
Candidate's Answer - B (E/M)

21 March 2002

European Patent Office
Munich

Dear Sirs,

European Patent Application No. XXXXXXXX.X
Wim Sickle Engineering Solutions

This is in response to the official communication pursuant to Article 96(2) and Rule 51(2) EPC.

We file herewith an amended set of claims to replace all claims currently on file. Also enclosed herewith is a receipt for documents for 1037.

Amendments

Claim 1 has been amended to specify that the graphite particles form a plurality of bands within the foam.

Basis for this amendment can be found at page 3 lines 13-14.

Claim 2 specifies that the foam contains at least four bands and is based on page 3 lines 13-14 and Figure 4.

Claim 3 specifies that the polymer is polyurethane and is based on page 2 line 20.

Claim 4 which is dependent on claim 3 specifies that the foam has a thickness of 15 mm and is based on page 4 line 2.

Claim 5 which is dependent on claim 4 specifies that the foam contains at least 12 bands of graphite particles and is based on page 4 line 2.

Claim 6 is based on old claim 2

Claim 7 is based on old claim 3

Claim 8 is based on old claim 4

Claim 9 is based on old claim 5.

Claim 10 is an independent method claim and is based in part on old claim 6, and specifies that the graphite particles are sprayed onto the foam from a plurality of spray heads, such that each of the spray heads produces a band of graphite, thereby to produce a foam containing a plurality of graphite bands. Basis for this can be found at page 3 lines 12 to 14 and in Figure 4.

Claim 11 specifies that the temperature of curing is regulated to affect the penetration depth of the graphite particles and is based on page 3 lines 2 to 3.

Claim 12 relates to the regulation of various parameters and is based on page 3 lines 18 to 22.

Claim 13 is an independent apparatus claim relating to apparatus for producing banded foams. Basis for this claim can be found at the paragraph bridging pages 3 to 4.

Claim 14 specifies that the apparatus contains a computerised control system enabling regulation of process parameters and is based on page 3 lines 9-10.

Claim 15 relates to the regulation of various process parameters by the computer regulation system of claim 14 and is based on page 3 line 10 and page 3 lines 20-23.

In view of the above basis can be found in the application as originally filed and Art. 123(2) is not contravened.

Unity

Reference is made to paragraph 7 of the communication.

The present application now contains independent claims to a:
product (polymeric foam) (Claim 1)
method for producing a polymer foam (Claim 13)
apparatus for producing a polymeric foam

These three independent claims are implied in accordance with Rule 30(1) and the test laid down by the Guidelines III 72.

The claims are linked by the special technical feature of a claim containing layers of graphite. The feature distinguishes all three claims over the prior art and the relationship between the claims involve this special technical feature. Thus the method claim is to a method which produces a foam containing bands of graphite. The apparatus relates to an apparatus for preparing such a method in order to produce a foam containing bands of graphite.

In accordance with the Guidelines at C-III, 7.2 it is permissible to have in addition to an independent claim to a product, an independent claim to a process specially adapted for the manufacture of that product and an independent claim to an apparatus specially designed for carrying out that process.

This is exactly the case here. It is also noted that although the words 'especially adapted' are not used in the claims, the Guidelines C-III, 7.3 state that the requirement of 'specially adapted' is fulfilled if the claimed process inherently results in the claimed product.

Novelty

Reference is made to paragraphs 2, 3 and 4 of the communication.

Claim 1

Claim 1 is novel over D1 because D1 does not disclose a polymeric foam which contains a plurality of bands of graphite particles.

Claim 1 is novel over D2 because D2 does not disclose a polymeric foam which contains a plurality of bands of graphite particles.

Should the Examiner consider that the foam of D2 could inevitably result from the process of D2 (when particles are introduced by spraying, page 2 line 10), we would submit that the foam of claim 1 is not the inevitable result of D2 (see Guidelines C-IV, 7.5), because of the absence of teaching of the use of multiple spray heads.

Thus Claim 1 is novel over each of D1 and D2. As claim 1 is novel, dependent claims 2-9 must also be found novel.

Claim 10

Claim 10 is novel over D1 because D1 does not disclose a method in which the graphite particles are introduced by spraying. Instead graphite particles are pre-mixed (D1 lines 27-28 of page 1).

Claim 10 is novel over D2 because D2 does not disclose a method in which a plurality of spray heads spray graphite into the foam so as to form a plurality of graphite bands. On the contrary D2 merely suggests the use of spraying (page 2 line 11) without reference to any particular number of spray heads.

Thus independent claim 10 is novel over each of D1 and D2.

Thus dependent claims 11 and 12 must also be novel.

Claim 13

Claim 13 is novel over D1 because D1 does not disclose any apparatus for producing a foam, and does not relate to spraying.

Claim 13 is also novel over D2 because D2 does not disclose an apparatus comprising a plurality of spraying heads.

Thus Claim 13 is novel. Therefore dependent claims 14 and 15 are also novel.

Inventive step

CLOSEST PRIOR ART

Both D1 and D2 mention the production of polymeric foams which contain graphite.

However, D2 is believed to be the closest prior art because it has the most technical features in common with the present invention, in particular it mentions the use of a spray head to produce deliver the graphite to the foam (page 2 lines 10 to 11). This is believed to be the most suitable (and practical) disclosure for the determination of obviousness.

PROBLEM

Starting from D1 the objective technical problem is to produce a polymeric foam which has greater accuracy and produces consistent results.

Note that this problem is foreshadowed in the present application at page 4 lines 5 and 6.

SOLUTION

The solution to this problem is to provide a polymer foam in which the graphite is in the form of bands, as set out in the characterising portion of claim 1. Such a foam is produced using the method of independent claim 10 or the apparatus of claim 13.

The claimed foam solves the objective technical problem of providing accuracy + consistent results, by having bands of determined thickness such that the foam has an even, predetermined electrical change in resistance per unit change in pressure. This is explained in the final paragraph on page 3 of the application.

THIS SOLUTION IS NOT OBVIOUS OVER D2

This solution cannot be considered obvious to the person skilled in the art because:

D2 does not contain any indication of the problem of producing greater accuracy and consistent results. On the contrary, D2 does not relate to foams for use in any measuring device – thus accuracy and consistency could not be appreciated as problems. Rather D2 relates to the production of a coating foam or a conveyor belt.

Although D2 does mention a problem of non-homogenous particle distribution leading to unpredictable effects on the conductivity of the foam coating and suggest solving this by layering on the graphite particles by spraying.

Nevertheless the person skilled in the art would not come at the claimed invention when starting from D2, because he would not consider the desirability of producing bands of graphite in the foam. Rather D2 has the aim of producing a homogenous particle distribution (see paragraph 2 of page 1 of D2). Thus the desired homogenous particle distribution would teach the person skilled in the art away from the banding pattern (which is not homogenous) of the claimed invention. Thus he would not aim at the product of claim 1.

Nor would the person skilled in the art arrive at the method of claim 10 or the apparatus of claim 13 when starting from D2.

Although D2 does mention the use of a spray head in passing reference, it does not mention the use of multiple spray-head, or the production of bands of graphite using these multiple spray heads. There is no motivation in D2 to use more than one spray head so as to produce a plurality of graphite ands.

Even if the person skilled in the art were to consider, based on D2, the use of a more than one spray head to deliver the graphite to the foam, he still would not aim at the invention as claimed in independent claims 1, 10 and 13.

If he were to use a further spray head, when starting from D2, he would, based on the introduction of D2 try to use multiple spray heads to produce homogenous mixing. Certainly there is no teaching in D2 which would give the skilled person any idea, let alone motivation, to try to use multiple spray heads to produce bands of graphite.

Thus the person skilled in the art would not arrive at the foam according to claim 1.

Neither would the person skilled in the art come at the method according to claim 10, as D2 does not contain any indication of the desire to produce bands of graphite, much less of the method steps required by claim 10 to achieve this.

Neither would the person skilled in the art come at the invention of claim 13 (apparatus) because D2 contains no indication of the arrangement of spray heads which would be required to produce a plurality of bands of graphite, as required by present claim 13.

THE INVENTION IS NOT OBVIOUS OVER A COMBINATION OF D1 AND D2

Neither is the invention obvious over a combination of D1 and D2 for the following reasons.

Firstly the person skilled in the art would not combine D1 with D2 because they are in different technical fields. D2 relates to electrically conductive coatings for conveyor belts, whereas D1 relates to electrical sensors for cow milking teats.

Furthermore D1 does not contain any indication of the objective technical problem defined above.

Also, if the sperson skilled in the art did combine the two documents he would not come at the invention of claim 1 because there is no indication of even the desirability of multiple layers of graphite.

Nor would he arrive at the method of claim 10 because D1 adds nothing further to D2, in that D1 purely relates to mixing (not spraying).

Nor would arrive at the apparatus of claim 13 because D1 does not describe an apparatus.

In view of the above independent claims 1, 10 and 13 are considered inventive over the cited document. All dependent claims must also therefore be inventive and Article 56 is satisfied.

As a precaution, any deletion or amendment of any previous claim does not amount to an abandonment of subject matter in the application as filed.

As a further precaution, oral proceedings under Article 16 EPC are requested before any decision to refuse this application is taken.

In view of the amendments and observations filed herewith, we trust that the objections raised have been overcome and hope that the next communication will be the communication under Rule 51(4) EPC.

Yours faithfully

Mr Te Deus
AUTHORISED REPRESENTATIVE

Enclosed: Replacement set of claims

CLAIMS

1. A polymeric foam (6, 6', 6'') comprising graphite particles, characterised in that said graphite particles form a plurality of bands (61, 62, 63, 64) within the foam.

2. A foam according to claim 1 having few or more bands of graphite particles.

3. A foam according to claim 1 or claim 2 wherein the polymer is polyurethane.

4. A foam according to claim 3 having a thickness of 15 mm.

5. A foam according to claim 4 having at least twelve bands of graphite particles.

6. *A sensor for the measurement of pressure comprising:*

an electrically non-conducting substrate (2, 2'), and

a plurality of electrodes (1, 1') provided at a distance from each other on a first side of the substrate, and

a layer of foam (6, 6', 6'') according to claim 1 provided on the first side of the substrate and in electrical contact with the electrodes.

7. *The sensor of claim 2 5, comprising more than two electrodes (1, 1') provided on the substrate (2, 2').*

8. *A device for measuring pressure comprising the sensor of claim 2 6 or 3 7 and a processor or electrical circuit capable of converting the electrical resistance between the electrodes into a signal for giving a corresponding pressure reading.*

9. *A switch comprising a sensor according to claim 2 6 or 3 7.*

10. *A method for making polymeric foam (6, 6', 6''), comprising graphite particles, whereby the foam is produced continuously, and the graphite particles are sprayed onto the foam before the foam has fully cured, characterised in that, the graphite particles are sprayed onto the foam from a plurality of spray head (36), such that each of the plurality of spray heads (36) produces a band of graphite particles (61, 62, 63, 64) within the foam (6, 6', 6'') with a plurality of graphite bands (61, 62, 63, 63).*

11. A method according to claim 10 wherein the temperature of the curing is regulated to affect the penetration depth of the graphite particles.

12. A method according to claim 10 or 11 wherein the graphite particle distribution within a band or the thickness of the band is regulated by control of at least one process parameter selected from: the curing rate of the foam, the speed of the foam, the weight and size of the particles, and the spraying velocity.

13. An apparatus for making a polymeric foam (6, 6', 6'') comprising graphite particles, wherein said apparatus comprises a curing chamber (32) for curing said foam and a spray head (36) for delivering graphite particles to the foam, characterised in that said apparatus further comprises at least a second spray head (36), the spray heads (36) being so arranged within the apparatus so as to produce a plurality of bands (61, 62, 63, 64) of graphite particles within the foam, each spray head producing one of the plurality of bands (61, 62, 63, 64).

14. An apparatus according to claim 14 further comprising a computerised control system for regulating the process parameters.

15. An apparatus according to claim 14 wherein the computerised control system regulates at least one of the following process parameters: curing rate of foam; speed of foam passing through the apparatus; the weight and size of the particles; the spray velocity and density.

NOTES TO THE CLIENT / EXAMINER

- Although the feature of having an even predetermined relationship between pressure and electrical charge underlies the invention, I do not believe that this feature alone can distinguish from the prior art, because I believe that any particular conductor foam has this predetermined relationship as evidenced in D1 where a particular threshold activates the light.
- Although the production of a single layer could produce the technical effect mentioned in the previous paragraph, I believe that this feature alone could inherently lack novelty over the D2 foams because of the second layer of foam in D2 produced by spraying before curing without concrete parameters for single layer (and therefore A 84 issues) I decided to use the plurality of layers feature to best distinguish from the prior art.
- Amendment to a broader means (in method / apparatus claims) for delivering graphite (ie other than spraying) did not seem to have basis in the application as filed. Control of spraying via the heads seemed critical.