Intellectual Property Office

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PATENTS ACT 1977

APPLICANT	TBRM Ltd
ISSUE	Whether patent application GB 1908080.3 complies with sections 1, 14 and 76 of the Patents Act 1977
HEARING OFFICER	Phil Thorpe

DECISION

1 Patent application GB 1908080.3, entitled "A method of removing halogen contaminants from milk and milk products", was filed on the 6th of June 2019. The application was subsequently published as GB 2584648 A on the 15th of December 2020.

2 Despite amendment of the claims during substantive examination, the applicant has been unable to persuade the examiner that the claimed invention complies with the requirements of the Patents Act 1977 ("the Act") for novelty, inventive step and clarity. The examiner has also raised the question of whether the amendments add subject matter. At the request of the applicant, the matter has been referred to me for a decision on the papers.

3 The section 20 "compliance period" was previously extended to the 6th of February 2024. With their request for a decision on papers, the applicant has requested a further 2-month discretionary extension of the period. This has been allowed, taking the compliance period to the 6th of April 2024.

The invention

4 The application is stated as being concerned with the removal of certain contaminants from milk and milk products. The application teaches that the removal of contaminants from milk and other milk products is important from a marketing point of view, but more importantly for reasons of health. Contaminants can result from the production (including crop/animal husbandry, and veterinary medicine), manufacture, processing, preparation, treatment packaging, transporting or holding of such food, or as a result of environmental contamination. I would observe that the claims as they currently stand are not concerned with the removal of contaminants as such but rather preventing contamination of milk and other milk products. That will become clearer shortly.

5 The application notes that contaminants in the form of chloroform (trichloromethane or TCM) and chlorates are unintentionally found in milk, dairy products and infant milk formulas but they add no benefit and should be removed. Indeed, such chlorine contaminants are regarded as hazardous substances which should not be present or delivered to consumers.

6 After discussing various legislative frameworks and published reports and studies relating to contamination of water and of milk, the application sets out a series of consistory clause mirroring the original claims, before detailing the approach and outcomes of a study conducted to examine the impact of trihalomethane ("THM") levels in the water used on dairy farms has on TCM residue levels of milk produced on those farms (herein after referred to as "the study").

7 The study found that of six farms participating in the study, two using water not treated with chlorine had zero levels of TCM in the milk produced by those farms, whereas milk produced on four farms that derived water from chlorinated supplies had detectable levels of TCM. The application summarises the results of the study in the following table:

Table 1

Comment	Water Source	Location	TCM µg/L	Total THM µg/L	TCM Milk mg/kg
	Private well	510683	<3	<10	0.000
	Private well	302316	<3	<10	0.000
Same water scheme	F group water scheme	305241	29	37	0.004
	F group water scheme	305247	28	36	0.000
Same water scheme	M group water scheme	307618	89	104	0.001
	M group water scheme	307623	93	109	0.004

8 For each farm - one farm per row - the levels of TCM and THM found in the water source are reported alongside the level of TCM found in the milk produced by that farm. The water drawn from the untreated private wells used by two of the farms (first two rows) contained levels of <3 µg/L of TCM and <10µg/L of THM, these being the lowest levels that could be recorded from laboratory testing. Zero levels of TCM contamination were found in the milk samples taken from these two farms. Varying levels of TCM were found in the milk produced by farms using treated water supplies (rows four to six).

9 Claim 1 of the application as filed read:

> A method of removing halogen contaminants from milk and milk products, which method comprises supplying water free of halogen compounds to a milk-producing ruminant during the production of milk by said ruminant.

10 Protection was also sought for a milk or milk product produced by such a method.

11 As noted, the claims were amended several times during the examination of the application to try and overcome various objections raised by the examiner. The latest claims, and on which this decision is based, were filed on the 18th of December 2023. Only a method is now claimed, with claim 1 reading as follows:

> 1. A method for reducing the risk of trihalomethane contamination of milk and milk products, which method comprises supplying water from a drinking water supply, which has not been treated with halogen compounds, and which has been determined through testing to contain less than 10µg/L of trihalomethane compounds as drinking water, to a milk-producing ruminant during the production of milk by said ruminant.

The Law

12 The relevant provisions of the Patents Act for the purposes of this decision are sections 1 and 2 relating to general grounds for patentability and novelty:

> *1.-(1) A patent may be granted only for an invention in respect of which the*
>
> *following conditions are satisfied, that is to say –*
>
> *(a) The invention is new;*
>
> *(b) it involves an inventive step;*
>
> *(c) …*
>
> *(d) …*
>
> *and references in this Act to a patentable invention shall be construed accordingly.*
>
> *2.-(1) An invention shall be taken to be new if it does not form part of the state of the art.*
>
> *(2) The state of the art in the case of an invention shall be taken to comprise all matter (whether a product, a process, information about either, or anything*
>
> *else) which has at any time before the priority date of that invention been made available to the public (whether in the United Kingdom or elsewhere) by written or oral description, by use or in any other way.*
>
> *(3) The state of the art in the case of an invention to which an application for a patent or a patent relates shall be taken also to comprise matter contained in an application for another patent which was published on or after the priority date of that invention, if the following conditions are satisfied, that is to say –*
>
> *(a) that matter was contained in the application for that other patent both as filed and as published; and*
>
> *(b) the priority date of that matter is earlier than that of the invention*.

13 Also, section 3 which defines an inventive step as follows:

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

14 In addition to statute, the courts have long used the so-called *Windsurfing*[1] test to assess issues of inventive step. This test was reformulated by the Court of Appeal in *Pozzoli*[2]. Paragraph 23 of this decision lays out the test as:

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

15 Section 14 sets out various requirements for the making of an application. The relevant provision is section 14(5) which reads:

> 14(5) The claim or claims shall –
>
> (a) …
>
> (b) be clear and concise:
>
> …

16 Finally, section 76 prohibits the adding of subject matter and so far, as is relevant, reads:

> (2) No amendment of an application for a patent shall be allowed under section 15A(6), 18(3) or 19(1) if it results in the application disclosing matter extending beyond that disclosed in the application as filed.

Clarity

The requirement for testing

17 I will start by considering the issue of the clarity of the claims. In their last examination report of the 11th of January 2024, the examiner noted that it is not clear what is meant by the requirement in Claim 1 that the water "has been determined through testing to contain less than 10 µg/L of trihalomethane compounds".

18 The examiner in their assessment of novelty relied on a construction of claim 1 as involving just one significant step, namely "supplying water which has not been treated with halogen compounds and which has less than 10 µg/L of trihalomethane compounds as drinking water to a milk producing ruminant".

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

19 This construction, reflecting most likely the clarity concerns of the examiner, however attaches no importance to the suggestion that the quantity of trihalomethane compounds in the water has “been determined by testing”.

20 The specific wording relating to testing in claim 1 was not to be found in the claims as filed nor was it in the application as filed.

21 The applicant notes that:

> The expression "determined through testing to contain less than 10µg/L of trihalomethane compounds” does not imply a 'new' step, but is rather a way of defining the drinking water to be used. The claim is not requiring testing to be performed but stating that testing has been done, where required, which will identify/determine the presence of trihalomethanes based on the source of water to be used for drinking water given to ruminants, whether well water, rainwater or any other water not treated with halogens.

22 I would note firstly that the amended wording of the claim does not include the proviso “where required” – were that present then it would beg the question of when would the water not need to be tested? This would certainly render the claim unclear. Fortunately, that is not something I need to consider further given the actual wording of the claim. The applicant further notes that:

> The Examiner states that there is no enabling disclosure for the person skilled in the art testing water to determine it is low enough in trihalomethane before using it as drinking water for ruminants producing milk. As advised, this is not a step in the method. The information already exists and is available to the skilled person and relates directly to whether or not the drinking water provided to ruminants is sourced from a halogen treated supply or not. The skilled person does not need to perform testing but can identify the appropriate source of water so as to ensure that trihalomethanes are not presence in the drinking water being provided to ruminants

23 It is not entirely clear to me what is meant by the argument that the information required “relates directly to whether or not the drinking water provided to ruminants is sourced from a halogen treated supply or not”. This would suggest that all that is required is to know whether the water has been treated with halogen. However, the wording of the claim requires more in that it states that the water supply has not been treated with halogen compounds and which has been determined through testing to contain less than 10µg/L of trihalomethane compounds. So it is not enough to know just that the water has not been treated with halogen. It is also necessary to know that the water source has been tested to ensure that it also contains less than 10µg/L of trihalomethane compounds.

24 But that begs the question of when is that testing to be done, how often and by who? Would the claim also for example be satisfied if the milk was tested and found to contain no contamination rather than testing the water supply? Would the results of such testing of the milk be such that it effectively determines that the water supplied to the ruminant must have contained less than 10µg/L of trihalomethane compounds. The description does not really help on any of this. In the study of six farms referred to above, samples of the water were collected by the farmers participating in the trial and then sent off for testing to the Public Analyst Laboratory (PAL), based at University Hospital, Galway, Ireland. This was however testing done as part of the study. There is nothing in the description to indicate how testing is to be done as part of normal milk production.

25 All the description says is that:

> "Presently there is no obligation on a dairy farmer who gets his water supply from a public water scheme to test his water supply for THM content. There is no obligation on the water services authority to notify consumers when there is a breach of the parametric value for THM content in drinking water. However, they must notify the EPA."

26 So where does this leave the clarity of the claim? The requirement of section 14 is that the claim needs to be clear. The description can assist in clarifying the meaning of the claims but as I have noted there is nothing really in the description here to assist. The applicant suggests that the wording used does not introduce a further method step and that it does not require the water to be tested every time it is supplied or for the person supplying the water to do any testing. That may have been the intention of the applicant when they made these amendments to the claim, however that is not something that is clear from the claims when read in light of the description. I therefore find the claim to be unclear in this respect.

Drinking water supply

27 A second clarity objection was pursued by the examiner in respect of wording added to the claim which requires the water to be from a "drinking water supply". The examiner says it is uncertain whether this is intended to mean only a mains water supply or could still mean any water supplied to a milk producing animal. In the examiner's opinion there is no suggestion of what is meant by this limitation and notes that the claim already discloses supplying water for drinking. The examiner concludes that any water supplied for drinking would implicitly come from a drinking water supply. I agree. I would however observe that a skilled person would regard the actual wording used as being somewhat superfluous, but I do not believe they would consider this expression to introduce doubt or a lack of clarity to the claim.

Added Matter

28 The examiner has also suggested that if the phrase "has been determined through testing to contain less than 10µg/L of trihalomethane compounds" does add a further testing step then it would add matter to the application contrary to section 76.

29 Guidance on section 76 has been provided in *Richardson-Vicks Inc's Patent*[3] where Jacob J (as he was then) noted:

> "The test of added matter is whether a skilled man would, upon looking at the amended specification, learn anything about the invention which he could not learn from the unamended specification."

and in *Bonzel Schneider*[4] , where Aldous J (as he was then) stated:

> "The decision as to whether there was extension of disclosure must be made on a comparison of the two documents read through the eyes of a skilled addressee. The task of the court is threefold: (1) To ascertain through the eyes of the skilled addressee what is disclosed, both explicitly and implicitly in the application. (2) To do the same in respect of the patent as granted. (3) To compare the two disclosures and decide whether any subject matter relevant to the invention has been added whether by deletion or addition. The comparison is

[3] *Richardson-Vicks Inc.'s Patent* [1995] RPC 568
[4] *Bonzel and Schneider (Europe) AG v Intervention Ltd* [1991] RPC 553

> strict in the sense that subject matter will be added unless such matter is clearly and unambiguously disclosed in the application either explicitly or implicitly."

30 The applicant when making this amendment referred in support to "for example the description at page 17, lines 12-16 and page 16." The referred to passage on page 17 reads:

> Water sample results: It was found that water from private spring wells contained levels of< 3µg/L TCM, and THM levels of< I0µg/L. These are the lowest levels that can be recorded from the laboratory test. (Levels of TCM in the range from zero to three are all recorded as three. Levels of THM in water less than ten are recorded as ten).

31 As noted above this refers to the testing done as part of the study. It does not relate to how the method of the claim would be put into practice more generally. Page 17 equally relates only to the results of the study performed.

32 There is simply nothing in the application as to how the testing requirement of the method of claim 1 is to be performed in a milk producing environment. This applies even if the applicant is correct in saying that the method does not including a testing step as such, but rather simply a requirement that the sourced drinking water has at some point been tested for trihalomethane compounds. There is nothing in my view that provides any basis even for this limited construction of the claim put forward by the applicant. That the method of claim 1 requires that the water supply has been tested is simply not clearly and unambiguously disclosed in the application as filed either explicitly or implicitly. The amendment to include this limitation therefore adds matter contrary to section 76.

Novelty

Assessing novelty – claim construction and the relevance of the purpose of the invention

33 In making the novelty objection the examiner takes the position that it does not matter that individuals were necessarily supplying drinking water to ruminants for the purpose of reducing the risk of trihalomethane contaminants in milk and milk products. The examiner has taken a broad construction to the claim. They have not attached any limitation from the reference to testing in claim 1 but instead have taken the claim to be anticipated by any disclosure that shows that ruminants have been supplied with water that has not been treated with halogen and which contains less than 10µg/L of trihalomethane compounds. I will return to this shortly but first I will consider the main argument put forward by the applicant relating to the relevance of the purpose of the invention to the question of novelty.

34 Early in proceedings the examiner referenced decision *T303/86*[5] of The Technical Board of Appeal of the EPO and associated guidance in the Manual of Patent Practice at paragraph 2.04.1[6], explaining that "it is sufficient to destroy the novelty of a claimed process if all of the steps are being carried out, regardless if the person

[5] *T 303/86* (CPC Int) [1993] EPOR 241
[6] Manual of Patent Practice

performing the steps did not realise they were making the desired result of the claim".

35 The applicant has in turn referred to decisions *G2/88*[7] and *G6/88*[8] of the EPO's Enlarged Board of Appeal (EBA), accompanied with an argument that the technical features of their claim have not previously been made available to the public and thus the claimed invention does not lack novelty. I take the technical features that the applicant is referring to as including that supplying water as set out in the claim, to a milk-producing ruminant, reduces the risk of trihalomethane contaminants in milk and milk products. Only if the prior art recognises this according to the applicant would it anticipate the claim.

36 In *G2/88* and *G6/88* it was noted that:

> "with respect to a claim to a new use of a known compound, such new use may reflect a newly discovered technical effect described in the patent. The attaining of such a technical effect should then be considered as a functional technical feature of the claim (e.g. the achievement in a particular context of that technical effect). If that technical feature has not been previously made available to the public by any of the means as set out in Article 54(2) EPC, then the claimed invention is novel, even though such technical effect may have inherently taken place in the course of carrying out what has previously been made available to the public."

37 The applicant argues that this demonstrates that "the concept of 'inherency', is not recognised under the EPC, and by implication under the UK Patents Act, as the examiner is asserting.

38 Furthermore, the applicant notes that:

> "A claim to a new non-medical use of a known product (as alleged by the examiner) to attain a new technical effect is novel. This is true, even if the means to realise the new technical effect is identical to a known use of the product (which is not the case with the present invention). In such a case, the novelty of the use resides in the new purpose, based on the technical effect. The attaining of the technical effect must be considered as a novel functional technical feature of the claims.
>
> We submit that the ratio decidendi of the aforementioned decisions can equally apply to the present invention, in addition to the fact that the invention as claimed and disclosed in the Application is not directly and unambiguously derivable from any of the prior art documents cited by the Examiner, nor is it implicit in anything expressly mentioned in any of said documents."

39 These EPO decisions however do not reflect the existing practice of the UK Courts which I am bound to follow. Of particular relevance is the decision of the Patents Court in *Tate & Lyle Technology v Roquette Frères* [9] (upheld at appeal[10]). Although the case does not refer to *G2/88*, it takes a different approach from the Enlarged Board to use claims based on an unrecognised technical effect.

40 At first instance Lewison J. found a claim to the use of maltotriitol to modify or control the form of maltitol crystals to lack novelty over a number of prior disclosures in

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[7] *G2/88* (Friction reducing additive) 11-12-1989 | Epo.org]
[8] *G6/88* (Plant growth regulating agent/BAYER) 11-12-1989 | Epo.org]
[9] *Tate & Lyle Technology v Roquette Frères* [2010] FSR 1
[10] *Tate & Lyle Technology v Roquette Frères* [2010] EWCA Civ 1049

which maltotriitol would inevitably modify or control the form of the maltitol crystals. The judgment was upheld by the Court of Appeal.

41 Lewison J. said at paragraph 76:

> "The industry has been using maltotriitol to control or determine crystal habit without knowing it. What is left of the patent as granted is no more than a discovery as such."

42 The approach in *Tate & Lyle* is not dissimilar to that taken in *T303/86*[11], in which the EPO's Boards of Appeal considered a process for the manufacture of flavour concentrates. The process involved a method of cooking with the flavour concentrates being a by-product of the cooking process. The method of cooking was shown to be known and would have produced the same by-product but its use as a flavour concentrate was not contemplated. The Board found the subject matter of claim 1 to be known. At paragraph 2.1 of the decision, they say:

> "…it is immaterial to the question of the novelty of the process of Claim 1… whether or not the possibility of such use is disclosed in (1) [Document 1], because this use does not form part of the subject matter of that claim. It is sufficient to destroy the novelty of the claimed process that this process and the known process are identical with respect to starting materials and reaction conditions since processes identical in these features must inevitably yield identical products."

43 What I take from *Tate & Lyle* and *T303/86* is that the purpose or reason for performing a method does not, in and by itself, convey novelty to a claim; the novelty of such claims must be found in the method steps being carried out. Hence it is not necessary here for the method of the invention to have been directed at reducing the risk of trihalomethane contaminants in milk and milk products. It is sufficient for a finding of lack of novelty for there to have been disclosure of the method steps of claim 1.

44 Though I have found the claim to be unclear, I must give it some meaning to assess its novelty. For that purpose, I will take the requirement that the water supply has been determined through testing to contain less than 10µg/L of trihalomethane compounds as meaning that the water has been tested at some time, though not necessarily at the time of supplying it to the ruminant. Further I would add that the testing must have been done before it is supplied to the ruminant.

45 Based on the disclosure of the description, I do not believe the skilled person would feel the need to apply any special construction to the other words and phrases used within claim 1.

46 From the description and the discussion of published studies, the skilled person would understand the reference to "trihalomethane compounds" to include: chloroform (TCM); bromodichloromethane or dichlorobromomethane (BDCM); dibromochloromethane or chloro-dibromomethane (DBCM); and bromoform. The application teaches the reader that these trihalomethanes are disinfection by-products and are commonly found in drinking water. Knowing this, the opening line of the claim would be understood as relating to a method of reducing the risk of such by-products being present in milk and milk products (this compares with the broader

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[11] *T303/86* (CPC Int) [1993] EPOR 241

range of halogen contaminants, including oxidation products thereof, originally contemplated in the application).

47 The requirement for there being less than 10µg/L of trihalomethane compounds present in the water would be understood as referring to the total of trihalomethane compounds present, rather than a reference to one specific compound.

48 Given the context, reference to “halogen compounds” would be understood to cover compounds of chlorine, fluorine, bromine and/or iodine; the claim excluding the use of water that has been “treated” with one or more of these compounds but allowing water that might have naturally occurring trace amounts.

49 Hence in summary if it can be shown that it was known to supply water from a drinking water supply, which has not been treated with halogen compounds, and which has been determined through testing to contain less than 10µg/L of trihalomethane compounds as drinking water, to a milk-producing ruminant during the production of milk by said ruminant, then claim 1 will be anticipated.

The prior art

50 The examiner has maintained their objection that the claimed method is known, being anticipated by the following disclosures:

A) Disclosures within the application and conventional farming practices, specifically:

1. Reference in the description to water supplies in Germany which are known to contain less than 10µg/L of trihalomethane compounds, the examiner saying that “any ruminant in Germany given mains water would implicitly be given drinking water with less than 10µg/L of trihalomethane compounds”,

2. References in the description to the use of rainwater and other natural water sources which have been tested to determine that they contain acceptable levels of trihalomethane compounds, and

3. Recognition that while mains water is the most common supply of water on farms, many utilise private drinking water supplies such as boreholes, water abstracted from rivers, streams, or springs, or even rainwater to provide drinking water for the livestock.

B) Four non-patent literature disclosures, namely

4. Njarui et al

Livestock Research for Rural Development, 26 (8), 2014, Njarui et al, "Water sources and quality for dairy cattle in smallholder farms in semi-arid Kenya" Available from: https://www.researchgate.net/profile/Donald-Njarui/publication/289621797

Water sources and quality for dairy cattle in smallholder farms in semi-arid Kenya/links/60 6dc29b4585150fe98de2fa/Water-sources-and-quality-for-dairy-cattle-in-smallholder-farms-in-semi-arid-Kenya. pdf

5. AHDB

Agriculture and Horticulture Development Board (AHDB), November 2013, Water use, reduction and rainwater harvesting on beef and sheep farms [online] available from https://media.ahdb.org.uk/media/Default/Imported%20Publication%20Docs/Water-use-reduction-and-rainwater-harversting-on-beef-and-sheep-farms.pdf [accessed 8/11/2023]

6. Wiltshire

Rainwater harvesting systems, 2018, "Dairy Farm, Wiltshire" [online] Available from: https://rainharvesting.co.uk/wp-content/uploads/2018/10/Dairy-Farm-case-study.pdf [accessed 8/11/2023]

7. The Farming Forum

The Farming Forum "Rainwater for cattle drinking" 2018 [online] Available from: https://thefarmingforum.co.uk/index.php?threads/rainwater-for-cattle-drinking.262886/page-1 [accessed 8/11/2023]

51 I will consider first the disclosures within the application itself. At page 5 of the application, the reader is told that Germany has set a TCM limit of 0.1mg/kg of product and that German dairy manufacturers “strive to minimise residual contamination in milk and butter products”. At page 20, it is explained that the issue of TCM residue levels in dairy products first became an issue on the German market. In Germany, the THM limit is 10µg/L in drinking water; in Ireland it is currently 100µg/L.

52 Whilst it may be possible to speculate that cows in Germany are being provided with drinking water that meet the requirements of claim 1 as I have construed it, there is no clear disclosure of that in the application as filed.

53 The application also contemplates the use of rainwater as a source of halogen free water as part of the claimed method and that providing milk producing ruminants with such water is a conventional practice. I will consider this line of argument when I look at the non-patent literature disclosures shortly.

54 By reference to disclosures within the description to “other natural sources that have previously been tested…”, the examiner is seemingly relying on the disclosure of the study set out in the application: that two of the six farms in the study were chosen because they derived their water from non-chlorinated supplies. These two farms formed what the application refers to as “Group 1”. The application details the water sample results for Group 1 at page 17: “It was found that water from private spring wells contained levels of <3µg/L TCM, and THM levels of <10 µg/L”. There is no suggestion in the application that these farms were sourcing drinking water for their ruminants from a new untreated source of water, rather they were continuing to use existing sources which were then tested to determine the trichloromethane and trihalomethane levels.

55 The study would appear to show that it is known to supply milk-producing ruminants with untreated water, and by virtue of being untreated, that water would contain less than 10µg/L of trihalomethane compounds as was subsequently determined by testing.

56 In keeping with the approach taken in *Tate & Lyle*, and in *T303/86*, it does not matter whether the farmers of Group 1 knew or did not know that supplying their milk producing ruminants with water sourced from private wells would have reduced the risk of trihalomethane contamination of their milk and milk products. What does matter is that until the water was tested there had been no determination that it contained less than 10µg/L of trihalomethane compounds. Hence any use up to the point of that determination would not have fallen within the scope of the claim as I have construed it. Has the use of that water supply continued after the testing and if so, was this working of the claimed invention done so publicly? More evidence would be required to demonstrate that it was.

57 Claim 1 does not, therefore, lack novelty in light of the disclosure within the application to water supplied from "other natural sources".

58 I turn now to the second strand of the examiner's novelty objection; the disclosures of four separate non-patent disclosures:

Njarui et al.

59 Njarui et al. was published in 2014 and discusses various sources of water used for dairy cattle in semi-arid ecosystems of Kenya. Recognising the link between milk production of lactating cows and the volume and quality of drinking water, the report identifies a need to increase water supplied from rainwater harvesting. Water sourced in this manner is considered to be of a better quality than water derived from other sources.

60 As can be seen in table 3 copied below, rainwater and water from water pans have lower levels of sulphates and chlorides and are not as saline as other sources. These sources also have favourable pH levels since a source with a pH of greater than 8.0 is considered unsuitable for use with livestock.

Table 3. Mean pH and salt levels of water from four sources; roof water, shallow well, water pan and valley bottom

Sources of water	pH	Sodium (me/litre)	Chlorides (me/litre)	Sulphates (me/litre)
Roof water	6.58	0.74	13.0	6.06
Shallow well	8.41	24.6	67.8	99.33
Water pan	7.47	0.41	10.0	14.12
Valley bottom	8.27	2.04	70.4	25.63
SEM	0.24	3.27	32.6	8.07
P	0.002	0.002	0.43	<0.001

61 As shown in Table 1 below, farmers have various sources of water available to them with usage varying upon a number of factors, including the milk production system employed. In "Stall-feeding" production systems, the study found that 25% of the cattle's water was derived from roof tops, 25% from water pans. Some also came from mixed sources which included roof top supplies.

Table 1. Sources of water for dairy cattle under different production systems in peri-urban area of Wote Town, eastern Kenya

Sources	Production systems			
	Stall- feeding (n=12)	Stall-feeding and grazing (n=36)	Grazing (n=8)	Total (n=56)
	% of water source			
Shallow wells	12.5	16.7	0	13.4
Valley bottoms	12.5	8.3	20	10.9
Boreholes	0	0	40	5.7
Roof tops	25	4.2	0	8.1
Water pans	25	0	0	5.4
Earth dam and valley bottom	0	12.4	20	10.8
Valley bottoms and rooftops	0	25	0	16.1
Shallow wells and rooftops	12.5	20.8	0	16.1
Shallow wells, valley bottoms and rooftops	0	4.2	20	5.6
Valley bottoms, rooftops and piped water	12.5	8.4	0	8.1

62 The reports concludes that smallholder dairy farmers had diversified their water sources to mitigate water scarcity, with over half obtaining water from more than one source. The report also recognised, however, that "the majority" of dairy farmers reserved water harvested from roof tops for domestic use. The report recommends installation of gutter systems and increased storage capacity to allow greater use of rainwater harvested from roof tops.

63 There is nothing in the report that goes to the presence of trihalomethane compounds within the various water supplies, or to trihalomethane contamination of the milk. This is something the applicant reflects on in their response of the 16th of November 2023, saying: "the issue of trihalomethanes does not appear to arise" (this being due the unavailability of chlorinated drinking water supplies). I agree. Whilst it is not necessary for anticipation for the farmers in this report to be sourcing water for the particular purpose of reducing risk of trihalomethane contaminants in milk and milk products, the water must according to how I have construed claim 1, have been determined through testing to contain less than 10µg/L of trihalomethane compounds has been met. And that is not disclosed in this document.

AHBD

64 The AHBD disclosure takes the form of an article promoting the benefits of rainwater harvesting systems as a way for beef and sheep farms to reduce their reliance on mains supplies and natural water sources, saying at page 3: "In the UK, there have been shortages of mains water in periods of drought and the cost of mains water has been increasing. Many livestock farms have their own natural water sources to provide some or all of the drinking water. However, animals having direct access to water courses to drink is being discouraged or prevented as it can lead to environmental problems from diffuse pollution."

65 The article goes on to discuss how much harvested water can be used, saying that "on farms with dairy or finishing units… it might be possible to use all the water harvested either for drinking or washing" before discussing the main costs of a rainwater harvesting installation and factors that need to be considered, such as requirements for water storage and pumping of water to livestock drinking troughs, filtration and UV treatments, and the use of mineral supplements given the absence of minerals in the rainwater.

66 The following photo appears in the article and shows an above ground water storage tank with filter, seemingly part of a rainwater harvesting system:

Gravity above ground storage with filter unit at top left (courtesy of ADAS)

67 A costed example installation is provided but it is unclear whether this is based on an actual installation or a hypothetical installation.

68 This disclosure provides clear instructions for supplying cattle with water that has not been treated with halogen compounds. Use of such a system in a dairy producing environment is clearly contemplated. The document also serves to show that it is known for farmers to use other natural sources for drinking water, i.e. not mains treated water. But again, what the document does not disclose is that the water has been determined through testing to contain less than 10µg/L of trihalomethane compounds.

Rainharvesting Systems Ltd

69 The case study produced by "Rainharvesting Systems Ltd" provides a summary of the company's installation of "a complete rainwater harvesting system to provide drinking water for dairy cattle" at a West Country dairy farm. The installation, commissioned in June 2015, sees water collected from a 2000m2 roof area being filtered and stored in an underground storage tank. The water is then pumped to a break tank equipped with a mains water back-up supply and from there to eight cattle drinking troughs. En-route, the harvested water undergoes additional filtering and is disinfected using an ultra-violet disinfection unit. A photo shows the break tank, sediment filters and UV disinfection unit:

Photo appearing in the "Rainharvesting Systems Ltd" disclosure.

This disclosure clearly anticipates a method of supplying water to dairy cattle as drinking water that has not been treated with halogen compounds but again like the two previous documents, the document does not disclose that the water has been determined through testing to contain less than 10µg/L of trihalomethane compounds.

The Farming Forum

70 The final disclosure takes the form of a discussion appearing on "The Farming Forum", an online discussion forum. The discussion appears under a thread of "Rainwater for cattle drinking" with the original poster ("Pluto") seeking the experiences of others who have harvested rainwater from roofs. Several people reply with details of their own rainwater harvesting systems, while others talk about sourcing water from boreholes. The most relevant replies are reproduced below.

C

cows r us
Member
BASE UK Member
Location: Buckinghamshire

Dec 11, 2018 #8

We feed rain water back too our cows. How many animals are you looking to water from this? You will be surprised at how big the tank will have to be. You will also need the mains as a back up for when water runs out in a dry spell.
We filter ours into the main tanks (this takes out the large things like leafs, moss, dead pigeons), it is then pumped back to the troughs at mains pressure and is put through a fine filter and a UV light to kill bacteria ect.
You may be able to get some EU funding for it, but be quick as apparently it's not going to be there for long.

Reply

lazy farmer, Robert K, neilo and 1 other person

M

mo!
Member
Mixed Farmer
Location: York

Dec 11, 2018 #9

We looked at this year's ago. A borehole was a lot cheaper.

Reply

Pluto
Member
Location: Hampshire

Dec 11, 2018 #10

Thanks for the comments. I am planning to top up with a bowser if necessary. They are still outside at the moment in a remote field with no water, and the bowser is lasting about 2 weeks, but obviously they will drink more when inside. There are only 16 in the bunch at the moment. According to my calculations 660ms roof should produce approximately 3,000 gallons of water for every 25mm of rain, which hopefully will keep them going through the winter.

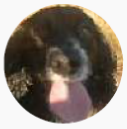
Reply

Crofter64
Member
Livestock Farmer
Location: Quebec, Canada

Dec 13, 2018 #15

Our animals prefer rainwater to well water and drink it all summer. I figure if they can drink from manure puddles, they can drink from my water harvesting tank(1000 gallons).I top it up with well water when it gets low. It is connected to a water trough with a float. I'm thinking of getting another tank on the other side of the barn next year and hooking it up to a jet pump so I don't have to rely on gravity. My only limitation is that I have to drain my tank , which is usually brimming, at the beginning of November when we start having serious frosts, and only resume at the end of April/ beginning of May.

Reply



brigadoon
Member
Location: Galloway

Dec 13, 2018 #16

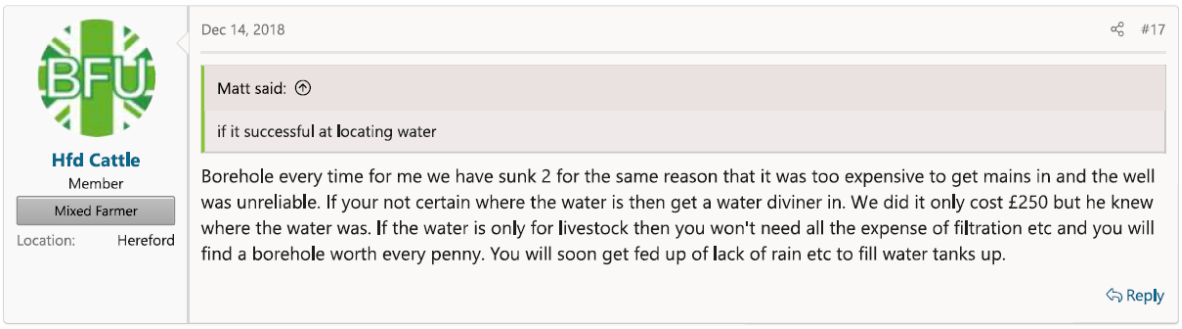
> Pluto said:
>
> Evening folks,
>
> Having nearly fainted after getting a quote to lay a water main to a new shed, am thinking about rainwater harvesting from the roof.
> But I don't want to kill the sucklers in the process if possible!
> Has anyone got experience of this, and are there any drawbacks?

Yes - design your system to exclude air & light from your storage so as to deter algal growth in the storage tanks.

Use some chlorine tablets on a regular basis to sterilise the system and flush it by dropping out the header tanks when you are expecting rainfall to refill them promptly.

Basically take normal precautions to keep the system clean

Reply



71 These posts demonstrate that harvesting rainwater (or water from boreholes) and supplying it as drinking water to livestock is not new. While one poster refers to the use of chlorine tablets to disinfect drinking water harvested from rainwater, others measures can be taken to make sure that the water is suitable for consumption by livestock – see especially post #8.

72 When taken as a whole, this forum discussion shows that the practice of supplying ruminants with drinking water that has not been treated with halogen compounds. But again, like the previous documents, this discussion forum does not disclose that the water has been determined through testing to contain less than 10µg/L of trihalomethane compounds.

Conclusion on novelty

None of the disclosures relied on by the examiner anticipate claim 1 as I have construed it. I would note that if I had adopted a broader construction of claim 1 such that the reference to testing does not impose any limitation on the scope of the claim, then I would have found the claim to be anticipated by those documents detailed above that disclose supplying untreated rainwater to milk producing ruminants.

Inventive step

73 Determining whether a claimed invention involves an inventive step requires an assessment of the claim following the *Windsurfing/Pozzoli* test. The examiner has not done this explicitly but given the primary questions concerning the clarity and novelty of the claims, and the dependent nature of the subsidiary claims, it is not surprising that a fully set out inventive step objection has not been raised. I would add that the applicant has also not addressed specifically the steps in *Windsurfing/Pozzoli* but has instead sought to counter the inventive step argument by relying on the EPO approach to the assessment of inventive step. I am however bound to follow the *Windsurfing/Pozzoli* approach which I will now do.

(1)(a) Identify the notional "person skilled in the art"

74 Neither the examiner nor the applicant has sought to identify who the skilled person might be. In this instance I believe it is the person responsible for the livestock and milk production and most likely be the person who would put the claimed invention into practice.

(b) Identify the relevant common general knowledge of that person

75 The skilled person would be familiar with good practices of livestock management, the equipment and products used during milk-production processes and how milk is subsequently processed, both at the large and small scale. They would also have an awareness of commercial aspects of dairy farming and the various legislative requirements placed on food production. The skilled person would readily appreciate that certain sources of drinking water, for example captured rainwater, would be free of treatments by for example halogens, whilst other sources of water might have been subject to some form of chemical treatment.

76 The examiner has suggested also that it is well known in the art that compounds in the water drank by milk producing ruminants affects the compounds in the milk produced. They refer by example to the following document:

> Journal of Agricultural Food Chemistry, Vol 55, No. 21, Sep 2007 (US), Rice C.P. et al "Predicting Perchlorate Exposure in Milk from Concentrations in Dairy Feed" pages 8806-8813. See especially Sample Collection, Perchlorate Analysis and final paragraph of page 8808 to first paragraph of page 8809

77 The examiner notes that this document focuses in particular on the relationship between percolate concentration in milk and the intake of a milk producing mammal. However, they argue it is generally well-known that the chemical composition of milk is affected by what the lactating parent has drunk.

78 Whilst a single document does not necessarily indicate that something is common general knowledge, I do believe that the knowledge that what is consumed by the ruminant, including milk producing ruminants, can affect what is produced by that ruminant would be part of the common general knowledge of the skilled person.

(2) Identify the inventive concept of the claim in question or if that cannot readily be done, construe it

79 The inventive concept of claim 1 is supplying water from a drinking water supply, which has not been treated with halogen compounds, and which has been determined through testing to contain less than 10µg/L of trihalomethane compounds as drinking water, to a milk-producing ruminant during the production of milk by said ruminant.

(3) Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed

80 A number of the documents relied on by the examiner teach the use of rainwater as a source of water for cows and such water is likely to be free of treatment with halogen compound and may well contain less than 10µg/L of trihalomethane compounds. However as discussed above none of the documents relied on by the examiner discloses the feature that the water supplied for drinking has been determined through testing to contain less than 10µg/L of trihalomethane compounds.

81 The application also refers to the low levels of THM in German drinking water where a limit of 10µg/L is set. This would clearly point to the level being determined by

testing. The applicant further recognises in its submissions that most of German water is extracted as ground water and as such does not require the level of chlorination required for surface water extraction. I have already indicated that it is possible that such water is already being provided to milk producing ruminants however there is no clear disclosure of that.

(4) Viewed without any knowledge of the alleged invention as claimed, 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?

82 I would consider first whether the invention would have been obvious based on those disclosures relating to providing dairy producing ruminants with rainwater. Would it be obvious for that rainwater to be tested to ensure it contained less than 10µg/L of trihalomethane compounds? If there was concern about the levels of trihalomethane contamination of milk and milk products, then the obvious thing to test would be the milk or milk products rather than the water supplied to the ruminants. However, as I have noted the skilled person would be aware that the quality of the water supplied could impact on the quality of milk and milk related products produced. As such whilst there may be no initial motivation to test the quality of the water, I do nevertheless consider it an obvious thing to do given the common general knowledge of the skilled person. As such I conclude that claim 1 is rendered obvious by disclosures such as *Njarui* and AHDB showing the supply of rainwater to milk producing ruminants.

83 The alternative starting point for considering inventive step is the disclosure that German drinking water has THM levels of less than 10µg/L. With such low levels of THM it can be assumed that the water is free of halogens. Further given the limits on the level of THM, it can be assumed that testing is taking place. The question then is whether it would be obvious to give such water to milk producing ruminants. I believe that it would be. Indeed, it would be the obvious thing to do for those who do not have a readily available alternative water supply.

Obviousness of the dependent claims

84 I would add that I can see nothing inventive in any of claims 2-4 which require the ruminant to be a cow (claim 2), the water to have not been chlorinated (claim 3) or that the trihalomethane is trichloromethane (claim 4).

85 Claim 5, also appended to claim 1, introduces details of a process for the cleaning of apparatus through which milk is passed during processing. More particular, the apparatus is cleaned with a chlorinated detergent to prevent bacterial contamination and then cleaned with water free of halogen compounds, prior to processing further batches of milk. Claim 6 further requires that the cleaning water of claim 5 contains less than 3 µg/L of trichloromethane.

86 The application however recognises the importance of post rinsing following cleaning and disinfection of milk processing apparatus using chlorine-based detergents. Reference for example is made to the Milk Quality Handbook, Series No. 8, Practical Steps to Improve Milk Quality. Edited by Dr. Bernadette O'Brien, 2008.

87 The examiner further notes that the cleaning processes set out by claim 5 and 6 are known, as demonstrated by the following document:

> International Journal of Dairy Technology, Vol 65, No 4, Nov 2012 Ryan S et al, "Evaluation of trichloromethane formation from chlorine-based cleaning and disinfection agents in cow's milk" pages 498-502 (hereinafter "*Ryan*")

88 The applicant has in their latest response addressed at length the disclosure in *Ryan* but that is predominantly in respect of the obviousness of claim 1 using the EPO's objective technical problem.

89 Claim 5 however is focused on the method of cleaning the apparatus. That it is appended to claim 1 which relates to a different approach to reducing contamination raises in my mind whether claim 5 relates to two separate inventions. I am conscious that the possibility of collocation has not been clearly put to the applicant however the examiner has consistently questioned the obviousness of both claims 5 and 6. *Ryan* discloses a study examining varying aspects of the cleaning and disinfecting process in milk production with the quantity of THM in the milk being analysed. One of the variables in the study is the concentration of chlorine in the final rinse water with concentrations ranging from 0 to 116 mg/L. That is clearly discloses a chlorine free final rinse makes it relevant to claim 5. Indeed, I have concluded that claim 5 does indeed relate to two inventions and that whilst both are aimed at the same problem of reducing contamination in milk, they are not interrelated in that they lead to an additional effect that goes beyond the sum of the effects of each invention taken in isolation. On that basis and considering the disclosure in *Ryan*, I am satisfied that claims 5 and 6 do not involve an inventive step.

Conclusion

90 I have found that claim 1 as filed on the 18th of December 2023 is not clear as required by section 14(5). Further the amendments made to the claim add matter to the application as filed contrary to section 76.

91 I also find the invention as set out in claims 1-6 filed on the 18th of December 2023 do not involve an inventive step.

92 I therefore refuse the application under section 18(3).

Appeal

93 Any appeal must be lodged within 28 days after the date of this decision.

PHIL THORPE

Deputy Director, acting for the Comptroller