

OPINION UNDER SECTION 74A

Patent	GB 2582713
Proprietor(s)	William Kingston
Exclusive Licensee	
Requester	William Kingston
Observer(s)	
Date Opinion issued	21 October 2021

The request

1. The comptroller has been requested to issue an opinion as to whether the invention claimed in GB 2582713 (“the patent”) involves an inventive step in light of one prior art patent document.
2. No observations have been received regarding the request.
3. The request is accompanied by copies of an International Search Report and a Written Opinion of the International Searching Authority both concerned with an application from the patentee under the Patent Cooperation Treaty. I have had no sight of this international application which has not been published as yet. Of course this opinion is not concerned with the international application, but rather with the patent granted in the United Kingdom.
4. I will come to an opinion regarding the validity of the patent based upon the prior art patent document that is referred to in both the International Search Report and the Written Opinion, taking account of the contents of the Written Opinion and the comments from the patentee accompanying the request.

The patent

5. The application for the patent was filed on 17 April 2020, it was granted with effect from 26 May 2021 and remains in force.
6. Entitled “*Method of shoreline wave energy capture*” according to the opening part of the description systems using natural and man-made blowholes to capture the energy of ocean waves are described in prior art patent documents and “*The present invention is a practical method of achieving their objectives.*”.

7. Several embodiments are described and illustrated. The arrangement shown in figure 2, below, is described as follows:

“... 1 is the cliff, and 2, 2, are the exits in its face of a pair of holes drilled from its top. These exit holes are at least an average wave height below low water spring tide level, so that they are always covered by water. 3, 3 indicate the exits of another pair of holes also drilled from the cliff top, to emerge from the cliff face below holes 2, 2. Each hole in a pair diverges laterally from the other, and the planes of each pair of holes are designed to intersect. 4 is diamond wire cutting equipment on the top of the cliff.

In operation, traces are threaded from the cliff top through the pair of holes 2, 2. When these emerge into the water, their ends can be retrieved by having attached to them either an inflatable float which can be picked up from a boat, or a balloon which can lift the end of the trace into the air for retrieval by a drone.

Both traces can then be connected to enable a continuous loop of diamond wire to pass down through one hole of a pair, and then across on the cliff face to the second hole, so that mechanism 4 can cut a slot upwards into the rock of the cliff for a prescribed distance from its face.

The same procedure is followed with holes 3, 3, until cutting upwards enables their slot to meet the slot already cut by using holes 2, 2. When both slots have met, a volume of rock has been excised remotely from the cliff face and will fall out into the water. This is facilitated by the divergence of the slots which define its shape.

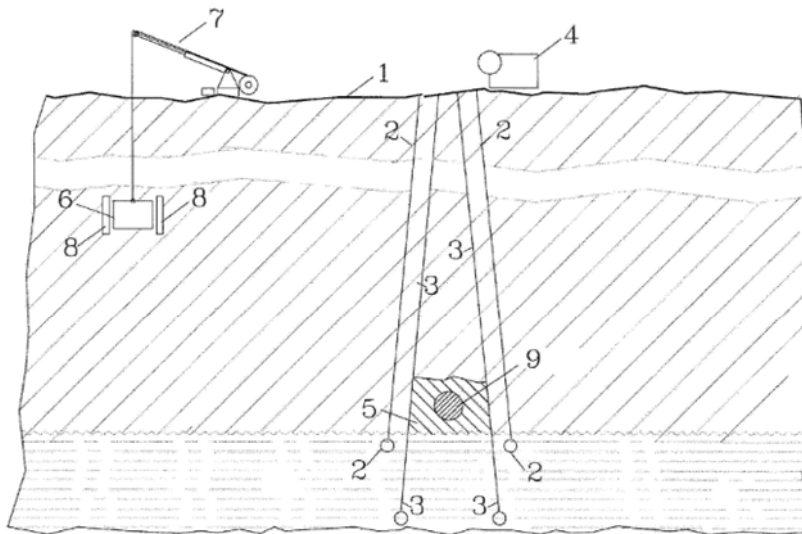


FIG. 2 of 3

The space left in the cliff by the removed rock then forms chamber 5 within which an oscillating water column (OWC) moves air through a means which can capture its energy such as a turbine. Any such means must be capable of being moved to safety from damage from exceptional waves.

For the lowest cliffs, it may be possible to use holes 2, 2 and 3, 3, possibly with one or more of their diameters enlarged, as exhaust shafts for the air moved by the waves in chamber 5.

When the height of the cliff makes this approach uneconomic, the energy capture means needs to be positioned as close as possible to the top of OWC chamber 5, as shown in Fig. 2. This can be done with lift car 6, under the control of crane or gantry 7, on the top of cliff 1. Wheels 8, 8 on car 6 enable it to move vertically over the face of cliff 1 while in contact with it. 9 indicates an air exhaust shaft at a point on the cliff face that corresponds to the upper part of OWC chamber 5.”

8. An alternative arrangement is shown in figure 3 and described as follows:

“The height of cliffs may also make it more economic not to operate from the cliff top to make each individual OWC chamber, but instead to make a tunnel 12 inside the cliff face at the waterline for whatever length of wave front it is proposed to exploit, as shown in Fig. 3. This tunnel need only be of sufficient diameter to enable means for making OWC chambers to be operated inside it. An access point 13 for this tunnel on the cliff face can be reached by lift car 6, and is fitted with sealable door 14 to protect gear in the tunnel from damage by water from exceptional waves during the period of tunnel construction. OWC chambers 15, 15 can then be excised from the cliff face from tunnel 12. This can be done by diamond wire excising as already explained, or by other means such as drilling and blasting or water jet cutting.

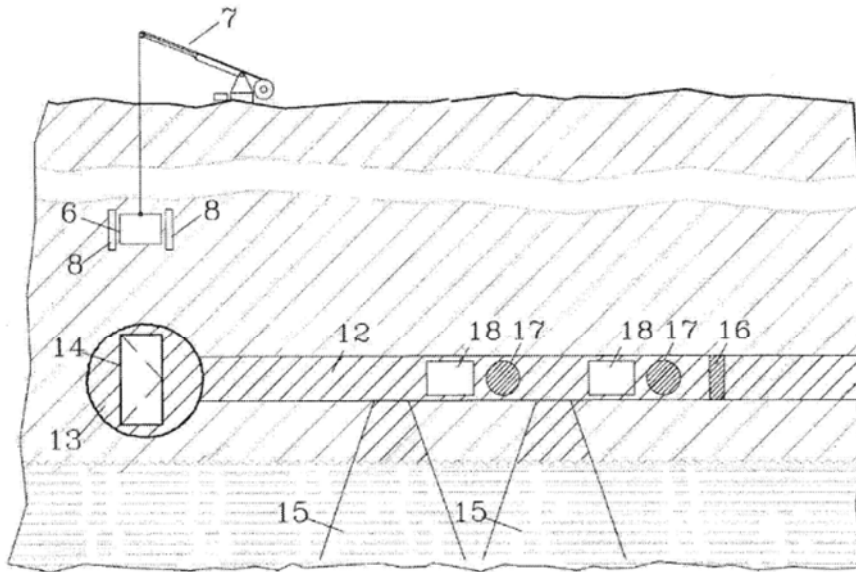


FIG. 3 of 3

Bulkhead 16 divides tunnel 12 into two or more discrete sections. If only two sections are needed, it is movable and sealable, in order to protect workers and gear in tunnel 12 from exceptional waves which could reach them once they had excised the first OWC chamber. Also, a multiplicity of bulkheads 16 may be permanent constructions in tunnel 12 to increase the aerodynamic efficiency of a multiplicity of OWC chambers by tuning them better to wave direction and periodicity.

Air exhaust shafts 17, 17 can be excavated from the tunnel to the cliff face, or inwards from the face by workers and gear transported by lift car 6. Energy capture means 18, 18 can then be installed in tunnel 12 or in shafts 17.”

Claim construction

9. Before considering the documents put forward in the request I will need to construe the claims of the patent following the well known authority on claim construction which is *Kirin-Amgen and others v Hoechst Marion Roussel Limited and others* [2005] RPC 9. This requires that I put a purposive construction on the claims, interpret it in the light of the description and drawings as instructed by Section 125(1) and take account of the Protocol to Article 69 of the EPC. Simply put, I must decide what a person skilled in the art would have understood the patentee to have used the language of the claim to mean.

10. Section 125(1) of the Act states that:

For the purposes of this Act an invention for a patent for which an application has been made or for which a patent has been granted shall, unless the context otherwise requires, be taken to be that specified in a claim of the specification of the application or patent, as the case may be, as interpreted by the description and any drawings contained in that specification, and the extent of the protection conferred by a patent or application for a patent shall be determined accordingly.

11. And the Protocol on the Interpretation of Article 69 of the EPC (which corresponds to section 125(1)) states that:

Article 69 should not be interpreted in the sense that the extent of the protection conferred by a European patent is to be understood as that defined by the strict, literal meaning of the wording used in the claims, the description and drawings being employed only for the purpose of resolving an ambiguity found in the claims. Neither should it be interpreted in the sense that the claims serve only as a guideline and that the actual protection conferred may extend to what, from a consideration of the description and drawings by a person skilled in the art, the patentee has contemplated. On the contrary, it is to be interpreted as defining a position between these extremes which combines a fair protection for the patentee with a reasonable degree of certainty for third parties.

12. There are 11 claims of which claims 1 and 5 are independent method claims corresponding to the two embodiments described above. The independent claims are as follows:

1. *The method of making a water wave energy capture means comprising, in combination –*
 - *drilling at least two pairs of holes in a cliff with the planes of each pair of holes intersecting, to and through the cliff face;*
 - *passing traces through each pair of holes which have means attached to them for retrieving their lower ends so that they can be joined to form a continuous loop through each pair of holes and across the cliff face between them;*

- *replacing this loop with diamond cutting wire and inserting this into its related driving mechanism;*
- *excising an oscillating water column (OWC) chamber from the face of the cliff by cutting with this wire through both pairs of holes, and*
- *attaching means for extracting the energy of the waves in the OWC chamber.*

...

5. *The method of making a water wave energy capture means comprising, in combination:-*

- *Excavating a tunnel along the line of the cliff above the waterline;*
- *drilling at least two pairs of holes from the tunnel to the cliff face in a pattern which enables an oscillating water column (OWC) chamber to be excised from the cliff face by cutting with diamond wire;*
- *passing traces through each pair of holes which have means attached to them for retrieving their lower ends so that they can be joined to form a continuous loop through each pair of holes and across the cliff face between them;*
- *replacing this loop with diamond cutting wire and inserting this into its related driving mechanism;*
- *excising the OWC chamber from the face of the cliff with this wire;*
- *excavating air exhaust shafts from the tunnel to the cliff face;*
- *constructing one or more bulkheads in the tunnel; and -*
- *installing means for capturing the energy from wave movements in the chamber.*

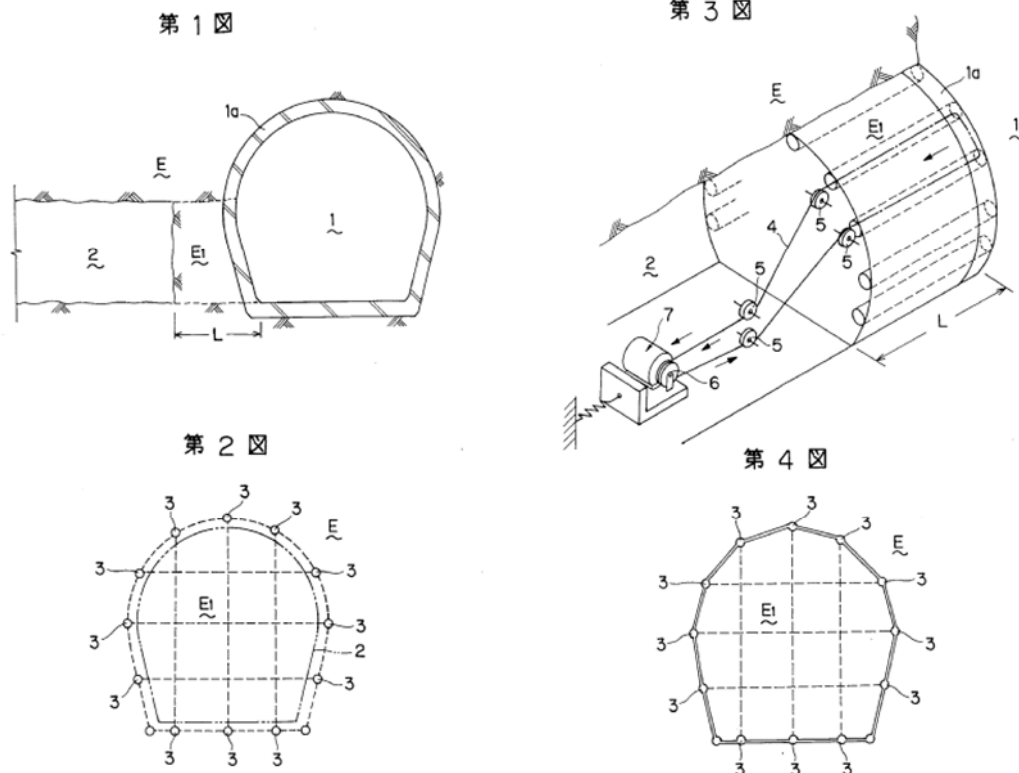
13. For the most part these claims seem to me to be clear and to require little interpretation. However, I do note that the two claims differ slightly in their wording. In the claim 1 the planes of each pair of holes must intersect, also implying that each pair of holes must lie in the same plane. By contrast in claim 5 the holes must be drilled "*in a pattern which enables an oscillating water column (OWC) chamber to be excised from the cliff face by cutting with diamond wire*". According to a sentence towards the end of page 3 in the description "*This can be done by diamond wire excising as already explained, or by other means such as drilling and blasting or water jet cutting.*". However, this is at odds with the claims since both claim 1 and claim 5 require the use of diamond cutting wire to form the oscillating water column chamber. In fact it seems to me that there is only one pattern of holes for which there is an enabling disclosure and which would achieve the result required by claim 5. That pattern is the pairs of co-planar holes whose planes intersect that are required by claim 1. In effect I take it that the skilled reader would understand the drilling step in claim 5 to be the same as the drilling step in claim 1.

14. At the excising step claim 1 includes a limitation "*through both pairs of holes*" that is absent from claim 5. Here again I believe that the skilled reader would understand the patentee to have used the language of claim 5 to mean the same as claim 1. Although the independent claims do not bring it out, it is clear from the description that the OWC chamber is to be formed by the wire cutting alone. On page 2 it is explained that when the slots cut with the diamond cutting wire have met a volume of rock will fall out into the water. There is no disclosure of any other method of excising the OWC chamber by cutting with the diamond wire.
15. Finally I believe that the skilled reader would understand the patentee to have used the language of the installing step at the end of claim 5 to mean the same as the attaching step at the end of claim 1.

Inventive step

16. To determine whether or not an invention defined in a particular claim is inventive over the prior art, I will rely on the principles established in *Pozzoli SPA v BDMO SA* [2007] EWCA Civ 588, in which the well known Windsurfing steps were reformulated:
 - (1)(a) *Identify the notional "person skilled in the art";*
 - (1)(b) *Identify the relevant common general knowledge of that person;*
 - (2) *Identify the inventive concept of the claim in question or if that cannot readily be done, construe it;*
 - (3) *Identify what, if any, differences exist between the matter cited as forming part of the "state of the art" and the inventive concept of the claim or the claim as construed;*
 - (4) *Viewed without any knowledge of the alleged invention as claimed, determine whether those differences constitute steps which would have been obvious to the person skilled in the art.*
17. Neither the comments from the patentee accompanying the request nor the Written Opinion explicitly follow these principles and they do little to assist me with Windsurfing/Pozzoli steps, especially the first two steps.
18. It seems to me that the person skilled in the art is more likely to be a team rather than an individual, given the complexity of installing a water wave energy capture means in a cliff. The team would be likely to comprise wave energy capture system engineers as well as rock drilling and cutting engineers.
19. As relevant common general knowledge such a team would need to understand the nature of an oscillating water column chamber that would make it suitable for use with a wave energy capture device. They would also need to understand the tools and techniques to be used to create such a chamber in a cliff.
20. I have commented above on some differences in wording between claims 1 and 5 and, stated briefly, I have concluded that the skilled reader would understand the working in claim 5 to mean the same as the corresponding passages in claim 1.
21. The matter cited as forming part of the "state of the art" is the prior art document from the International Search Report referred to in the Written Opinion which is a

Japanese patent application published as JP H04 198583 A. This document is concerned with methods of connecting two tunnels. The nature of the tunnels is not entirely clear, but there is no indication that they are to be used with wave energy capture arrangements.



22. The figures from JP H04 198583 above show a new tunnel 2 being driven towards the concrete shell 1a of an existing tunnel 1, there being isolated ground E_1 between the two tunnels. In order to remove the isolated ground E_1 a series of holes 3 are drilled and those holes are connected by cutting using a diamond wire saw as shown in figure 3. This allows the isolated ground E_1 to be removed by crushing or drilling without disturbing unduly the existing tunnel 1. Optionally the diamond wire saw can be used to cut between holes 3 along the pattern of dotted lines shown in figures 2 and 4 allowing individual blocks of material to be withdrawn from within the isolated ground E_1 .
23. There are significant differences between the Japanese patent document and the invention claimed in the patent. First and foremost it is not concerned with a method of making a water wave energy capture means and there is no suggestion that the tunnels are located in or around a cliff face. Multiple drilled holes 3 are shown in figure 4, adjacent pairs of holes each appear to lie in a common plane and the various planes intersect in the sense that they are not parallel. There is no explanation of the manner in which the diamond wire saw 4 is inserted and hence no disclosure of a method using traces as claimed in the patent. Cutting using wire 4 does not result in excising a chamber in the manner of the claims of the patent. In this respect it is worth noting that, unlike the patent, additional steps are required to remove the isolated ground E_1 after cutting using wire 4. Of course there is also no disclosure of attaching or installing means for extracting energy from waves. There

is also no suggestion of the steps from claim 5 of excavating air exhaust shafts and constructing bulkheads in the tunnel.

24. A statement from the requester accompanying the request for an opinion identifies several inventive steps. I take it that these are intended to be differences between the invention and the cited prior art. The first is said to be making openings in a cliff face remotely with a minimum of excavation using diamond wire cutting with planes that intersect. I agree with this, apart from the intersecting planes and wire cutting which are shown in the prior art. The statement goes on to argue that the prior art does not show the use of a float or balloon to retrieve the traces. I noted above that there is no disclosure of traces in the prior art, although in fact neither a float nor a balloon appears in either claim 1 or claim 5. A second inventive step is outlined in the statement which is the use of a lift car (see reference 6 in figures 2 and 3 from the patent above) for carrying out works close to the waterline. Such a lift car is not shown in the prior art. However, it only appears in the dependent claims of the patent and is not an essential feature of the invention claimed in claims 1 and 5. For the purposes of this opinion it is not a difference that I will consider further.
25. The final Windsurfing/Pozzoli step is to, “[V]iewed without any knowledge of the alleged invention as claimed, determine whether those differences constitute steps which would have been obvious to the person skilled in the art”. It must be borne in mind that the person skilled in the art, or the team in this case, is thought of as unimaginative for the purposes of considering obviousness. Presented with the Japanese prior art in question I believe that the unimaginative, skilled team would struggle to see its relevance to forming chambers or passages in a cliff for a wave energy extraction system. It is possible that the team might appreciate that what is disclosed is a potentially useful method of excavating material, but how this might be applied to excavating chambers and passages used to extract wave energy would not be apparent. It seems to me that JP H04 198583 shows a method for creating a relatively short horizontal passage between two tunnels and it would require some imagination or inventive ingenuity to apply such a method in the relatively long, inclined, predominantly vertical orientation required for wave energy capture systems of the kind with which the patent is concerned.

Conclusion

26. It is my opinion that the invention claimed in the patent is inventive having regard to the document referred to in the request.

Karl Whitfield
Examiner

NOTE

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