
Candidate's answer

CLAIMS

1. A seal (1) comprising a sealing element (3) for sealing a gap, the sealing element (3) comprising intumescent material, characterized in that the seal (1) further comprises an electrical heating means (2) that is suitable to transmit heat to the intumescent material for activating the seal (1) to seal the gap.
2. The seal (1) of claim 1, wherein the electrical heating means (2) is a resistive heating wire (2).
3. The seal (1) of claim 2, wherein said resistive heating wire (2) is embedded in the intumescent material.
4. The seal (1) of claim 2, wherein the resistive heating wire (2) is arranged adjacent to the intumescent material such that it is able to heat the intumescent material.
5. The seal (1) of claim 1, wherein the electrical heating means is a resistive foil or a resistive paint.
6. A fire protection system having a control unit (9) and at least one fire detector (8), characterized in that the system comprises at least one seal (1) according to any one of the preceding claims, which can be activated by said control unit (9) in response to a signal from said fire detector (8).
7. The system of claim 6, wherein said fire detector (8) is located remotely from the seal (1).
8. Method for allowing activation of an intumescent seal (1) for sealing a gap, characterized in that the method comprises the step of arranging an electrical heating means (2) suitable to activate the seal (1) so that the means (2) can heat the intumescent material of the seal.

Applicant hereby replies to the EPO communication pursuant to Art. 96(2) and R. 51(2) EPC.

In response to the objections raised, the validity of which is not conceded, new claims pages are herewith enclosed for substitution of the corresponding claim pages of the original application, without prejudice to the later filing of a divisional application directed to any aspect of the original claims. It is also reserved the right to reinstate any canceled subject matter.

Amendments

Claim 1 has been amended by including the subject matter of original claims 2 and 3 and by replacing the original expression “the sealing element can be activated” with the new expression “the seal (1) further comprises”.

The new expression is supported by the description, page 2 line 16-17 (where a seal further comprising a resistive heating wire is disclosed) in combination with page 3, lines 1-2 (where electrical heating means are correlated to the resistive heating wire).

New claim 1 also recites that the electrical heating means “is suitable to transmit heat to the intumescent material”, in accordance with the description, page 2 lines 25-26 in combination with page 3, lines 1-2.

New claim 2 is based on the description, page 3, lines 1-2, from which it is directly and unambiguously derivable that the resistive heating wire is an electrical heating means.

Claim 3 is based on the original description, page 2, lines 16-17.

Claim 4 is based on the original description, page 2, lines 17-19.

Claim 5 is based on the description, page 3, lines 1-3.

Claim 6 is based on original claim 4 and has been amended so as to moot the lack of clarity objection (Art. 84 EPC) raised in item 6 of the Office Communication. According to the EPO Guidelines, C-III, 4.8b, the claim has been directed to the fire protection system of original claim 4 and comprising the seal of any one of the preceding new claims 1-5.

It is noted that the relationship between new claim 6 and “any one of the preceding claims does not offend against Art. 123(2) EPC, because it is directly and unambiguously derivable from the description (page 3, lines 5-6) that the fire protection system includes at least one seal (1) and such seal can be any one of the seals having the different electrical heating means disclosed in page 2, lines 16-19 and page 3, lines 1-3.

New claim 7 recites a feature taken from the description, page 3, line 9.

New claim 8 is a new independent method claim which is supported by the procedural step described on page 3, lines 15-17.

The preamble of claim 8 makes it clear that an intumescent seal (1) already exists and the method provides for the activation of such a seal. Then, the characterizing portion recites the step of arranging an electrical heating means (i.e. “a heating means of the type described above”, see page 3, line 16) suitable to activate the seal (as recited in line 2 of page 3) so that it can heat the intumescent material of the seal.

Support for such arranging step is found on page 3, lines 16-17.

Since the newly claimed method identically reflects a procedure originally disclosed in the application, it does not offend against Art. 123(2) EPC.

Since the European Search Report has been drawn up under Art. 92(1) EPC based on the original claims with due regard to the description, it is submitted that the newly claimed features which were not present in the originally filed claims have been searched.

Moreover, such features represent details of the originally claimed electrical heating means, i.e. they achieve the same function of such electrical heating means, thus the requirement of unity (Art 82 EPC) is fulfilled. Therefore, the amendments to the claims comply with R. 86(4) EPC.

Since all the features of the amended claims are directly and unambiguously derivable from the application as filed, it is submitted that there is no contravention of Art. 123(2) EPC.

Novelty

D1 discloses a seal having a sealing element (104) for sealing a gap made of intumescent material (D1, page 1, lines 3-4, 10-11, 14-15).

D1 does not disclose the features of the characterizing portion of claim 1, namely that the seal comprises an electrical heating element that is suitable to transmit heat to the intumescent material.

Therefore, claim 1 is novel over D1.

As a consequence thereof, dependent claims 2-5 are novel over D1 (Guidelines C-IV, 9.12).

Claims 6-7, which include all the limitations of claim 1, are also novel over D1 (Guidelines C-IV, 9.12).

D1 does not disclose to arrange an electrical heating means so that it can heat the intumescent material of the seal, as in claim 8. Therefore, claim 8 is novel over D1.

* * *

D2 discloses a rubber tube door seal (203) that can be expanded by filling it with air (page 1, lines 3-4).

D2 does not disclose a sealing element comprising intumescent material according to claim 1.

D2 does not disclose an electrical heating means that is suitable to transmit heat to such intumescent material, according to claim 1.

Therefore, claim 1 is novel over D2.

Claims 2-5, being dependent on claim 1, are also novel over D2.

Claims 6-7, including all the features of the seal of claim 1, are novel over D2, too.

D2 does not disclose a method for allowing activation of an intumescent material in which an electrical heating means is arranged as per claim 8.

Therefore, claim 8 is novel over D2.

* * *

D3 discloses fixing points for frames for doors and windows, which are made of intumescent material, (page 1, line 7).

D3 does not disclose an electrical heating means that is suitable to transmit heat to the intumescent material as per claim 1.

Therefore, claim 1 is novel over D3.

Claims 2-5, being dependent on claim 1, are also novel over D3.

Claims 6-7, including all the features of claim 1, are novel over D3, too.

D3 does not disclose a method for allowing activation of an intumescent seal comprising the step of arranging an electrical heating means so that it can heat the intumescent material of the seal, as per claim 8.

Therefore, claim 8 is novel over D3.

D4 is a prior right according to Art. 54(3).

D4 discloses a fire seal comprising a folded elastic strip (402) which is kept folded by an adhesive layer (403) and then unfolded by supplying electric current to a resistive heating wire (404) located in the layer (403), (page 1, lines 13-16).

D4 does not disclose a sealing element comprising intumescent material, as per claim 1.

Therefore, claim 1 is novel over D4.

Claims 2-5 are also novel over D4, being dependent on claim 1.

Claims 6-7 are also novel over D4, because they include all the limitations of claim 1.

Claim 8 is also novel over D4, because the claimed method is limited to an intumescent seal, which constitutes a limitation on the scope of the claim (Guidelines C-III, 4.8, last paragraph).

Conclusions regarding novelty

The invention as claimed in the new claims is not comprised in the state of the art as presented in D1, D2, D3 and D4. Thus, the invention as now claimed should be considered new according to Art. 54(1) EPC.

Inventive step

D1 may be taken to be the closest prior art, since it deals with an intumescent seal used to prevent the spread of smoke in the case of a fire upon heating activation of the seal.

Therefore, D1 is directed to a similar purpose as the invention and requires the minimum of structural and functional modifications to arrive at the claimed invention (T 606/89, Guidelines C-IV, 9.8.1).

It is noted that D1 is already acknowledged in the original description (page 1, lines 12-17), thus the requirement of Rule 27(1)(b) EPC is fulfilled.

The difference between D1 and the invention of claim 1 is the electrical heating means as claimed in claim 1, which is not disclosed in D1.

This difference leads to the effect of quickly activating the intumescent seal even when fire has started at a location remote with respect to the seal.

Therefore, the problem solved by the present invention may be regarded as allowing quick and effective activation of the intumescent seal.

This problem is also suggested in the original application, page 1, lines 23-25.

The invention of claim 1 solves this problem by providing an electrical heating means that is suitable to transmit heat to the intumescent material for activating the seal.

The electrical heating means allows on the one hand to efficiently distribute heat throughout the intumescent material and, on the other hand, it allows prompt and easy connection with any electric sources such as fire detectors which may be remotely located, without the interposition of electro-mechanical transducers and simply using an electronic control unit.

There is no suggestion in D1 that the intumescent seal can be activated by an electrical heating means, but D1 only teaches that the intumescent seal is activated by the heat of the fire (page 1, lines 13-14).

Therefore, the activation of the seal of D1 is very slow because fire must be close to the seal in order to activate it, while smoke may have already escaped from the room to be sealed.

Starting from D1 and faced with this problem, the skilled person would not look to D2 to find a solution to the problem because D2 does not deal with intumescent seals.

Even if the skilled person were to consider D2, he would not arrive at the claimed subject-matter because D2 does not disclose any electrical heating means whatsoever.

D2 uses a tube seal that can be expanded by filling it with air using an air pump (204), i.e. an electro-mechanical transducer.

The skilled in the art starting from D1 would not consider D3 as it falls in a field different from the fire smoke escape prevention, i.e. the field of installing frames (D3, lines 3-4).

Even if the skilled person were to consider D3, he would not arrive at the claimed invention of claim 1, because D3 would teach him that the intumescent material can be manually and locally activated through cords (D3, lines 16-17) and chemical heating agents (D3, lines 10-12).

The invention of claim 1 is therefore not obvious over any of the prior art document D1÷D3, either taken alone or in combination. Therefore, claim 1 complies with Art. 56 EPC.

Claims 2-7 are accordingly inventive over D1÷D3, (Guidelines, C-IV, 9.12).

The method of claim 8 is also inventive over the cited prior art, since it regards arranging an electrical heating means with respect to an intumescent seal.

Therefore, claim 8 has a technical relationship with the invention of claim 1, according to Rule 30 EPC.