate to the avoidance of elevated temperatures in electric showers (Mr Murray's opinion) or

whether it was just a general desire to avoid an interruption to water flow while the shower was in use (Mr Mills' opinion). The points made by Mr Murray to support this opinion are those that he resiled from in cross-examination, in paragraph 86 of his report, and his incorrect point about warnings on stop-start showerheads (which I am satisfied were not generally sold at the Priority Date with warnings against using them with electric showers, for the reasons previously given). However, in cross-examination Mr Mills acknowledged that the skilled addressee would know at the Priority Date: (i) that if the flow rate changes in an electric shower the output temperature would change; and (ii) that the relevant standards required no obstructions downstream of the water heater, agreeing with Dr Nicholson's contention that the skilled addressee would know that a substantially unrestricted flow path should be maintained at the outlet. He said that the skilled addressee may also have a compliance engineer who would pick up this potential problem. This suggests to me that Mr Mills may be over-simplifying in considering that at the Priority Date the undesirability in reducing water flow rate in electric and mixer showers was considered to be the same, namely arising from a general desire to avoid interruption of water flow during use of the shower rather than concern about the elevation of temperatures in electric showers. On balance I find that the skilled addressee would know that there was a particular issue with reducing flow rate in electric showers because of the concern about elevation of temperatures arising from such reduction.

46. In relation to shower design, the experts agreed that at the Priority Date:
- i) the first step for the shower engineer would be receipt of a brief from the marketing department, identifying the specification and features of the product wanted, which would then be turned into a technical brief by the engineering team, identifying the technical features which were required to meet the marketing specification;
  - ii) typically there would be a discussion between the marketing and engineering teams to agree the brief, after which the design phase would follow;
  - iii) the device would be designed in the knowledge that it would have to comply with applicable safety standards, which for electric showers was BS EN

60335-2-35 “Household and similar electrical appliances – Safety – Part 2-35: Particular requirements for instantaneous water heaters”, which was a supplement to the also relevant BS EN 60335-1 “Household and similar electrical appliances: Safety Part 1: general requirements”, and the skilled addressee would be familiar with these safety standards, as updated and amended from time to time, within his common general knowledge.

47. I accept Mr Mills’ evidence that at the Priority Date the design of mixer showers and the design of electric showers were treated as practically distinct, because the two types of products operate in different ways using different sorts of components that give rise to different design considerations. His evidence was that in putting a prototype design together, the skilled person would look at pre-existing showers and, where possible, at least for the prototype, see if they can use pre-existing parts and solutions, but core components of mixer showers and electric showers were different and cannot generally be transferred between the two contexts. He described there as being a “*different mindset*” for each of electrical and mixer showers.
48. Mr Mills was challenged on these points in cross-examination, but not successfully, in my judgment. I will deal with his evidence in more detail in the discussion of inventiveness.
49. Mr Murray disagreed in his report that the design and development of the two types of showers was “*practically distinct*”, saying that there were some common components, but those that he discussed were the showerhead, the riser rail to which a showerhead can be attached and hosing which can be used to outlet water to a showerhead or hand-held attachment. I accept those are common components in a showering experience, but they could equally be used with a gravity-fed shower field shower amounting to a bag or bucket of water hooked onto a stand. They do not tell us anything about the commonality of engineering of a mechanical mixer shower and an electric shower, or the mindset of the engineers designing such showers, in my judgment. Mira describes them as trivial components. In any event he moved away from this position in cross-examination, accepting that these common elements did not undermine the proposition that mixer and electric showers were “*fundamentally different*” to each other. I accept Mr Mills’ evidence that mixer

showers and electric showers were treated as practically distinct, and a “*different mindset*” was required to engineer either an electric shower or mixer shower.

## F. THE PATENT

50. The Patent is titled “Ablutionary installation”.

### *The invention as described*

51. The Patent begins (page 1) by stating that the invention relates to “*ablutionary installations for washing and more especially to ablutionary installations for showering*” with particular application to “*shower installations employing an instantaneous water heater to provide a source of hot water on demand*”, i.e. electric showers, as is made clear by the next paragraph. It explains that “*in such installations, a supply of cold water is heated at the time of use by passage through a heater tank, typically by means of one or more electrical heating elements positioned within the tank*”, and notes that “*the increase in temperature between the inlet and outlet is dependent on the flow rate and power input. ...*” and that “*For a given power input, varying the flow rate alters the outlet water temperature and enables the user to select the desired outlet water temperature*”. It is common ground between the experts that this describes an electric shower within the common general knowledge at the Priority Date.

52. The Patent sets out on page 1 the reasons why it is desirable in such installations to maintain the required flow rate while the heating elements are energised:

- i) To avoid sudden unexpected changes in the water temperature, especially an increase in temperature which could give rise to a risk of scalding; and
- ii) To avoid interruption in the flow, as this may result in a rapid increase in temperature of the water in the tank, which may vaporise to steam, giving rise to a risk of rupture of the tank to release the steam, with a consequential risk of scalding.

53. The Patent goes on (page 2) to explain that these risks were recognised by designers of the “*...known shower installations employing an instantaneous water heater...*”

and that they were typically mitigated by employing “...*an uninterrupted flowpath from the outlet of the heater tank to the spray outlet so as to avoid, as far as possible, any blockage that may reduce or interrupt the flow of hot water through the heater tank*”.

54. The Patent explains (page 2) that its invention “...*has been made from a consideration of the foregoing, and seeks to provide an instantaneous water heater and a shower installation employing an instantaneous water heater that mitigates some of the disadvantages above-mentioned*”. It describes a “*first aspect of the invention*” as follows:

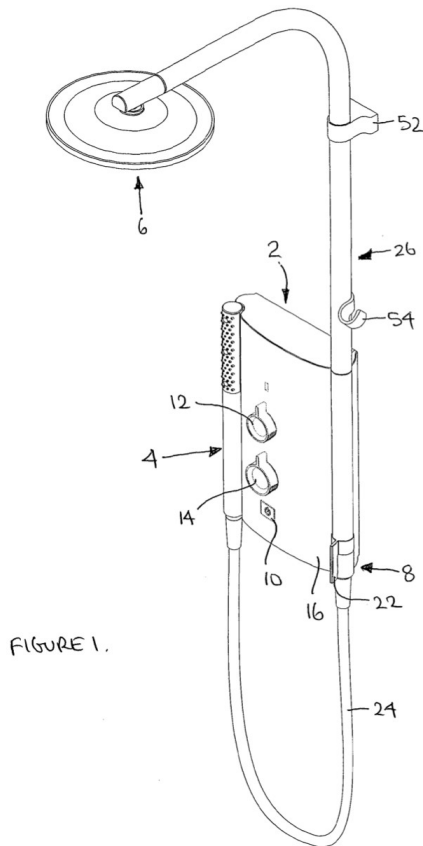
“... there is provided an instantaneous water heater having a heater tank to heat water flowing through the tank, and a diverter valve downstream of the heater tank to select at least one outlet from at least two outlets and direct water from the heater tank to the selected at least one outlet, wherein the diverter valve is configured so that flow rate is substantially unchanged during changeover from one or more selected outlets to another one or more selected outlets.”

55. The Patent describes (on page 3) that the diverter valve changes the outlet from which the heated water is directed, allowing the user to select it to be delivered from different fittings. It states that preferably the diverter valve:

- i) has two outlets and is operable to select one or other of the outlets; and
- ii) cannot be positioned to prevent water flow; and
- iii) is configured so that the flow rate is substantially unchanged during changeover from one outlet to the other outlet.

56. The Patent notes that where the instantaneous water heater is employed in a shower installation, the outlets are preferably connected to spray fittings, and in one embodiment “*one of the outlets is connected to a handset via a flexible hose and the other outlet is connected to a showerhead via a supply pipe*”. It then discusses methods of mounting the handset which are not relevant to the issues I have to determine.

57. On page 4 onwards, the Patent refers to four labelled diagrams and provides a detailed description of them.



58. In Figure 1 the instantaneous electric water heater 2 operates to heat an incoming cold water supply (not shown) to provide a source of hot water on demand for delivery to a handset 4 or a fixed showerhead 6, selected by means of a diverter valve 8. The electric water heater 2 is manually operated with push button 10 to start and stop flow of water and separate rotatable control knobs 12, 14, by which the user selects the power input to the water heater 2 and the water flow rate. These are mounted on a casing 16. The user can alter the outlet water temperature by adjusting the flow rate for a selected power input. In this embodiment, the power selection knob 12 has three positions corresponding to power off, half power and full power settings. By adjusting the power input, the required outlet water temperature can be obtained with an acceptable flow rate for a wide range of inlet water temperatures. For example, the cold water supply temperature may vary by as much as 20C between summer and winter. The power input is provided by electric heating elements (not shown) contained in a heater tank (not shown) housed within the casing 16. The power control knob 12 operates a switch mechanism (not shown) within the casing 16 for controlling the power supply to the heating elements according to the selected power input. The push button 10 operates an on/off valve

(not shown) within the casing 16 for starting and stopping water flow and the switch mechanism may be responsive to water pressure so as to connect the power supply to the heating elements only when there is a sufficient flow of water through the heater tank. Lights 18, 20 mounted on the casing are illuminated to provide an indication when the power supply is switched on and when the water flow is low respectively.

59. The Patent states that it is not limited to the construction and operation of the electric water heater 2 shown and described, and that it can be worked with other constructions of electric water heaters and other types of instantaneous water heaters including gas or oil powered instantaneous water heaters.
60. The Patent describes the diverter valve 8 as being connected to an outlet from the heater tank and with a manually rotatable control knob 22 for delivering water from the diverter valve 8 to either a flexible hose 24 connected to the handset 4 or a pipe (not shown) concealed within a fixed riser rail 26 and connected to the showerhead 6. It provides that *“The diverter valve 8 is preferably configured so that during the changeover from the handset 4 to the showerhead 6 or vice versa the flow to one outlet gradually reduces as the flow to the other outlet gradually increases. In this way, the diverter valve 8 cannot be positioned to prevent water flow and changing over from one outlet to the other can be achieved without any significant reduction in flow. As a result, if the diverter valve 8 is operated to select a different outlet while the shower is in use, the water flow is maintained to prevent a sudden, unexpected increase in temperature of water delivered from water heater 2 which could otherwise occur if the water flow was reduced or temporarily interrupted during the changeover. Also, maintaining the flow prevents water in the heater tank being rapidly heated and changing to steam causing a sudden increase in pressure sufficient to rupture the heater tank which could otherwise occur if the water flow was interrupted. In this way, the risk of a user being scalded by discharge of hot water from a spray fitting or escape of steam from a ruptured heater tank is reduced.”*

*The claims*



61. Claims 1, 4 and 17 have been set out above. Following the expert evidence, the only dispute in construction appears to be in relation to claim 1.

**CONSTRUCTION OF CLAIM 1**

*The Law*

62. There is no dispute on the law relevant to construing the claims. It is for the Court to construe the patent objectively, adopting the mantle of the notional skilled addressee to whom it is directed, and in the light of the common general knowledge with which the skilled addressee is assumed to be imbued (*Dyson v Hoover* [2001] RPC 26 at [48f]). The question is what the skilled addressee would have understood the patentee to be using the words of the claim to mean, in the light of his common general knowledge (*Kirin-Amgen Inc v Hoechst Marion Roussel Ltd* [2004] UKHL 46, [2005] RPC 9).
63. Both parties agree that in construing a document, including a claim, it should be given a purposive and not a literal meaning, (*Catnic Components Ltd v Hill & Smith Ltd* [1982] RPC 183, 243, *Virgin Atlantic v Premium Aircraft Interiors* [2010] RPC 8 at [5]) and should be construed as a whole. That means, in the context of construction of a patent, as the specification and the claim are part of the same document, they are to be construed as such (see Laddie J in *Brugger v Medic-Aid* [1996] RPC 635 at 642), subject to the warning provided by Henry Carr J in *L'Oréal Société Anonyme v RN Ventures Ltd* [2018] EWHC 173 (Pat) at [51]: “*Not everything disclosed in the specification of a patent necessarily falls within the scope of its claims, which may have been amended during prosecution*”.

***Disputes in construction of Claim 1***

64. I set out the integers of claim 1 again here for convenience:

<b>Claim</b>	<b>Integer</b>	
1	a	An instantaneous water heater having
	b	a heater tank to heat water flowing through the tank, and
	c	a diverter valve downstream of the heater tank to select at least one outlet from at least two outlets and direct

		water from the heater tank to the selected at least one outlet,
	d	wherein <b>the diverter valve is configured so that</b> the flow rate is <b>substantially unchanged</b> during changeover from one or more selected outlets to another selected one or more outlets.

65. There is a dispute about the meaning of the phrases I have emboldened: ‘*substantially unchanged*’ and ‘*the diverter valve is configured so that*’ the flow rate is substantially unchanged during changeover of outlets, both in integer 1c of claim 1.

*‘Substantially unchanged’*

66. The parties were required to plead to the criteria by which the skilled person can assess whether the flow rate is ‘*substantially unchanged*’ by order of HHJ Hacon of 26 July 2023.

67. Mira pleads that the skilled person can assess whether the flow rate is ‘*substantially unchanged*’ by the following criterion: when water is flowing at a selected water temperature while the heating elements are energised, any increase in temperature during changeover from one or more selected outlets to another selected one or more outlets does not give rise to a risk of scalding (“**the risk of scalding criterion**”). It pleads that this construction follows from the technical purpose of the integer.

68. Mira also pleaded a secondary criterion, (the “sudden unexpected change in temperature criterion”), but does not pursue that at trial.

69. Triton did not plead a meaning of ‘*substantially unchanged*’, instead pleading that the term is so uncertain that the skilled person cannot tell whether they are working the claimed invention. It pleads that any construction of the term necessitates consideration of the purpose for which the water heater is used, and a change in flow rate which would be considered to be “substantial” in one use context may not be “substantial” in a different use context. It pleads: “*claim 1 is not limited to instantaneous water heaters used for any particular purpose, and includes*

*instantaneous water heaters suitable for use for multiple purposes” such that it is “not possible to ascribe a consistent and objective meaning to the term ‘substantially unchanged’ in the context of claim 1”.*

70. Mira submits that the title of the Patent, the introductory passages, all of the embodiments and the Figures all point to use as an electric shower, and so those are plainly embodiments which the patentee intended to cover. It submits that construing the language according to the risk of scalding criterion is preferable to Triton’s argument that the language has no meaning at all. It relies on the explanation of Laddie J in *Merck v Generics* [2004] RPC 31 that the Protocol on Interpretation “*requires that the monopoly should cover all embodiments whether explicitly mentioned in the claims or not, which the notional skilled reader would conclude, with reasonable confidence, the inventor wanted to cover*”, which “*involves assessing all the facts of the case. The wording of the claims is the most important one, but not necessarily determinative. Matters such as the way the inventor describes his inventive contribution and his explanation, if any, of how the invention achieves its claimed results are matters to be taken into account. The factors, and how they interrelate to each other, will vary from case to case.*” (at [49]).
71. Mr Murray supports Triton’s approach. He opines that the phrase ‘substantially unchanged’ is unclear and undefined in the Patent, and the Patent does not propose any objective way of deciding whether a change in flow rate is substantial or not. He also opines that claim 1 of the Patent covers uses of instantaneous water heaters with heater tanks in all circumstances, not just in electric showers. In his opinion, a user of a shower would want any changes in temperature to be as small as possible, such that even a small difference in flow rate may give rise to quite a large change in output temperature which some users may perceive as substantial, as human skin can detect even small temperature changes, but the same reduction in flow rate in the output temperature of another device, such as a heated pressure washer, may not even be noticed by a user.
72. Mr Mills disagrees that the phrase ‘substantially unchanged’ is unclear to the skilled addressee. He opines that the skilled addressee would understand that the technical

purpose of this arrangement is that it enables a user to divert water flow between outlets in a way which avoids or mitigates the risks of a sudden unexpected change in temperature, and, specifically, an “*increase in temperature which may give rise to a risk of scalding*”, as outlined within the Patent at paragraph 1, lines 19 – 26. He further opines that the skilled addressee would not consider the technical purpose of the claim to be concerned with maintaining output temperature in a ‘heated pressure washer’ as the Patent is not concerned with such devices, in his opinion. He also does not understand why a hot water pressure washer would have a diverter valve.

73. Dr Nicholson in his written and oral submissions for Triton did not pursue Mr Murray’s idea of a heated pressure washer, instead arguing that claim 1 is not limited to a heater installed in a shower, as its scope includes a heater which is designed and intended to heat water to, say, 95C, e.g. for a dishwasher with the diverter valve used to select between different washing patterns. Any construction of the term ‘substantially unchanged’, he submits, would have to hold good across the scope of the claim, and the “risk of scalding criterion” would not do so in such a case.
74. There are a number of difficulties with this argument, in my judgment. First, it is not pleaded. At its highest, Triton’s pleaded case on construction is that “claim 1 is not limited to instantaneous water heaters used for any particular purpose and includes instantaneous water heaters suitable for use for multiple purposes”. As Mr Campbell submits, there is no specific pleading in relation to dishwashers and heated pressure washers and there is no real evidence in relation them, from the experts or otherwise. I could take judicial notice that one does not operate a diverter valve while a domestic dishwasher is operating. One sets the desired washing pattern or programme before switching the device on. I cannot say that I have the experience to say the same of all dishwashers but if that is what Triton wished to argue they should have pleaded and evidenced it. Second, and of greater significance in my judgment, the Patent describes itself in the first sentence as an invention which “*relates to ablutionary installations for washing and more especially to ablutionary installations for showering*” and notes within a couple of paragraphs that it is desirable to avoid any sudden unexpected change in temperature “*especially an increase in temperature which may give rise to a risk of scalding*”. That is a problem

which the Patent is intended to solve. These and other parts of the introductory paragraphs, specification, embodiments and Figures suggest that the ablutionary installations for washing to which the invention relates are intended to be those where the user is anticipated to have, or there is a risk of, exposure to the outlet water, otherwise there would be no risk of scalding from an unexpected rise in temperature (I leave to one side for the moment the secondary risk identified in the Patent of steam vapourisation causing rupture of the tank).

75. That is also suggested, in my judgment, by the reference on page 2 and throughout the Patent to a spray outlet which is “*usually in the form of a handset connected to the outlet*” which may be “*supported by a bracket... [but] may also be detached from the bracket and held in the hand for directing the spray from the handset as desired*”. These references to a handset also point to potential user exposure to the outlet water. In my judgment the skilled addressee would conclude with reasonable confidence that the inventor wanted to cover ablutionary installations where there was potential user exposure to outlet water, such as electric showers, and not closed ablutionary installations without risk of user exposure to output water such as a dishwasher, or ablutionary installations which deliberately or intentionally produce scalding output water which inherently have a risk of scalding for the user, such as Mr Murray’s suggested heated water pressure washer which he described as producing scalding water. This is a mouthful, and for the remainder of this judgment for convenience I will refer only to electric showers, but in doing so I do not intend to minimise or mislabel the scope of claim 1. Triton has not suggested what, if any, such ablutionary installations would fall within this scope where the risk of scalding criterion would fail to hold good across the claim, and I cannot think of any.
76. For those reasons I construe ‘substantially unchanged’ in accordance with the risk of scalding criterion, as Mira pleads it.

***“Diverter valve is configured so that”***

77. Mira’s position is that this integer is fulfilled where, as used by the user, the operation of the diverter valve to achieve changeover between the different outlets does not give rise to a risk of scalding.

78. Triton pleads that this integer should be construed so that “*the achievement of a ‘substantially unchanged’ flow rate during changeover is solely due to the configuration of the diverter valve itself*”. Dr Nicholson for Triton submits that the claim does not relate to the configuration of an entire device or product, still less a shower, and this integer is about the configuration of a single component, the diverter valve. He submits that the skilled person has to be able to look at an instantaneous water heater, the heater tank and diverter valve combination sitting upon a shelf in a warehouse waiting for someone to install it and be able to determine whether that water heater fulfils the requirement of the claim. I do not accept this submission which appears to be divorced from reality. How could the skilled person look at such an assembly, on a shelf, with no water connection, and assess whether the diverter valve is configured so that the flow rate is substantially unchanged? There is no flow rate as there is no water supply, and as Mira submits, there would be no water flowing through the diverter valve but for the presence of the other components of the system. Dr Ivison for Triton accepted that point in his submissions on insufficiency, which I address later in this judgment. I accept Mr Mills’ opinion that it makes no technical sense to analyse the operation of the diverter valve absent the context of the “*ablutionary installation for washing and more particularly... for showering*” in which the Patent envisages it may be located.
79. Given my acceptance of Mira’s pleaded case on the construction of ‘substantially unchanged’, Triton further submits that:
- i) **The configuration of a diverter valve cannot prevent scalding, as if scalding water enters a diverter valve, the diverter valve cannot cool it down.** However, as Mr Mills notes, there is no realistic scenario where scalding hot water would enter an electric shower installation, or, I suggest, any other ablutionary installation with an instantaneous water heater, or there would be no reason to heat it. Such installations have a cold feed which the instantaneous water heater heats, not a hot feed, and although the cold feed may vary in temperature depending on the season, it should never be scalding. If scalding water enters through the cold water inlet, something has gone very wrong. In any event, the construction that I have given to ‘substantially unchanged’ is that “*any increase in temperature during changeover... does not*

*give rise to a risk of scalding*” and where scalding water enters the diverter valve, it is not an increase in temperature during operation of the diverter valve which gives rise to a risk of scalding, but the fact that scalding water has entered the diverter valve in the first place. Accordingly I reject this submission.

- ii) **The temperature of the water coming out of a water heater is a function of the temperature of the inlet water, the power of the heater, and the flow rate over the heating element, and the configuration of the diverter valve can only, potentially, affect the flow rate over the heating element. As it can do nothing about the other two factors, it cannot itself remove a risk of scalding. The heater tank itself would also have to be configured in such a way as to avoid the risk of scalding, yet the claim contains no such requirement.** Once again, this is an argument which is based on a misunderstanding of the construction that I have given to ‘substantially unchanged’. That is not that the configuration of the diverter valve “*removes a risk of scalding*”, but that it is configured so that an increase in temperature during the operation of the diverter valve... “*does not give rise to a risk of scalding.*” It is not that the configuration of the diverter valve fixes problems elsewhere in the system, but rather that it does not cause problems by increasing the temperature of the output water to a level which gives rise to a risk of scalding. Accordingly I reject this submission.
- iii) **The “risk of scalding criterion” is still impossible to relate to the requirement for a change in water flow by the diverter valve because:**
- a. **Some users prefer a relatively cold shower (say, 30C) and some users prefer a much hotter shower (say, 46C), so that avoiding the maximum allowable temperature of the output water of a domestic shower under normal operation according to IEC 60335-2-35 (55C) would require a diverter valve to ensure that the flow rate does not change by very different margins in each case (to prevent a 25C rise and to prevent a 9C rise, respectively).** That may be so, but the temperature at which there is a risk of scalding is known, and such a valve can easily be engineered to

take account of that range. Mr Mills and Mr Murray both note that if a diverter valve leaves flow rate ‘substantially unchanged’ (as the Patent teaches on page 10 line 14-19 where it describes the diverter valve being preferably configured so that flow to one outlet gradually reduces as the flow to the other gradually increases), then there is no risk of scalding at any realistic inlet temperature or, it follows, at any preferred user temperature within those wide ranges.

- b. **In any event, insofar as there is a temporary reduction in flow rate caused during change-over from one outlet to another using the diverter valve, construing the claim’s requirement of a ‘change in flow-rate’ to a test based on ‘change in temperature’ introduces a significant further uncertainty, as temperature change depends significantly upon the speed at which the changeover takes place.** I also disagree for the reasons given in sub-paragraph a. above, and this argument was not supported by either expert in cross-examination. If the diverter valve is configured such that when changeover takes place slowly the increase in temperature gives rise to a real risk of scalding, the flow rate is not ‘substantially unchanged’. Both Dr Nicholson and Dr Ivison for Triton in closing submissions posited the contrary example of a diverter valve which completely interrupts the flow between changeover from outlet 1 to outlet 2, but is operated so quickly that it does not actually give rise to a problem. In my judgment this is a submission which mistakenly elides the distinct concepts of ‘configuration’ and ‘operation’ of the diverter valve. Such a diverter valve is not ‘configured so that’ the increase in temperature during changeover does not give rise to a real risk of scalding. It is configured so as to give rise to a real risk of scalding, although it may not scald every time it is operated. An ablutionary installation for washing with such a diverter valve would not fall within claim 1 of the Patent.
- iv) **The term ‘*substantially*’ is incapable of being given any objective meaning in the context of claim 1, as what is a substantial change in flow rate when the heater is installed in a delicate piece of laboratory equipment, or when the heater is installed in a domestic shower, or when it is installed in an**

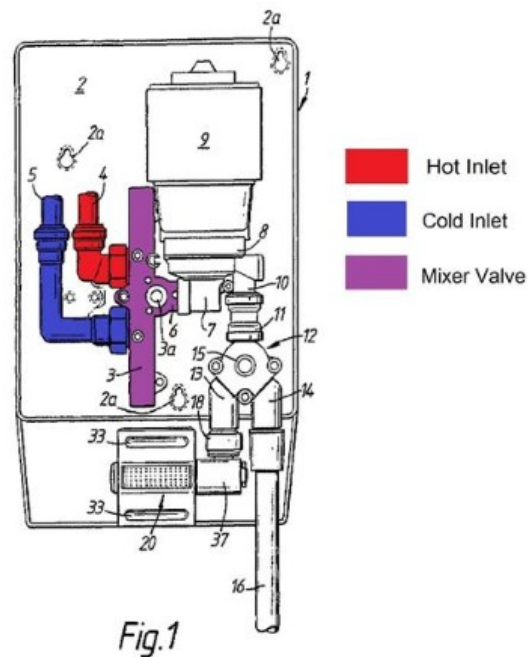


**industrial hot water pressure cleaner, are all different.** In my judgment it is not so incapable when it is construed with reference to the real risk of scalding.

## G. INVALIDITY

### The Prior Art

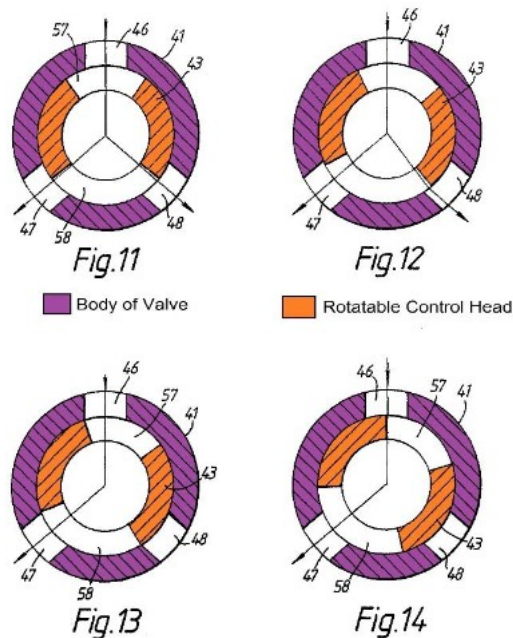
80. Deeley was published on 17 August 1994. Mr Mills describes it as “*primarily concerned with describing a mixer shower which is capable of delivering water via two outlets, preferably a handheld fitting and a fixed fitting*”.
81. Deeley states on page 1 that it relates to shower installations and their control units with particular reference to the domestic context. It describes a typical domestic shower installation at the time of publication, which was one which featured water outlet through a single spray fitting. It states that an object of Deeley is to provide a shower installation having a wider range of facilities, namely which “*includes a mixer valve with a cold and a hot water inlet for mixing supplies from the inlets and with an outlet for the mixed supplies, a motor-driven pump unit with a pump inlet joined to the outlet of the mixer valve and a pump outlet connected to the inlet of a diverter valve having first and second outlets*”. It explains that one of these outlets is joined to a hand-held shower head and the other is joined to another shower head, which it goes on to identify is one which is preferably mounted on the unit and capable of limited movement. Mr Mills says that the skilled addressee would understand Deeley to be describing a mixer shower arrangement with two outlets, one being a handheld spray fitting and the other a fixed or overhead fitting and to use a diverter valve to direct water between the two. His opinion, accepted by Mr Murray in cross-examination, is that if Deeley was read at the Priority Date in December 2008, the skilled addressee would consider this to be a description of a typical dual-outlet mixer shower of the sort they would be familiar with from their common general knowledge.



82. Figure 1 in Deeley shows control unit 1. The mixer valve 3, coloured purple, is fed by hot and cold water supplies from inlets 4 and 5, coloured red and blue respectively. Deeley explains that these inlets are normally taken from domestic low-pressure supplies, being the hot water cylinder and cold water tank in the home. Deeley goes on to state that “*Alternatively, the control unit may also incorporate a water heater as is described in [McMaster-Christie]*”. I will come back to that.
83. Deeley describes that the pump outlet 8 is connected to the inlet 11 of the diverter valve 12, with two outlets 13 and 14. The diverter valve has a control shaft 15 which is operable by the user to direct the flow of water. It explains that the valve “*is able to divert the flow of water from inlet 11 to both of the outlets 13 and 14 giving an equal output from each or it can be operated to allow a greater proportion of the flow of water through one outlet as compared with the flow through the other outlet. The proportion is variable and allows the flow from the inlet to pass entirely to one outlet or to the other. Further suitable operation of the diverter valve then allows a user to reduce, to a trickle, the flow to the one outlet then in use, flow being terminated by operation of the control shaft 3a of the mixer valve 3 to a position in which the micro-switch is actuated to de-energise the motor. In those embodiments in which motor energisation is controlled by a flow responsive device, the user is*

able to stop completely the flow of water from the diverter valve 12, the motor then being de-energised by operation of the flow responsive device”.

84. The operation of the diverter valve 12 is described by reference to explanatory diagrams in Figures 11 – 14. Mr Mills describes those as schematic cross-sectional views of the diverter valve shown in different positions of rotations, where the water inlet is from the top of the page as drawn and flows down to exit via the outlet in the direction of the arrows. The body of the diverter valve is shown in purple and the rotatable control member 43 is shown in orange.



85. Figure 11 shows the diverter valve positioned in its central position such that water flows equally out of each outlet 47 and 48. Each is partially closed, but to the same amount. Figure 12 shows that control member 43 has been rotated clockwise such that outlet 47 is almost fully opened, while outlet 48 is almost fully closed, reducing the outlet to a trickle as described in the specification. Figure 13 shows the control member 43 further rotated so that outlet 48 is fully closed and outlet 47 is fully opened. Figure 14 shows further rotation so that the inlet is partially closed such that the flow rate through the diverter valve 12 is reduced.

86. In its description of the diverter valve 12, Deeley describes that the cover plate of the diverter valve has stops which limit the extent of rotational movement of the control member 43. Deeley explains Figure 14 in the following terms: “*The minimum flow position is reached when the stops referred to above prevent further rotation of the shaft. Rotation of the control member in the opposite direction has the opposite effect on the flow pattern. The user is thus able to divert water flow to a selected shower head and to control the rate of flow to that head. Again, the minimum flow position is reached when the other stops come into contact*”.
87. Returning to McMaster-Christie, this is a UK patent entitled “Shower control device” which was filed in June 1988. I will deal with this relatively briefly although I have of course read the patent carefully and studied the figures in it. It states that the invention relates to a “*hot water shower control device comprising a hot water inlet; a cold water inlet; an electrical heater assembly arranged to heat water as it passes therethrough; a heater by-pass passage, said by-pass passage and said heater assembly being connected, in use, to a shower head; a diverter valve arranged to divert the flow of water either through said heater assembly or to said by-pass passage, and a pump for pumping water to the diverter valve.*”.
88. Accordingly it is a conventional pumped mixer shower which can also be used with an instantaneous electric heater consisting of a “*pair of electrically conductive plates*” which heats the pumped low-pressure cold inlet. A diverter valve either diverts the cold water inlet through the instantaneous electric heater, or through the heater by-pass passage so it does not go through the instantaneous electric heater. It is not used to divert outlet water to different showerheads. Control circuitry may be used to cause the diverter valve to divert water automatically depending on whether or not the central heating boiler is switched on. In one mode of operation, the central heating boiler is switched on and is generating hot water. The device takes hot water from the hot water storage tank and cold water from the low pressure supply, mixes them by a mixer valve and are directed by the diverter valve via the heater bypass pipe. In the second mode of operation, the central heating boiler is switched off, so while water may be drawn through both the cold water and hot water inlets, both will be cold water. The diverter valve will direct water to the instantaneous water heater which will heat the water to the desired level and then to the handset.

89. Mr Mills opines that the skilled addressee would understand the invention to have some of the characteristics of an electric shower, because it can take a cold water supply and heat it through the use of an instantaneous water heater. In his opinion, it would not form part of the common general knowledge of the skilled person, nor would they be aware of any such device being marketed or demonstrated. He describes it as an “*unnecessarily complex... system in which two forms of hot water supply are combined in the same product*”. Mr Murray in cross-examination also accepted that McMaster-Christie was not part of the common general knowledge in the shower industry, and was not relevant to it, at the Priority Date or at the time it was published in 1992. He, too, was not aware of any device incorporating the teaching of McMaster-Christie being marketed or demonstrated at any time.

### **Issue 1 - Are the Relevant Claims of the Patent novel over Deeley?**

#### ***The Law***

90. Pursuant to section 2(1) of the Patents Act 1977, an invention shall be taken to be new if it does not form part of the state of the art. An invention lacks novelty if the specified combination of features has already been anticipated in a previous disclosure. To constitute a prior disclosure of an invention, the matter relied upon as prior art must disclose subject matter which, if performed, would necessarily result in infringement of the patent (see *General Tire & Rubber Company v Firestone Tyre & Rubber Company Limited* [1972] RPC 457 at p485-486.). Per *Dr Reddy's Laboratories (UK) Ltd v Eli Lilly and Co Ltd* [2008] EWHC 2345 (Pat), the question is whether there was a clear and unambiguous **disclosure** of all the features of the claim under consideration, taking into account the teaching implicit in a document which would be understood by a skilled person utilising their common general knowledge as at the date of the disclosure.
91. A disclosure which is capable of being carried out in a manner which falls within the claim, but is also capable of being carried out in a different manner, does not anticipate, although it may form the basis of an attack on the grounds of obviousness.

92. For anticipation to be established, the ordinary skilled person must be **enabled** to perform the invention which satisfies the requirement of disclosure (*Synthon BV v SmithKline Beecham Plc* [2006] RPC 10 at [14]). Accordingly Triton must satisfy the Court of both disclosure and enablement.
93. It is common ground that although it is not generally permissible to seek to build up a “mosaic” of unrelated prior art documents with which to mount an attack on novelty, where a piece of prior art contains an express cross-reference to another document, it is permissible to consider the combined disclosure of both documents. There must be a clear and unambiguous disclosure in the combination of the cross-referring documents to deprive the later patent of novelty.

### ***Submissions***

94. Mr Mills notes in his report, and Mr Murray agreed in cross-examination although he did not address it in either his first or second report, that the disclosure of a diverter valve which can select between two or more outlets is something that is new to the skilled addressee in the context of electric showers, as it was not within the common general knowledge and was not present in any commercialised product on the UK market at the Priority Date so far as either expert was aware, although electric showers had been common on the UK market since the 1970s.
95. I have already set out my real concerns about Mr Murray’s approach to the prior art, and that I cannot be sure to what extent hindsight has, impermissibly, played a role in his analysis of it. However, Triton’s pleaded case on novelty against the integers of claim 1 of the Patent did not, in my judgment, survive admissions made by Mr Murray in cross-examination as follows:
- i) Integer 1a “***An instantaneous water heater having***” and Integer 1b “***a heater tank to heat water flowing through the tank***”: - Triton’s case is that the skilled addressee would understand from reading Deeley that it was disclosing, in its reference to “*Alternatively, the control unit may also incorporate a water heater as is described in [McMaster-Christie]*”, an electric water heater which heated water flowing through the tank. This would be confirmed by reference to McMaster-Christie which states on page 2 “*The electrical heater assembly*

*is preferably of the type which is normally used for instantaneous electric showers*". However, Mr Murray admitted in cross-examination that:

- a. It was not clear what the reference in Deeley to McMaster-Christie actually amounts to and he did not know what it meant, from which I infer that he considered that the skilled addressee similarly would not understand it;
  - b. Deeley was not clear whether it was teaching that you can add a new water heater to Deeley, or take out the hot water supply in Deeley and replace it with the McMaster-Christie water heater;
  - c. If Deeley was teaching that you can add a new water heater to Deeley, it did not teach to put a flow stabilisation valve before the heater tank, or to locate a thermal cut-off anywhere in the system, both of which would be required with an instantaneous water heater.
- ii) Integer 1c "***a diverter valve downstream of the heater tank to select at least one outlet from at least two outlets and direct water from the heater tank to the selected at least one outlet***". Triton's case is that Deeley discloses "*a pump outlet connected to the inlet of a diverter valve having first and second outlets*" and "*A shower installation... in which one of the outlets of the diverter valve is joined to a hand-holdable shower head and the other outlet is joined to another shower head*", and that the skilled addressee would understand that the diverter valve would have to be downstream of the water heater. However, Mr Murray accepted:
- a. that Deeley alone is typical of a dual-outlet mixer shower. It contains no water heater. I note that McMaster-Christie does not place the diverter valve downstream of the heater tank. It teaches a diverter valve upstream of the heater tank so that it either directs water to the heater tank or away from it, where there is an existing hot water inlet in use. It does not divert heated water from one outlet to another; and
  - b. Mr Murray further accepted that simplifying the McMaster-Christie design so that it was only an instantaneous water heater, as he assumed would be required for use with a Deeley diverter valve to select one outlet from at

least two outlets, requires removing pipework from McMaster-Christie which is not taught by either Deeley or McMaster-Christie, and involves throwing away almost everything that Deeley teaches on the back of McMaster-Christie;

- c. That there is no motivation for the skilled addressee to do any of that absent hindsight of the invention.

96. Integer 1d “*wherein the diverter valve is configured so that the flow rate is substantially unchanged during changeover from one or more selected outlets to another selected one or more outlets*”. Triton’s case is that the diverter valve depicted in any of figures 9 to 14 of Deeley is one in which the resistance to water flow presented by the diverter valve would not change (or would not change substantially) during changeover from the first and second outlets. However, Mr Murray accepted in cross-examination that Deeley positively teaches using a diverter valve to reduce the flow to a trickle and then terminate it, which is the opposite of the Patent’s teaching that the flow rate should be “*substantially unchanged*”.
97. Mr Mills similarly opined that there was nothing in Deeley that gave any consideration how to implement McMaster-Christie into Deeley, and it was not at all routine to incorporate an electric shower heating element into Deeley, which he described as “*basically making another product*”. He said “*To me, Deeley teaches a mixer shower. It doesn’t teach an electric shower. There is no consideration of safety factors when I add an electric element, changes I might need to make. There is a huge amount of work to do. Changing from a mixer shower to something else. A skilled person is not going to do that*”. He said that a skilled person “*wouldn’t have the imagination to turn it into something else*”. When Mr Mills was pushed and asked in cross-examination if there was any reason why the skilled person would not ask “*can I add a diverter valve to the outlet of the electric shower*”, he said that it “*may or may not occur to the skilled person to use it, I can’t say*”. Mr Murray’s evidence in cross-examination was less equivocal on this point: he said that the skilled addressee at the Priority Date would not previously have considered a diverter valve in an electric shower. The simple fact is that use of a diverter valve in



an electric shower had not been disclosed in the 30 or so years since electric showers became commonplace on the UK market until the Patent was filed.

98. It follows that Triton is very far from satisfying me that there was a clear and unambiguous prior disclosure of all the features of claim 1 in Deeley read with McMaster-Christie, particularly integers 1a, 1b and 1c, or that there was any enabling disclosure of Deeley. I find that there was not. I am satisfied that claim 1 is novel. As claims 4 and 17 of the Patent rely on an instantaneous water heater according to, *inter alia*, claim 1, I reach the same conclusion on novelty in relation to those claims.
99. The answer to Issue 1 is ‘yes’ – claims 1, 4 and 17 of the Patent are novel over Deeley.

**Issue 2 - Are the Relevant Claims of the Patent inventive over (i) Deeley in conjunction with the common general knowledge and (ii) the common general knowledge?**

***Law***

100. S.3 Patents Act 1977 provides that 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), and disregarding section 2(3).
101. In *Windsurfing International Inc. v Tabur Marine (GB) Ltd* [1985] RPC 59 the Court of Appeal provided a four-part guide for assessing. This was slightly reworked by the Court of Appeal in *Pozzoli SpA v BDMO SA and Anor* [2007] FSR 37, EWCA Civ 588 at [14] – [23]:
- i) Identify the notional “person skilled in the art”
  - ii) Identify the relevant common general knowledge of that person;
  - iii) Identify the inventive concept of the claim in question, or if that cannot readily be done, construe it;

- iv) Identify what differences, if any, exist between the matters cited as forming part of the ‘state of the art’ and the inventive concept of the claim or of the claim as construed; and
  - v) Determine whether, viewed without any knowledge of the alleged invention as claimed, those differences constitute steps which would have been obvious to the person skilled in the art, or whether they require any degree of invention.
102. Lord Hodge’s clear guidance in *Actavis Group PTC EHF & Ors v ICOS Corporation & Anr* [2019] UKSC 15 was that the focus of an obviousness assessment should be the inventive concept of the relevant claim, and the guidance of *Windsurfing/Pozzoli* should not distract the court from the statutory question. He confirmed the general approach to questions of obviousness, namely that the question of obviousness must be considered on the facts of each case, the court weighing the balance of factors in light of all the relevant circumstances (from the House of Lords case of *Generics (UK) Ltd v H Lundbeck A/S* [2008] RPC 19 approving the summary of Kitchin J (as he then was) at first instance).
103. Since *Actavis* there has been judicial consideration about what is meant by the ‘inventive concept’, as it is not a phrase that is found in any of the relevant UK or European patent legislation. Lord Kitchin described it in *Icescape v Ice-World* [2018] EWCA Civ 2219 at [72] as “*the problem underlying the invention and the patent’s inventive core.*” In *EValve Inc v Edwards Lifesciences Ltd* [2020] EWHC 514 (Pat), Birss J (as he then was) said at [315] that “*one should examine what is the problem underlying the invention and how does the patent solve that problem*”.
104. Per Laddie J in *Brugger v Medic-Aid* [1996] RPC 635 at 656, if anything falling within the claim is obvious, then the claim is invalid.
105. In *Schlumberger Holdings Ltd v Electromagnetic Geoservices AS* [2010] EWCA Civ 819, the Court of Appeal held that the person skilled in the art for the purposes of determining inventive step may vary from the skilled addressee used for determining claim construction or sufficiency, but neither party submit that any variation is required in this case. I have already identified the common general knowledge of that skilled person.

*Inventive Step or concept*

106. Mira's pleaded position is that the Patent's inventive step or concept of claim 1 is the identification of the problem that incorporating a valve which can block the outlet of an electric shower, is dangerous, and the Patent is a solution to a problem which would not have been perceived without invention. As Mr Lunt put it for Mira in his submission on insufficiency, Mira's invention lies in the perception or the appreciation of the problem that having a diverter valve in a dual-outlet electric shower can give rise to a risk of scalding, and in overcoming it.
107. Mr Mills' evidence is that the skilled addressee would understand that the technical purpose of the arrangement described in the Patent was to avoid or mitigate the risk of a sudden unexpected change in temperature, particularly one which may give rise to a risk of scalding, as identified as a risk early in the Patent description (at page 1, lines 19-26). His evidence is that this is the technical purpose of the diverter valve, and that the skilled addressee "*would recognise that configuring the diverter valve to achieve a function in terms of maintaining flow rate*" was an inventive aspect of the Patent, as was configuring the diverter valve in such a way that it cannot be positioned to prevent water flow. He said, "*I thought it was a neat and useful way to achieve the aim of not scalding a user*".
108. Triton did not plead to the inventive step of claim 1 of the Patent, as Mira noted in its Amended Reply and Defence to Counterclaim.
109. In answer to Mira's request for further information asking Triton to identify what it contends the inventive core or inventive concept of claim 1 of the Patent to be, Triton responded (without prejudice to its positions that the Patent does not claim anything which can properly be described as inventive, and that 'substantially unchanged' is uncertain) with the contention that it should be understood as "*an instantaneous water heater having a diverter valve downstream of the heater tank which is configured so that the flow rate is substantially unchanged during changeover between different outlets*". However, because Triton has not pleaded to a meaning of 'substantially unchanged', instead pleading that the term is so uncertain that the skilled person cannot tell whether they are working the claimed invention, the Court cannot know what it is that Triton considers is the inventive core of claim

1. It is not clear that it is simply willing to adopt the meaning of ‘substantially unchanged’ that the Court has determined.
110. Triton argues that Mira’s pleaded inventive step is untenable in light of Mr Mills’ oral evidence that:
- i) the skilled addressee would know at the Priority Date that if flow rate changes in an electric shower, the temperature would change;
  - ii) the skilled addressee would understand that the relevant British standards required no obstructions downstream of the water heater; and
  - iii) he accepted that the skilled addressee would also understand that a substantially unrestricted flow path must be maintained at the outlet.
111. It is true that this evidence has led me to find that the skilled addressee would know that there was a particular problem with reducing flow rate in electric showers because of the concern about elevation of temperatures arising from such reduction, but this does not fully address Mira’s pleaded case on inventive step, which includes offering a solution to the problem.
112. Triton submits that this case is analogous to that in *Petra Fischer’s Application* [1997] RPC 899, in which Jacob J (as he then was) held that a claim to a cabriolet car with a diesel engine was obvious, as both cabriolet cars and cars with diesel engines were both very well-known at the priority date, but there had never been a production cabriolet car with a diesel engine. He noted that “*the skilled man could have tried this, but did not*”. He held, “... *it seems to me that the decision not to make a diesel cabriolet is indeed one based on the perception of the market demand and thus the changes of commercial success... I conclude there is no technical inventive step in the invention at least as claimed in claims 1 and 13*”. It submits that adding a second outlet to an electric shower does little more than produce an electric shower product which is more appealing to some customers, and that the decision to do so is a commercial decision taken in an industry which the experts agree is marketing-led.
113. However, in my judgment:

- i) Mr Murray's evidence about commercial impediments to the development of a dual or multi-outlet electric shower did not survive cross-examination, as I have already set out;
  - ii) I do not agree with Triton's characterisation of this case as providing a close analogy to that of *Petra Fisher*. Unlike in *Petra Fisher*, there is no evidence in this case that a commercial decision was taken not to produce a dual-outlet electric shower based on concern about reception in the market. As Mr Campbell submits for Mira, there is no evidence that any marketing department ever identified the problem to which the Patent is addressed, and considered adding a diverter valve to an electric shower, and the skilled addressee is not a marketing department or commercial decisionmaker, or a team containing such people. It is an engineer engaged in the design and manufacture of showers. Mr Murray in cross-examination accepted that he had never thought of or been asked to design a dual-outlet electric shower. Triton also does not have any technical support, in my judgment, for its argument that it is nothing more than a commercial decision taken by a marketing department, in my judgment. Mr Murray in answer to my own question, accepted there was nothing about the market at the Priority Date which would lead him to suspect that dual-outlet electric showers would have had a less successful reception in the market at that time, than they did when eventually launched some years later. I also accept Mr Campbell's submission for Mira that in *Petra Fisher* there was no evidence of any technical prejudice against the idea of a diesel cabriolet, whereas in this case I have the experts' agreement that mixer showers and electric showers were fundamentally different, in principle, Mr Mills' evidence that they each required a different mindset, which I accept.
114. I accept Mira's pleaded position on the inventive concept, but prefer to express it as Mr Lunt did: it is the perception or the appreciation of the problem that having a diverter valve in a dual-outlet electric shower can give rise to a risk of scalding, and overcoming it.

***Differences between Deeley and the common general knowledge and the inventive concept.***

115. The experts agreed that Deeley was typical of a dual-outlet mixer of the sort the skilled person would be familiar with from their common general knowledge. It has a hot water inlet, no instantaneous water heater, no heater tank, no diverter valve downstream of the heater tank because there is no heater tank and so those are differences with the inventive concept which relates to an electric shower.
116. Deeley cross-refers to McMaster-Christie, but as I have set out in my discussion on novelty I am satisfied, and the experts accept, that the skilled addressee would not likely not understand what the reference to McMaster-Christie in Deeley means and it was not clear what it was teaching. If it was teaching that a diverter valve from Deeley could be put in a simplified McMaster-Christie it taught a diverter valve which is not configured so the flow rate is substantially unchanged and does not teach how to simplify it to reach the inventive concept. If it was teaching that an instantaneous water heater could be integrated into Deeley, as Mr Mills said, that was changing the Deeley mixer shower into something else and there was “*a huge amount of work to do*” which was not taught.
117. In cross-examination Mr Murray denied that claim 1 was obvious over Deeley, but said that in his opinion, the sole and only reason was because a diverter valve appears in Deeley and the same two words, “diverter valve”, appear in claim 1. That ignores the other differences between Deeley and the inventive concept, as I have set out. However, as noted, he accepted that Deeley positively teaches a diverter valve which slows the flow rate to a trickle and then terminates it during changeover, so is not configured so the flow rate is substantially unchanged during changeover between outlets. His evidence was that the skilled addressee at the Priority Date would not previously have considered a diverter valve in an electric shower.
118. The key difference between the common general knowledge at the Priority Date and the inventive concept is that there were no dual-outlet electric showers on the UK market and so the electric showers on the market did not contain a diverter valve to divert flow from one outlet to another.

***Do those differences constitute steps which would have been obvious to the person skilled in the art, or do they require any degree of invention?***

119. In relation to the differences between Deeley and the inventive concept of claim 1, I have no doubt that the steps which were required to get from Deeley alone to the inventive concept would not have been obvious. The notional uninventive skilled person is assumed to be interested in the field of art covered by the Patent, i.e. instantaneous water heaters including electric showers, whereas Deeley comes from the related but “*practically distinct*” field, from an engineering point of view, of mixer showers. Although Deeley would be of interest to the skilled person who is an engineer who designs both mixer and electric showers, it requires a different mindset and in my judgment the skilled person would question its relevance to his work. If he does follow-up the reference to McMaster-Christie in Deeley, I have found that he would likely not understand it or what it or Deeley was teaching in relation to it. I consider it to be in the highest degree unlikely that it would have been obvious to him to carry out the “*huge amount of work*” that Mr Mills (and, in effect Mr Murray) identified in either implementing the simplified water heater from McMaster-Christie into Deeley, or the Deeley component diverter valve into McMaster-Christie, none of which I have found was taught, adequately disclosed or enabled. To get there would have required the skilled addressee to carry out, effectively, a degree of invention amounting to really the full inventive concept.
120. Mr Murray accepted in cross-examination that claim 4 was inventive over Deeley.
121. In relation to the differences between the common general knowledge alone and the inventive concept, Mira submits that the simplicity of the solution in this case is no objection to inventive step, per Lord Herschell in *Siddell v Vickers & Sons Ltd* (1890) 7 RPC 292, 304:

“If the apparatus be valuable by reason of its simplicity there is a danger of being misled by that very simplicity into the belief that no invention was needed to produce it. But experience has shown that not a few inventions... have been of so simple a character that once they have been made known it was difficult... not to believe that they must have been obvious to everybody”.

122. This warning against considering obviousness with the benefit of hindsight has sounded down the authorities in the 124 years since Lord Herschell's comment. It is important to remember that the person skilled in the art is him- or herself uninventive. Mira relies in particular in the "Anywayup Cup" case of *Haberman v Jackel International* [1999] FSR 683 which, like this case, also involved the solution of a well-recognised problem (in Haberman, the fact that toddlers' spouted cups leaked if dropped or knocked over) by the simple yet inventive concept of introducing a valve. Laddie J explained at [45]:

"Mrs Haberman has taken a very small and simple step but it appears to me to be a step which any one of the many people in this trade could have taken at any time over at least the preceding ten years or more. In view of the obvious benefits which would flow from it, I have come to the conclusion that had it really been obvious to those in the art it would have been found by others earlier, and probably much earlier. It was there under their very noses. As it was it fell to a comparative outsider to see it. It is not obvious. This finding can be expressed in the language used by Hoffmann LJ as he was in *STEP v Emson* [1993] RPC 513. Mrs Haberman's patent discloses something sufficiently inventive to deserve the grant of a monopoly."

123. Jacob LJ in *Actavis v Novartis* [2010] EWCA Civ 82 used the Haberman case as an example of an 'idea invention', and also cautioned against the risk of applying hindsight when assessing inventiveness in such types of invention, which he described as "*where the invention involves perceiving that there is a problem, or in appreciating that a known problem, perhaps "put up with for years", can be solved.*" He noted that when the patentee in Haberman "*had the technically trivial idea of putting in a valve, there was an immediate success. The invention was held non-obvious, a conclusion with which most parents would agree. Yet fitting reasoning to uphold the patent into a [problem/solution approach] would not really work. For by identifying the problem as leakage and suggesting it can be solved, one is halfway to the answer – put in a valve*".

124. Mr Murray's evidence about obviousness over the common general knowledge was, in my judgment, highly confused. In his report he asked himself whether it would have been obvious to the skilled addressee at the Priority date to make a claimed water heater with a diverter valve downstream of the heater tank to direct water to at



least one outlet from at least two outlets, but as Mr Campbell put to him in cross-examination, and he accepted, he did not answer that question. He simply said that the choice of the number of outlets would be a commercial or marketing decision and *“I do not think that the skilled addressee would see any technical reason not to attempt to make a multiple outlet electric shower”*. That does not address whether it would be obvious to the skilled person. He would not be drawn on this. When asked if there was any technical reason why the skilled addressee would attempt to make a multiple outlet electric shower, he said that if the skilled addressee was instructed to do so, he would make an attempt based on diverter valves that already exist and instantaneous electric showers that already exist. When asked whether, if the skilled addressee was not instructed to do so, it would not be at all an obvious thing to do, Mr Murray confusingly said *“It is not a case of obviousness”*, and then *“It would not be considered”*. I remind myself that his evidence was, once again, that the skilled addressee at the Priority Date would not previously have considered a diverter valve in an electric shower.

125. Dr Nicholson asked Mr Mills whether, if the marketing department approached the skilled addressee in 2008 with the design brief *“Can you make me a rainfall/handheld [dual-outlet] combination for an electric shower please?”* the skilled addressee would say *“What are you talking about? It cannot possibly be done.”*. Mr Mills replied: *“... if you are talking about a skilled person looking at it as an electric shower, then they may challenge it. They may say “You cannot do that. All electric showers have one output” because that is what they currently have. That is what they know. That is what is in the field”*. He conceded that if marketing were asking for it, then *“they might go away and think about it”*, but said that his view was that those thoughts *“would be within the context of an electric shower or a mixer shower.”* He did not agree that the skilled addressee – who I remind myself is not inventive – would take a diverter valve from a mixer shower and an instantaneous water heater from an electric shower and create a dual- or multi-outlet electric shower within claim 1. He said *“They would take an electric shower, look at what bits they could re-use from an electric shower, if any, and take it that way. Likewise, if they were designing a mixer shower, they would look at an existing mixer shower and take any bits they could re-use or ideas or concepts from that... To my experience and understanding, there is next to no crossover between the*

*components with an electric shower and a mixer shower. An electric shower is typically made of moulded plastic components. It might have a metal heater can, it might have a plastic heater can, whereas a mixer shower is typically made of brass or some other similar metal and with either ceramic valves or mixing valves, et cetera, in it. They are very, very different products and there is next to no crossover within the engines of the body*". His evidence was that an engineer would look to design a rough prototype from scratch, and perhaps 3-D print something quickly, however "*You might pick up [a component from the mixer world] off the shelf, more to see if it did anything, but I think in terms of demonstrating a product, as you are developing an electric shower, you would develop something new*".

126. I accept Mira's submission that this case has clear parallels to *Haberman*. Mira took the small and simple step of identifying the problem which I have found was known in the common general knowledge but appreciating that it could be solved by the installation of a diverter valve which leaves the flow rate substantially unchanged during changeover from one outlet to the other. That solution was under the noses of all of those involved in the design of electric showers, yet they had not solved it. Rather, it had been "*put up with*" (per Jacob J in *Actavis*) in the electric shower market for decades. I consider that Mr Murray's opinion that it was obvious is the paradigm of one that is made with the benefit of hindsight. If it had been obvious, I consider that it would have been solved years earlier. I am satisfied that the inventive concept of claim 1 was not obvious to the skilled addressee either taking into account the Prior Art in conjunction with the common general knowledge or the common general knowledge alone, and that it is sufficiently inventive to deserve the monopoly protection of the Patent.
127. As claim 1 is not obvious over Deeley and the common general knowledge or the common general knowledge alone, neither are claims 4 and 17. For those reasons, the obviousness challenge fails.

**Issue 3 - Are the Relevant Claims of the Patent invalid for lack of sufficiency as pleaded in paragraph 17 of the Amended Defence and Counterclaim?**

128. Section 72(1)(c) of the Patents Act provides that a granted patent may be revoked if "*the specification of the patent does not disclose the invention clearly enough and*

*completely enough for it to be performed by a person skilled in the art*". The parties rely on *Anan Kasei Co Ltd v Neo Chemicals & Oxides Ltd* [2019] EWCA Civ 1646 at [21]-[27], which provides that a patent is invalid on this ground if a term used in the claims is uncertain so that it is not possible to determine what is within the claims and what is not. The burden is on the party who seeks revocation of the patent, and [99]-[104] which distinguished between a fuzzy boundary and a boundary "whose location is impossible to ascertain". The Court of Appeal noted that it was traditionally referred to as "*ambiguity*" but considered that it was more accurately described as "*uncertainty*", saying "*If the court cannot ascertain the boundary, having used all the interpretative tools at its disposal, it must conclude that the specification does not disclose the invention clearly enough and completely enough for it to be performed by a person skilled in the art*".

129. Paragraph 17 of Triton's Amended Defence and Counterclaim pleads:

(a) The term '*substantially unchanged*' is so uncertain that the skilled addressee of the Patent would be unable to tell whether or not they were working the alleged invention of claim 1.

(b) Further or alternatively, the skilled addressee of the Patent would not know how or under what conditions the flow rate should be measured in order to determine whether it was "*substantially unchanged*" during changeover.

(c) Further, or alternatively, insofar as Mira contends that the requirement for "*substantially unchanged*" flow rate can be satisfied by an instantaneous water heater in which a flow stabilisation valve and/or an electronic flow stabilisation system and/or thermal cut-off system is present, the breadth of claim 1 (and all claims dependent thereon) exceeds the scope of the patentee's technical contribution.

(d) Further, or alternatively, insofar as Mira contends that the Skilled Addressee would not be able to make a product falling within the scope of the claims of the Patent (or some of them) based on the prior art referred to above and/or the common general knowledge, Triton will say that the Patent is no more enabling than the prior art and/or the common general knowledge and is accordingly insufficient.

130. So far as paragraph 17(a) of the Amended Defence and Counterclaim is concerned, I have already found when construing the claims that '*substantially unchanged*' should be given a purposive meaning. Per *Anan Kasei* as quoted above, conceptual

uncertainty insofar as it is required for the law of insufficiency is a logical inability to resolve what the meaning of the language is, not just an ambiguity that is capable of determination by the ordinary process of construction, i.e. construing it purposively. I have found that it is capable of determination. Accordingly, this pleaded ground of insufficiency fails.

131. In relation to paragraph 17(b) of the Amended Defence and Counterclaim, I accept Mr Lunt's submission that Triton did not identify in its pleading what conditions it says a skilled addressee would be uncertain about, or which it says would be varied and give rise to a different result depending on whether you are inside or outside the claim. Nor has Triton identified such conditions in its skeleton argument. I have already addressed and rejected the oral submissions made by Dr Ivison on this point and as I have already discussed, my construction of 'substantially unchanged' ties this to the risk of scalding and that is something which is both known and measurable.
132. In relation to the ground of insufficiency at paragraph 17(c) of the Amended Defence and Counterclaim, Triton submits in its skeleton argument "*...it is important to stand back and appreciate how far removed the Claimant's interpretation of claim 1 is from the plain language on the page of the Patent. On its face it is a prosaic claim about the design of valves in heaters, in the Claimant's hands it becomes a monopoly over any electric shower with more than one showerhead which does not scald its users, by **whatever** technical means this is achieved, and notwithstanding that the claim does not mention electricity, showers, or scalding – and does not teach anything more than the idea of the diverter valve. The mismatch between the meagre technical contribution of the Patent (if any) and this expansive alleged monopoly is jarring and unjustifiable.*" (emphases in the original).
133. I accept Mira's submission that claim 1 of the Patent is not to any electric shower with more than one outlet that avoids scalding users. This ignores the problem of the diverter valve during changeover, and the solution to the problem, being a diverter valve which is configured so that in changeover from one outlet to the other it does not give rise to a risk of scalding.

134. In relation to the ground of insufficiency pleaded at paragraph 17(d), being the squeeze that the Patent is no more enabling than the prior art, Dr Ivison for Triton submits that the Patent gives the skilled addressee absolutely no help whatsoever, merely telling readers what it wants them to do and leaves all the details up to them. However this is not the evidence of Triton's expert. Mr Murray noted in his first report at paragraph 119 that the skilled addressee "*would expect to make a diverter valve which produced only very small changes in flow rate (and thus temperature). A simple and obvious design would be one in which there is a directly proportionate opening of one outlet at the same rate that the other outlet closes, which would be expected not to create a changing restriction in the flow path through the valve as it is operated*". He confirmed in cross-examination on this section of his report that he did not see any difficulty in making a diverter valve which satisfies this part of claim 1. Similarly, Mr Mills accepted that once the skilled addressee had decided to create a diverter valve with such a function and desired result, it is "*technically relatively straightforward to come up with a mechanical arrangement that would do so*". I accept Mr Lunt's submission for Mira that as it is pleaded by Triton, this ground is engaged only insofar as Mira contends that the skilled addressee would not be able to make a product falling within the claims, and that is not contended so it is not engaged.
135. Dr Ivison for Triton accepted in closing that there is nothing wrong in principle with a patent which is described at a high conceptual level, but submits if it is, it ought to be enough for an equally high-level disclosure in the prior art to invalidate it. I have, however, found that Deeley had no enabling disclosure.
136. For those reasons, the insufficiency challenge fails.

## H. INFRINGEMENT

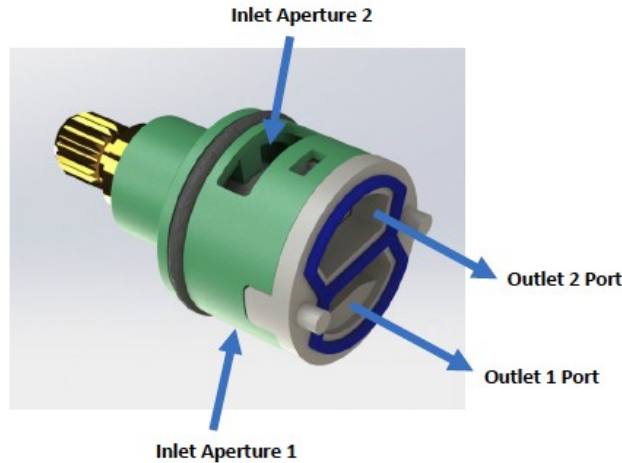
**Issue 4 - Do the products of the DuElec Range (and each of them) fall within the scope of protection of the claims 1 and/or 4 of the Patent (whether on the basis of normal construction or by reason of equivalence)?**

### *The DuElec Range*

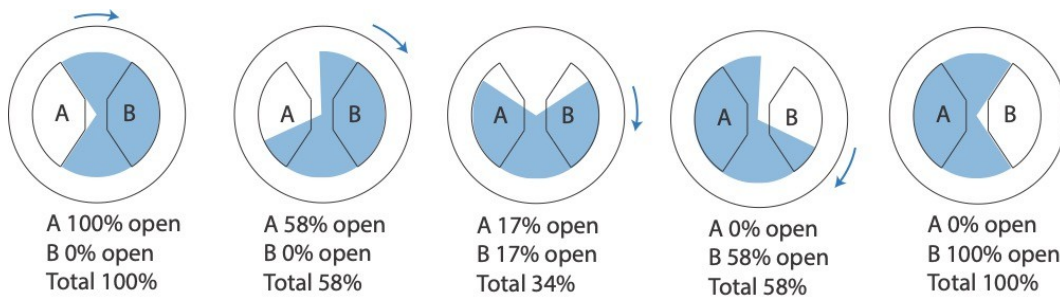
137. As I have mentioned, there is no dispute about the operations of Triton’s products alleged to infringe as described within the Product Description. It appears to be common ground that although there are differences between the various showers in Triton’s DuElec Range, they are not relevant distinctions for the purposes of considering infringement. They are all electric showers, they all contain an instantaneous electric water heater and two spray heads (one fixed, overhead “rainfall” showerhead and one moveable handheld shower attachment, fed by a flexible hose, which can also be ‘parked’ in a holder). They all have a diverter valve which the user can operate to switch the flow of warm water between these two spray heads, and which for the purposes of the claims of the Patent is a green and yellow component, a model of which has been provided to the Court for its consideration. In ordinary use only one spray head will output water, although it is possible to adjust the diverter valve such that some water comes out of both spray heads simultaneously. I will come back to the configuration and operation of the diverter valve.
138. The showers in the DuElec Range also all have:
- i) a flow stabilisation valve. In some of the showers within the DuElec Range this is a mechanical valve which automatically regulates the flow rate of water entering the water heater in response to changes in water pressure, to keep the flow of water constant in the system. In others, this is an electronic system rather than a mechanical valve, which monitors the water temperature and pressure and dynamically adjusts the flow rate to maintain a steady showering temperature;
  - ii) a thermal cutoff, which measures the temperature of the heated water and cuts off the electricity supply to the instantaneous water heater if it rises too high.
139. Certain showers in the DuElec Range (the “ENVi DuElec Showers”) have an electronic thermostatic control system, which comprises of a combination of electronic components and sensors which monitor and actively control water flow rate and temperature. The user sets a showering temperature between 32C and 46C using a controller interface, and the electronic thermostatic control system maintains this by continuously monitoring the water temperature and flow rate (including

during changeover from one outlet to the other by user operation of the diverter valve), and adjusting the Flow Stabilisation Valve to control the flow rate through the heater by use of a motor drive.

140. Triton have admitted at 4(a) of its response to Mira's Notice to Admit Facts that each of the products in the DuElec Range is configured "*so that when water is flowing at a selected water temperature while the heating elements are energised, any increase in temperature during changeover from one or more selected outlets to another selected one or more outlets does not give rise to a risk of scalding*".
141. Mira advances a case on infringement of claim 1 and claim 4 (not claim 17) of the Patent on both normal construction and on equivalence. Triton accepts that if claim 1 is infringed, then claim 4 is also infringed and so I will only consider claim 1.
142. Dealing first with normal construction, Triton does not dispute that the Du Elec Range all contain an instantaneous water heater as required by integer 1a of claim 1, and a heater tank to heat water flowing through the tank as required by integer 1b. It submits that the dispute is in relation to integer 1c and integer 1d. However it is clear from Triton's Product Description (and it was also accepted in Triton's skeleton) that the Du Elec Range showers all contain a diverter valve downstream of the heater tank to select at least one outlet from at least two outlets and direct water from the heater tank to the selected at least one outlet, so I do not understand that there is in fact any dispute in relation to integer 1c.
143. The dispute at trial was about integer 1d, whether the diverter valve is configured so that the flow rate is substantially unchanged during changeover from one or more selected outlets to another selected one or more outlets.
144. I have been given as a model one of the diverter valves which are contained in all of the DuElec Range. I borrow with thanks the following annotated image from Triton's skeleton argument:



145. Directly under the outlet ports is a part circular flap which pivots on a central axis to block the ports as the user rotates the handle of the diverter valve to divert flow from one outlet to the other. The following diagram also from Triton’s skeleton illustrates the interaction between the flap and the ports as this is done.



146. I accept Triton’s submission that because of the shape of the ports and the flap there is not a linear and gradual progression from port A being open to port B being open, with the same cross-sectional area of the outlet ports being open at all times (whether port A or port B or both combined, in part). Instead, I accept that the combined cross-sectional area of the open outlets varies significantly during changeover, as can be seen in the illustration above, so that at one point it is only about a third of the area of a fully open outlet port. I believe both experts accepted this was the case and Mr Mills stated that this diverter valve “*has clearly been designed to have a reduction in aperture size*”.

147. However Mr Mills’ evidence was that even where the open aperture was at its minimum cross-section area that could be sufficient not to affect the flow, if that was the same as or larger than the minimum aperture somewhere else in the flow path



within the installation. In that case, he said, the reducing cross-section while the diverter valve is being operated to divert the outlet flow from one outlet to the other would not have any impact on flow. He said that minimum aperture elsewhere in the system could be in the exit of the heater can, in the flow stabilisation valve or anywhere upstream of the diverter valve. Mr Mills noted that within Triton's own DuElec Range product literature it acknowledged that the temperature stayed unchanged during changeover, and that being so, he considered that the diverter valve had been designed in combination with the other elements of the system to achieve that end. I accept this evidence.

148. Mr Murray also accepted in cross-examination that the DuElec Range dual-outlet electric showers “*seamlessly divert from one outlet to the other*”. I have seen this claimed as a feature in Triton's marketing literature. In re-examination Mr Mills agreed that the reduction in the cross-section of the diverter valve used across that range did not interfere with the seamless diversion between outlets. Mr Murray accepted that the flow stabilisation valve generally determines the rate of flow at the narrowest point, and even if the diverter valve does change the water pressure, the flow stabilisation valve would compensate for that change up to normal parameters, and he had no reason to suppose that the Du Elec Range showers did go outside normal operating parameters. Finally, Mr Murray accepted that if ‘substantially unchanged’ was construed with reference to the risk of scalding, as I have construed it, the diverter valve alone and the diverter valve together with the flow stabilisation valve were merely two different ways of achieving the same result.
149. Triton submits was that it is wrong of Mira to treat claim 1 as if it were a claim to a complete shower unit, when it is a claim to an instantaneous water heater with a diverter valve with multiple outlets, i.e. one component of a shower unit which contains many other components. This is really the same argument that I considered and rejected at paragraph 78 above, in relation to the construction of ‘the diverter valve is configured so that’ in integer 1d. I accepted Mr Mills’ opinion that it makes no technical sense to analyse the operation of the diverter valve absent the context of the installation. I am of the same view when it comes to assessment of whether a product infringes the Patent.

150. Triton further submits that Mira is wrong to attribute observed behaviour of a complete DuElec Range shower unit, namely that it does not pose a risk of scalding to their users, to the configuration of a single component, namely the diverter valve, because of the behaviour of the DuElec Range. It submits that the reason why they do not scald their users is not entirely due to flow rate control of the diverter valve, but also because of the flow stabilisation valve (and electronic equivalent in the ENVi DuElec Showers) and the thermal cutoff mechanism. It submits that the diverter valve in the DuElec Range is configured so as to be virtually indifferent to control of the flow rate, and it is the cross-sectional area of the narrowest part of the flow path, which is upstream of the water tank, which determines the flow rate. Dr Nicholson in closing submits that “*it would be a nonsense for the claim to require or intend that an important functional role, that final 1d integer, be fulfilled by components which are never mentioned in the claim.*” I do not agree. This is a repeat of Triton’s argument on construction of ‘*the diverter valve is configured so that*’ that it should mean that ‘*the achievement of a substantially unchanged flow rate during changeover is solely due to the configuration of the diverter valve itself*’, and I have already rejected that argument. As Mr Murray accepted, the user of a DuElec Range shower does not care if the seamless diversion from one showerhead to another is due to the construction of the diverter valve alone or the overall effect achieved by operating the diverter valve. I have construed it as requiring the operation of the diverter valve to achieve changeover between the different outlets so as not to give rise to risk of scalding. I am satisfied that the DuElec Range fulfils that requirement as Triton, Triton’s product literature and the experts all agree.
151. Accordingly I am satisfied that the DuElec Range of showers fall within the scope of claim 1 (and, it follows, claim 4) of the Patent on the normal construction, and infringe it. It follows that it is not necessary for me to go on to consider infringement by equivalence and the *Formstein* defence.

## I. SUMMARY

152. I have determined the Issues as follows:
- i) Claims 1, 4 and 17 of the Patent are novel over Deeley;

- ii) Claims 1, 4 and 17 of the Patent are inventive over: (i) Deeley (read with McMaster-Christie) in conjunction with the common general knowledge; and (ii) the common general knowledge;
- iii) Claims 1, 4 and 17 of the Patent are not invalid for lack of sufficiency as pleaded;
- iv) The products of the DuElec Range (and each of them) fall within the scope of protection of the claims 1 and 4 of the Patent on the basis of normal construction and so infringe the Patent.