

Examiners' Report on Paper B/1995 - Electricity/Mechanics

1. Introduction

The present Report is divided into two main sections, dealing with the two aspects of Paper B, namely the claims - section 2. and the argumentation - section 3. Some general comments will be made in section 4.

2. The Claims

2.1 Basic Considerations

Document II cited in the Office Communication for the first time destroys the novelty of all the claims as filed.

In his letter in Paper B the Client expressed his wish to prosecute the application on the basis of the "separate working fluid" embodiments described with reference to Figs. 8 and 9. He asked to ensure patent protection at least for these embodiments. It was expected that the candidates would follow the instructions expressed in this letter. Consequently, what was expected in Paper B as a solution with respect to claim revision was a set of claims directed to the embodiments mentioned above (see also 2.2 below).

2.2 The Independent Claim or Claims

In view of what has been said under 2.1 a good independent claim serving as a basis for the further prosecution of the application, could be obtained by specifying that the means for forming the vapour bubble is arranged to form the bubble in a working fluid separate from the ink. A basis for such an amendment is to be found in the application as filed (see 95/B(E/M)/e/6, 1st paragraph).

An additional method claim was not expected in Paper B, so that the full marks for the claims were available for a set of apparatus claims. No proposal for a divisional application was expected.

Many candidates limited their independent claim by specifying a flexible membrane which separates the ink and the working fluid. This limitation was considered unnecessary for the following reason: although the application as filed only discloses a flexible membrane for that purpose, the general teaching of the application nevertheless is directed to the use of a separate working fluid (see 95/B(E/M)/e/6, 1st paragraph). Consequently, any suitable means (e.g. a rigid element such as a piston) separating the two liquids could be used (at least theoretically) for that purpose.

Such a broader formulation, however, was considered to require some arguments proving that the candidate was aware of the fact that a functional generalisation for the mentioned purpose had been made (see also 3.1 below).

As in Paper A marks were lost when the claim included unnecessary features. Examples of major unnecessary restrictions include references to capillary feed and ink reservoir,

examples of minor unnecessary restrictions include references to a resistor and the location thereof with respect to the means separating the ink and the working liquid and/or with respect to the ink supply passage (see also what has been said under 2.5 of the Examiners' Report on Paper A).

Claims which did not specify the presence of a working fluid, e.g. a reference to "means indirectly acting on the ink" were considered as poor. Apart from the question of whether such a definition is sufficiently clear there is insufficient support for such a claim since no alternative to a separate working fluid is disclosed in the application as filed, this being an essential feature of the invention.

Other vague and unclear formulations such as negative definitions, e.g. "means for avoiding the formation of a vapour bubble in the ink" or "means for preventing the bubble from reaching the outlet" were equally considered as poor.

Low marks were also awarded for solutions in which the independent claim was directed to the fact that "no drainage system" was used (such a drainage system is mentioned in the 6th paragraph of Document II - 95/B(E/M)/e/16). Its use is, however, limited in Document II to the case in which a pressurised ink supply system is provided, such a system consequently being unnecessary in the case of a capillary ink supply which is also mentioned in Document II.

Claims which specified that the ink was provided "above" a membrane or that the working fluid was provided "below" a membrane also lost marks for reasons of lacking clarity and possibly being unnecessarily restricted.

2.3 The Dependent Claims

All the dependent claims presented in Paper B are anticipated by Document II. candidates who have simply maintained these claims have overlooked the fact that Claim 5 as filed (specifying that the vapour bubble is formed in the ink) contradicts an amended Claim 1 which defines the separate working fluid aspect. Moreover, Claim 7 as filed would have needed some amendment since the resistor in the separate working fluid embodiments is not provided in the ink supply passage.

In order to create a good fall-back position it was desirable to add dependent claims directed separately to the relevant details of the working fluid embodiments, which comprise the following features:

The fact that the working fluid is housed in an additional cavity (Fig. 8), that the cavity can be created by means of a rough surface of the resistor and/or the membrane (Fig. 9), that there is a membrane and that it consists of silicone rubber, and that the working fluid is water-based.

Moreover it is also desirable to direct dependent claims to the side- and the end-shooter embodiments, the latter being mentioned in the last paragraph of the application.

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

3. The Argumentation

3.1 Formal Aspects

As is stated in the Examiners' Report on Paper B/1994, as regards the admissibility of amendments, the primary requirement is that the application must not be amended in such a way that it contains subject-matter which extends beyond the content of the application as filed (Art. 123(2) EPC). If, in order to meet the requirements of novelty and inventive step, it is necessary to incorporate a feature from the description and which is described therein in a quite specific form, then it may be inadmissible to propose a generalised version of that feature in terms so broad as to cover possible embodiments which were not disclosed. If, however, a concrete item, such as the membrane (see 2.2 above), had been disclosed for a stated purpose (in this case the separation of the ink and the working fluid), then it may well be appropriate to use a functional generalisation thereof for the stated purpose, subject to this being justified by argumentation.

Amendment by way of deletion of a feature from the independent claim, i.e. claim broadening, can also offend against Art. 123(2) EPC. In the present case, the application as filed was expressly concerned with the vapour bubble printing principle. Consequently, an amendment of Claim 1 by deletion of this or any other feature has the effect of bringing into the application the possibility of operating without this feature, giving rise to an objection under Art. 123(2) EPC. Candidates who nevertheless did so but sought in their arguments to show that it was admissible to do so, were marked more favourably than those who simply deleted it without considering the provisions of Art. 123(2) EPC.

3.2 Novelty

A good argument with respect to the novelty of the subject-matter claimed should establish that the claim contains at least one feature of distinction from each of the prior art documents available. It is not considered sufficient merely to state that none of the documents discloses the combination of the features claimed thus only asserting that the subject-matter of the claim is novel.

Moreover, a feature which distinguishes the subject-matter claimed from one prior art document may not necessarily distinguish it from another. Of course, as to novelty, it is not always necessary to go into deep details and sometimes a reference to what is shown in the drawing of a document may well suffice to show that the claimed apparatus is indeed different from the one disclosed in the prior art.

3.3 Inventive Step

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 favoured way to do this is the "problem and solution approach", the three steps of which will be outlined below under 3.3.1 to 3.3.3 in their logical sequence, which in most cases will provide the most convincing argumentation. Candidates who followed this sequence tended to score higher marks.

- 3.3.1 The problem and solution approach requires firstly the determination of the closest prior art. The reason for this selection should also be given. In the present case, Document II can be considered the closest prior art since it deals with the basic vapour bubble printing principle.
- 3.3.2 In a next step, the technical problem which is to be solved by the provision of the distinguishing features of the independent claim is to be established in an objective way. It will be appreciated that this part of the argumentation is more convincing, when the problem is identified before the solution is introduced in terms of the distinguishing features.

In the present case, starting from Document II, possible problems are all associated with the fact that the vapour bubble is formed in the ink. Such problems can be subdivided into those concerning the undesirable effects occurring through interaction between the ink and the resistor and those concerning undesirable effects on or caused by the ink itself (see the application as filed, 95/B(E/M)/e/6, last paragraph, where it is clearly stated that chemical problems associated with ink compositions, such as corrosiveness and the deposition of ink particles on the resistor can be the source of difficulties).

However, the sensitivity of the resistor to corrosion cannot be regarded as the problem to be solved, since this can be solved by the provision of a thermoconductive foil in close contact therewith (mentioned in Document II - 95/B(E/M)/e/16, 5th paragraph), which foil makes the resistor insensitive to the chemical properties of the ink used. However, in Document II it is still necessary to take into account the thermal and chemical properties of the ink which has to be suitable for evaporation. Therefore, the best statement of the problem to be solved is that this limitation upon the ink is to be avoided.

Vague statements of problems, such as the improvement of printing quality and/or the printing resolution, were not considered with much favour. In addition, marks for the formulation of the problem were lost if a correct statement of problem or problems was to be found among a large number of incorrect or vague statements.

- 3.3.3 The third and final step in the problem and solution approach is to demonstrate, starting from the closest prior art and the technical problem, and taking into account the teachings of the prior art as a whole, why it would not have been obvious to the skilled person, to modify or adapt the closest prior art and thereby arrive at the subject-matter of the independent claim or claims.

In Document II (the closest prior art), the purpose of the thermoconductive foil, which must be in close contact with the resistor is the protection of the resistor against corrosion and burnout (see Document II - 95/B(E/M)/e/16, 5th paragraph). The use of a thermoconductive foil, however, means that a deposition of ink particles is still possible since - according to Document II - it is always the ink which is to be evaporated. Consequently, Document II neither addresses nor offers any hints at the problem and its solution of providing a separate working fluid.

As regards the combination of both Documents II and I (which combination has been made in an ex-post-facto-analysis by the EPO Examiner in paragraph 8 of the Office Communication), where in Document I the evaporation of the ink is not an issue, the candidates should have explained that such a combination on the one hand is not reasonable and on the other hand - even if it were attempted - would result in a device completely different from the one claimed. Such a device would possibly be provided with electrorestrictive elements and with heating elements provided somewhere else in the ink supply passage, which heating elements would create a vapour bubble in the ink. What would certainly not be obtained is a separate working fluid for the purpose of vapour bubble formation.

The arguments should also include a refutation of the arguments set out in paragraph 8 of the Office Communication.

A mere assertion that, since neither Document I nor II disclose a separate working fluid, the combination of these documents cannot make the invention obvious, certainly does not constitute a sufficient argument. Only a few marks were available for such an approach.

- 3.3.4 With respect to what is said under 3.3.1 to 3.3.3 above it is to be mentioned that it is not considered the purpose of the present report to set out all the possible arguments in detail. What has been said here is to be understood as an outline of valid arguments which could be used for the problem and solution approach. The Examiners are aware of the fact that the complete disclosure of Paper B in its entirety allows a more detailed argumentation.
- 3.3.5 In the particular task set this year, in addition to the problem and solution approach starting from Document II, a good candidate would also look at the possibility of using Document I as the starting point. In this case it would have to be borne in mind that the nozzle head disclosed in Document I already provides an *independence of the thermal properties of the ink used*. The candidates were expected to briefly demonstrate in the light of the available prior art, that it is not obvious to replace the electrorestrictive elements by a vapour bubble generator using a separate working fluid whilst retaining the advantages of Document I.
- 3.3.6 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 two aspects mentioned above under 3.1 and 3.2 being rather formal and straightforward. It is to be emphasised, however, that the use of the problem and solution approach is to be preferred, but the essential requirement is to demonstrate inventiveness positively and any line of argument which is developed in a logical and convincing manner is potentially capable of obtaining high marks.

4. General Comments

In Paper B the Examiners aim to test the candidate's skill in respect of a revision of the claims to the extent necessary to overcome the objections raised against the claims filed and in respect of the draft of 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.

In this year's Paper B the marking schedule was slightly weighted towards the argumentation, with 20 marks being available for the claims and 28 marks for the argumentation.

Again, as in the Examiners' Report on Paper B/1994, 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, with perhaps a note of other possible solutions - if any. 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 done too hurriedly. 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 by first examiners		Revision of marks / grade (if any) or marking of further examiners (if appropriate)	
		Exr	Exr	Exr	Exr
Claims	20				
Argumentation	28				
Total	48				
Corresponding Grade					

Translation of marks into grades

Grade
0 - 11
12 - 17
18 - 23
24 - 29
30 - 35
36 - 41
42 - 48

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

- (a) the grades awarded by the two first examiners before their discussion differ by two grades or more;
 - (b) the marks awarded by at least one of the two first examiners have been changed during their discussion.
- If marks are revised, brief explanation should be given.

Sub-Committee for Electricity/Mechanics

- Sub-Committee agrees on _____ marks and grade _____
- Sub-Committee does not agree on a grade

Remarks by Sub-Committee which must be given where the Sub-Committee does not agree on a grade

Grade recommended to Board by Committee I _____

Remarks by Committee I

07.09.95

Date

Signature of Chairman of Committee I