

Examiner's Report on Paper B/1998

1. Introduction

The present report is divided into four main sections 2 to 5. In section 2 some general background information will be given on the substance of the paper and sections 3 and 4 deal with the two aspects of Paper B, namely the claims - section 3 - and the argumentation - section 4. In section 5 some general comments on Paper B will be made.

2. Background

Document II destroys the novelty of the given Claim 1 and it hardly appears possible to put the novelty objection of the EPO Examiner into question.

It is to be noted, however, that the given Claim 1 is entirely silent about the way in which the smoke detector actually converts the pressure waves into a signal which can be evaluated in a (remote) alarm unit. Claim 1 therefore covers all possible kinds of signal conversion in the smoke detector.

In the application documents of Paper B two basic approaches are set out to convert the pressure waves occurring in the smoke detector into an output signal which is suitable for further use:

- i. The first one is described in detail in the application with respect to the embodiments of Figs. 1 to 3 and consists of a conversion of the pressure waves into light signal variations in a light guide. In more detail, the light guide has a first portion for carrying light into the acoustic transducer and a second portion for carrying light from the acoustic transducer and the acoustic transducer is operable to vary the intensity of light transmitted from the first to the second light guide portion.
- ii. The second one is mentioned in the third paragraph of page 4 of the description of the application: it consists basically in the use of a microphone which converts the pressure waves into an electrical signal which then can be forwarded to the alarm unit. This approach is described in Document II disclosing a microphone, an amplifier and a voltmeter (see the Figure of Document II).

The novelty of approach ii. is therefore also destroyed by Document II, and the expected solution to Paper B was to concentrate on approach i. This was also clearly indicated in the Client's letter (see last paragraph thereof).

It should be noted that Document II mentions in lines 16 to 28 of the right-hand column of page 2 a somewhat "hybrid" approach of signal conversion which consists of the use of a microphone, the output voltage which is amplified and fed to a light source in the smoke detector which emits its light into a light guide leading from the smoke detector to the evaluation circuit. When put into practice, this approach, however, requires a considerable number of electrical components in the smoke detector (a microphone, an amplifier, a battery or some other kind of power supply) and is therefore subject to all the disadvantages which are mentioned in the opening part of the description of Document I when the smoke detector is used in an explosion-endangered environment (see

Document I, page 1, 2nd paragraph).

In view of the above the candidates were expected to draft a claim which defines a smoke detector that is capable of converting the pressure waves generated by the smoke particles into a varying light signal in the light guide without any electrical components (i.e. being "electrically passive") and which is therefore particularly suited for explosion-endangered environments.

3. The Claim(s):

3.1 The Independent Claim or Claims:

In view of the basic considerations under 2 above, a good independent claim could be obtained by defining in more detail the distinguishing features of the acoustic transducer: it is associated with a light guide, the light guide has a first portion for carrying light to the acoustic transducer and a second portion for carrying light from the acoustic transducer and the acoustic transducer is operable to vary the intensity of light transmitted from the first to the second light guide portion (NB.: the light guide carrying light into the acoustic transducer is not to be confused with the light guide that carries light into the detection chamber of the smoke detector in order to generate the pressure waves!).

These are the features which are common to both embodiments of the invention described in Figs. 2 and 3. It was considered that the general disclosure of the invention in the application was such as to allow such a definition without an infringement of Art. 123(2) EPC, since this functional definition can be derived from the general disclosure of the application. This would nevertheless require a justification under Article 123(2) EPC in the argumentation.

However, claims that included a reference to the presence of a "membrane, vibrations of which cause variation in the intensity of light in the second portion of the light guide" could also earn full marks. Therefore, the mention of a membrane in the independent claim was not considered as an undue restriction of the claim.

As regards the use of the terms "electromagnetic radiation" on the one hand and "light" on the other hand, these expressions were considered equivalent in the present context and consequently neither a credit was given nor a penalty was deducted for the use of the one or other term.

It is to be emphasized here that all good solutions for an independent claim necessitated the clear definition of the light guide portions as mentioned above, since a light guide portion leading from the smoke detector to a central alarm unit is also present in the proposal mentioned in the "Conclusions" of Document II (lines 16 to 28 of the right-hand column of page 2). In more detail, the light guide mentioned in Document II extends from a light source, whose light intensity is modified depending on the output voltage of the microphone, to the central alarm unit. A mention of the light guide portion carrying light into the transducer would establish novelty of the claim over the disclosure of Document II.

Care should have been taken as regards the use of the term "transducer": it was considered acceptable only if the claim made clear what is converted into what, e.g. that

pressure variations are converted into light variations. If this was not made clear, a lack of clarity resulted which led to the loss of some marks.

Claims which merely stated that "the smoke detector converts the pressure waves into light (or light intensity variations)" or that "the transducer generates an optical output signal" were considered with little favour since these formulations actually lack novelty with respect to Document II: in the case described in Document II in lines 16 to 28 of the right-hand column of page 2 it can justifiably be stated that the transducer generates an optical output signal.

Claims attempting to distinguish the invention over the arrangement suggested in the final paragraph of Document II by reference to a "direct" conversion of pressure waves into light signal variations were also considered with very little favour since this was considered as an unclear definition of the invention (Art. 84 EPC). Moreover, it could be argued that the transducer according to the invention actually does not directly convert the pressure waves into light intensity variations: it only does so by the intermediate step of converting the pressure waves into mechanical movements of the membrane which then in turn cause light intensity variations in the associated light guide. Therefore, such a definition would be open to an objection under Art. 123(2) EPC. In potential subsequent opposition proceedings the respective feature, however, could not easily be removed from the claim without an offence against Art. 123(3) EPC. Therefore, claims directed to the "direct conversion" of pressure waves into light intensity variations could fall into the Art. 123(2) and (3) EPC trap. The committee considers this trap to be particularly serious as it can lead to a revocation of the patent.

Claims defining the invention merely by the desired result, such as "the transducer being electrically passive" or claims defining the invention in negative terms, such as "the transducer having no electrical components" were also considered poor since definitions of this kind are not clear at all and do not properly define the subject-matter for which protection is sought (Art. 84 EPC).

Generalisations of the membrane with terms such as a "vibratable member" or the like have at least a doubtful basis in the application as filed and the use of such terms can offend Art. 123(2) EPC - such generalizations therefore lost marks. However, marks could be recovered, when an argumentation was present and the candidate demonstrated that he or she was actually aware of what he or she was doing.

Independent claims which were restricted to the two alternative embodiments described in the application, either by the use of the word "or" in a single independent claim or by the presence of two independent claims were considered as a less good solution. It is to be noted that claiming the invention in this manner requires an appropriate argumentation as to unity.

Solutions in which the claims clearly excluded one of the two embodiments for which the client wanted protection, lost a significant number of marks since there was no reason to limit the application to only one of the embodiments. Nevertheless, a small number of the lost marks could be regained by proposing a divisional application for the excluded embodiment.

Apart from this latter case suggestions to file divisional applications were neither expected

nor rewarded.

The presence of unnecessary features in the independent claims resulted in the loss marks, examples of major unnecessary limitations including:

- i. the inclusion of the central alarm unit (5),
- ii. a reference to a reduction in light intensity as opposed to a variation¹ and
- iii. a common source for the light supplied to the detecting chamber and the light supplied to the acoustic transducer.

It was not considered necessary to define the source of light for the light supplied to the acoustic transducer.

The amended independent claim(s) should include all the features of Claim 1 as filed, since there is no support in the application for any claim broadening.

Candidates are reminded that reference numerals should not be relied upon to differentiate between like features, e.g. light guide portion (12) and light guide portion (14). The same of course applies to the dependent claims.

3.2 Dependent Claims:

Marks were available for retaining Claims 2 and 3 and amending Claim 4. Candidates were expected to draft some new dependent claims representing improved fall back positions. Suitable subject-matter includes details of the construction of the acoustic transducer as described in the embodiments of Figures 2 and 3, some examples being the fixture of the light guide to the membrane (Fig. 2), the reflective surface of the membrane and the arrangement of the two light guide portions with respect to the membrane (Fig. 3).

Contradictory or illogical dependencies of dependent claims lost marks. The same applied for excessive numbers of dependent claims.

4. Argumentation

A well structured argumentation is expected to include the following items:

- i. A discussion of the sources of amendment and issues arising under Art. 123 (2) EPC, including the basis for and identification of amendments and the basis for and justification of any generalized expressions used in the claims. In cases where argumentation is appropriate and necessary under Art. 123(2) EPC but is absent, marks were deducted.
- ii. A discussion of the requirement of unity of invention where appropriate. In cases where argumentation is appropriate under Art. 82 EPC (see 3.1 above) but was

¹ Although a light reduction is immediately apparent from the disclosure of the invention, the application refers at all times to "variations in light intensity". In fact, there are cases (depending on the type of light guide used), in which an increase in intensity can occur as the result of the vibration of the light guide. Candidates were of course not expected to know this, however, the test was, whether the amended claim was not unnecessarily restricted.

absent, some marks were deducted.

As regards the provisions of Rule 86(4) EPC, this rule only applies to cases where the amended claims do not form a single general inventive concept with the originally claimed invention. It was considered that this question did not arise in the present Paper B and consequently any comments in this respect were not considered relevant.

iii. Novelty: all available prior art documents should be covered. In order to establish novelty over each document, a feature of the claim should be identified which is not disclosed in the respective prior art document.

iv. Inventive step: the arguments concerning inventive step are sub-divided as set out below:

iv.i Identification of the closest prior art.

In this year's Paper B, Document II was clearly the most relevant piece of prior art as it employs the same basic detection principle as the invention. It is desirable to give a brief reason why a particular document has been selected as the closest prior art. The closest prior art is that combination of features derivable from one single reference that provides the best basis for considering the question of obviousness. In the present Paper B it was considered insufficient merely to state that Document II had the most features in common with the claim.

iv.ii Definition of a problem associated with the closest prior art and relevant to the distinguishing features of the independent claim.

In respect of Document II a problem can be defined as follows: a smoke detector is to be provided which is capable of converting the pressure waves generated by the smoke particles into a signal and which is particularly suited for explosion-endangered environments.

Of course, it is necessary that care is taken that the problem defined is actually solved by the features of the independent claim.

Definitions of very general or vague problems (e.g. "a smoke detector is to be provided that is reliable in operation", "cheap to produce" or "of simple construction") were considered with little favour.

iv.iii Arguments as to why the prior art does not lead to the invention as claimed.

It is not intended to set out a detailed argumentation in this report, as there are numerous ways in which this could be done. Such argumentation should, however, take account of the points mentioned below.

Starting from Document II which makes use of the "pressure wave principle" and bearing in mind the above problem, the skilled person can find no teaching which would avoid the use of electrical components within the smoke detector:

Document II uses a microphone for the detection of the pressure waves and necessitates the use of additional electrical circuitry, such as an amplifier and a power supply. Although Document II includes the possible use of light guides, this is described therein exclusively in addition to the above electrical circuitry.

There is no suggestion in Document II of the desirability or possibility of replacing the microphone and the associated electrical circuitry.

Turning to Document I, the skilled person knows that the basic key to making a smoke detector suitable for explosion-endangered environments is to avoid the use of any electrical components in the smoke detector and that this can be achieved through the use of light guides. The principle of scattered light detection immediately lends itself to the use of light guides since the property to be detected by the smoke detector is light as such. However, the principle employed in Document II is of an entirely different nature, viz. acoustic.

Since the two Documents I and II are based on incompatible principles, the skilled person would not consider combining their teachings. Even if he or she were to consider Document I with Document II, this would not lead to the expected solution, as no alternative would be found to the use of a microphone and its associated circuitry for the interpretation of the pressure waves.

Due to the particular relevance of Document II, it was not considered necessary in this year's Paper B to also include a discussion of inventive step with Document I as the most relevant prior art document (starting point).

Marks were lost for illogical and/or muddled presentation of the argumentation. As a general rule it should always be clear which arguments are considered by the candidate to be relevant to which issue.

In general, the arguments relating to inventive step should show that the features claimed and which distinguish the claim from the closest prior art are not obvious.

The Examiners regard the establishment of inventive step as the most important part of the argumentation and the marks awarded are strongly weighted towards that aspect, the aspects mentioned above under i. to iii. being rather formal and straightforward.

5. General Comments

In Paper B the Examiners aim to test the candidate's skill in revising the claims to the extent necessary to overcome the objections raised against the claims filed and in drafting a letter of response to the European Patent Office in which, according to the Instructions to candidates, arguments in defence of the revised claims should be presented.

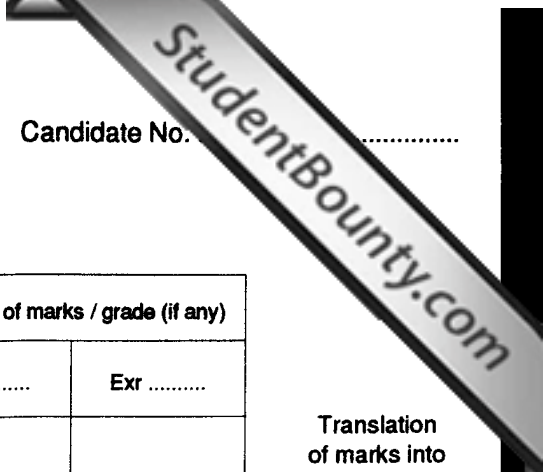
Again, as in previous Examiners' Reports on Paper B, the Examiners would like to point out that the "Instructions to Candidates" required argument only in respect of the independent claim or claims and did not require any amendments to the description.

Consequently no marks were available for this and candidates who have nevertheless done so simply wasted their time.

A candidate's best approach to Paper B is first to identify possible distinctions from the prior art cited and to seek the best overall concept of solution. Then the wording of the claim should be carefully considered, having regard on the one hand to the need to keep the claim as broad as possible and on the other to avoid any offence against Art. 123(2) EPC. The consequences for the dependent claims should also receive attention but should not be allowed to take up so much time that the construction of the argumentation has to be hurried. Care should be taken to draft the arguments in strict accord with what is actually claimed.

EXAMINATION COMMITTEE I

Candidate No.



Paper B (Electricity/Mechanics) Schedule of marks

Category	Maximum possible	Marks awarded		Revision of marks / grade (if any)	
		Exr	Exr	Exr	Exr
Claims	24				
Argumentation	24				
Total	48				
Corresponding Grade					

Translation of marks into grades

Mark	Grade
0 - 11	7
12 - 17	6
18 - 23	5
24 - 29	4
30 - 35	3
36 - 41	2
42 - 48	1

Marking by further examiners if appropriate

	Claims	Argumentation	Total	Grade
Examiner				
Examiner				

Remarks (which must be given if both the following requirements are fulfilled:

- (a) the grades awarded by the two individual examiners before their discussion differ by two grades or more;
- (b) the marks awarded by at least one of the two individual examiners have been changed during their discussion.)

If marks are revised, a brief explanation should be given.

Sub-Committee for Electricity/Mechanics agrees on _____ marks and grade _____

Grade recommended to Board _____

J. Combeau - Chairman of Examination Committee I