
Candidates' Answer

RESPONSE

Letter to:

European Patent Office

D-80298 Munich

Germany

Examiner

Dear Sirs,

European Patent Application No:

Applicant:

title:

Further to the Examining Division's communication pursuant to Article 96(2) and Rule 51(2) EPC for the above application, we enclose herewith:

1. Revised pages to replace the equivalent pages currently on file;
2. Amendments in manuscript to assist the Examiner;
3. New claim pages (new claims 1 to 16); and
4. Form EPO 1037 for receipt and return.

We hereby request grant of the patent on the basis of the application documents which are now on file, including the amendments made herewith.

This request and the enclosed submissions do not imply the abandonment of any subject matter previously filed in relation to this application, and the applicant reserves the right to reinstate any cancelled subject matter and /or to file divisional applications under Article 76 EPC.

By way of precaution, in the event that the Examiner is minded to refuse the application, oral proceedings are hereby requested under Article 116 EPC.

SUBMISSIONS

Basis - Article 123(2) EPC

New claim 1 is based on old claim 1 with the additional feature of the “thin layer support” material which finds basis on page 2, line 16; page 3, line 12 and page 4, line 11 and Fig. 3 which all refer to the support material being a thin layer. It can be seen on page 2, lines 15 to 17 that the support material is the same as the insulating material. The characterising portion of claim 1 has been amended to include “a receptacle for receiving liquid is formed in and extends at least partly through the thin layer support”, this finds basis on page 2, lines 17 and 18 which states that “In” the support a blind hole is provided which forms a receptacle for receiving liquid. It can be seen that on page 3 lines 6 and 7 that the blind hole can be replaced by a hole which extends through the complete thickness of the support (1). Also, page 2, lines 18-19 state that the depth of the blind hole is less than the thickness of the support. It is submitted, based on the above and the Figures that it would be clear and unambiguous that the blind hole forms the receptacle and that the receptacle is formed in and extends at least partly through (basis for partly and fully from blind hole and fully extending hole) the thin layer support.

Claims 2 and 3 are based on original claim 2 which has been split into two, each finding individual basis on the description on page 2, lines 19-20.

Claims 6,7,12 and 15 are based on original claims 3,4,5 and 6 respectively.

Claim 4 is based on page 3, lines 1 to 2 disclosure

Claim 5 finds basis on page 3, lines 2 to 3

Claim 8 finds basis on page 2, lines 18 to 19

Claim 9 finds basis on page 2, lines 29 to 31

Claim 10 finds basis on page 4, line 10

Claim 11 finds basis on page 4, lines 10 and 11

Claim 13 finds basis on page 3, lines 12 to 13

Claim 14 finds basis on page 3, lines 19 to 20

Claim 16 finds basis on page 4, lines 1 to 3

It is submitted that the search report has been drawn up under Article 92(1) EPC on the basis of the original claims with due regard to the description and drawings. Since, as stated above, the basis of new claim 1 is to be found in the description, it is thus submitted that the characterising feature of new claim 1 has been searched.

All the features of original claim 1 are maintained in new claim 1 thus ensuring unity between old and new claim 1. Accordingly, the amendment satisfies Rule 86(4) EPC and should be examined in the present application.

Novelty - Article 52(1) and Article 54 EPC

Claim 1 has been amended in line with Rule 29(1) EPC, according to D2 which is considered to be the closest prior art. The invention as claimed in claim 1 relates to a liquid detector having in particular a “thin layer support material” and “a receptacle for receiving liquid formed in and extends at least partly through the thin layer support”.

D1 differs from claim 1 because there is no disclosure, teaching or even hint in D1 of a “thin layer support material”. A “thin layer” would be clear to the skilled man as a material which is dimensioned to have a length and width of substantially greater size than the depth, it would be completely clear to the skilled man that “thin” means the depth is very significantly smaller than the length and width dimensions. Quite differently, D1 has no such “thin layer” it has a cylinder (10) of significant depth and would in no way be thought of as a “thin layer”.

D2 differs from claim 1 because there is no disclosure, teaching or hint in D2 of a receptacle for receiving liquid formed in and extending at least partly through the thin layer support. Whilst it may be arguable that the depressions (2) are recesses, these in no way extend at least partly through the thin layer support (1). In the “no depressions” embodiment of D2, there are not even receptacles.

Accordingly, it is submitted that claim 1 is novel over D1 and D2 individually.

Inventive step - Article 52(1) and Article 56 EPC

The closest prior art is document D2 because it has the combination of features which has the greatest number of technical features in common with the invention and is capable of performing the function of the invention, namely D2 is a liquid detector comprising a first electrode (5a, 5b, 5c) and a second electrode 4a, 4b, 4c, 4d. The conductors are arranged on a liquid impermeable, electrically insulating thin layer support material (water proof element 1). The water proof element 1 of D2 forms receptacles (depressions 2) for receiving liquid. D2 also fulfils the function that the first and second electrodes (5a; 4a etc) are arranged such that when sufficient electrically conductive liquid is in the receptacle an electrical connection is established between them, thus capable of performing as a liquid detector.

D2 suffers from the problem that the receptacles (depressions 2) are formed from “undulations” in a rigid water proof element. D2 itself identifies that it is not robust, and suggests a detector with no depressions for a more robust detector (D2, page 1, lines 29-30). However, a detector without depressions would not function properly as if a leak occurred at an area without electrodes, the leak could continue for sometime until liquid reached the electrodes. This could be too late notice, particularly in sensitive industrial environments. Robust apparatus may be necessary for industrial uses.

Further, to create the “undulations” the device must be rigid thus meaning it cannot adapt to uneven surfaces.

The present invention solves this problem by virtue of the receptacle being formed in and extending at least partly through the thin layer support, because it means that the device is more robust, especially for industrial environments, as the receptacles are “sunk” into the support it means a person can step on the device without damaging it (see p. 3, lines 15-16).

Further, due to the recesses being “sunk into “ the layer, this prevents the receptacles from “tipping over” and spilling even on uneven surfaces. Also, this type of “sunk in” arrangement allows for the possibility of flexibility of the layer, thus allowing the layer to adapt to any surface.

It would not be obvious to a skilled person to modify or adapt D2 and arrive at the subject matter of the independent claim (claim 1) because, D2 teaches against the feature of the receptacles extending at least partly through the layer, in D2 all that is taught is depressions in the layer, these do not extend at all into the layer.

Further D2 teaches against the solution as it actually proposes a solution to increase robustness which is different from the invention (i.e. the “no depressions” solution).

Nor would it be obvious from a combination of D2 and D1 because technically they are incompatible, the way the electrodes are arranged and the fact that D2 is completely involved with forming numerous depressions whilst D1 only relates to an individual receptacle in a differing field, albeit that it mentions industrial applications.

Further, there is no identification in D1 of the need for a more robust device (i.e. that can be walked over for example and which will not tip over on uneven surfaces).

There is also no identification in D1 of a device wherein the receptacle is formed in a thin layer support material, nor any identification of the possibility of the device tipping over on an uneven surface.

In the event that D1 is considered to be the closest prior art, the technical problem of D1 is that it is unsuitable for uneven surfaces as it could tip over. It would not be obvious to a skilled person to modify or adapt D1 and arrive at the subject matter of claim 1, because D1 does not teach of the problem of tipping over, let alone the solution of “sinking” the receptacles into a thin layer.

Nor would it be obvious from a combination of D1 and D2 because they are technically incompatible with positioning of electrodes and as discussed above the multiple depressions. There is no identification in D2 of the problem of tipping over nor of “sunken” receptacles that can be walked over and go over uneven surfaces without tipping over.

Being able to walk over the detectors and not have them cluttering the floor in an industrial environment is very important as they could get damaged or cause a safety problem.

Accordingly, it is submitted that the teachings of claim 1 are inventive over D1, or alternative D2.

Yours faithfully

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PROFESSIONAL REPRESENTATIVE

Note to Examination Committee

I would ensure the extra claims fees were paid for in respect of claims 11 to 16.

CLAIMS

1. Liquid detector (100, 200, 300) comprising a first electrode (2, 20), a second electrode (3), and a liquid impermeable, electrically insulating, thin layer support material (1) on which the first electrode (2, 20) and the second electrode (3) are arranged, characterised in that a receptacle (4, 40) for receiving liquid is formed in and extends at least partly through the thin layer support (1), and that the first and second electrodes (2, 20; 3) are arranged such that when sufficient electrically conductive liquid is in the receptacle (4, 40) an electrical connection is established between them.
2. Liquid detector (100, 200, 300) according to claim 1 wherein the first electrode (2, 20) is at least partially located below the second electrode (3).
3. Liquid detector (100, 200, 300) according to either preceding claim, wherein the second electrode (3) is at least partially located on a side wall (5, 50) of a receptacle (4, 40).
4. Liquid detector (100, 200, 300) according to any preceding claim, wherein a terminal portion (6) of the first electrode (2) is located on the underside of the support (1).

5. Liquid detector (100, 200, 300) according to claims 1-3, wherein the terminal (6) of the first electrode (2) is located on the topside of the support (1).
6. Liquid detector (100, 200, 300) according to any preceding claim, wherein the receptacle (4) is a blind hole in the support material (1).
7. Liquid detector (100, 200, 300) according to claims 1 to 5, wherein the receptacle (40) is formed as a hole passing completely through the support material (1) and wherein the first electrode (20) closes one end of the hole.
8. Liquid detector (100, 200, 300) according to claim 6, wherein the depth of the blind hole is less than the thickness of the support (1).
9. Liquid detector (100, 200, 300) according to any preceding claim, wherein the receptacle (4) is in the form of a concave hole.
10. Liquid detector (100, 200, 300) according to any preceding claim, wherein the support material (1) is rigid.
11. Liquid detector (100, 200, 300) according to claims 1 to 9, wherein the support material (1) is flexible.
12. Arrangement comprising a plurality of liquid detectors (100, 200, 300) according to any preceding claim.
13. Arrangement according to claim 12, wherein the detectors (100, 200, 300) are arranged as a matrix.
14. Arrangement according to claims 12 or 13, wherein a monitoring device (400) is provided.
15. Arrangement according to claims 12 to 14, wherein the current flowing in each liquid detector (100, 200, 300) is individually detectable.
16. Arrangement according to claims 12 to 14, wherein all of the first electrodes (2) are connected together, and all of the second electrodes (3) are connected together.