Examiners' Report Paper B 2014 (Electricity/Mechanics)

1. General considerations

It is noted that any references in this text to the Guidelines for Examination at the European Patent Office refer to the version valid at the date of the examination.

1.1 Introduction

This year's paper relates to an electrical connector for connecting to electrically insulated cables. The application concerns an electrical connector of the type (Figure 1) having an electrical contact element comprising a pin contact and blades for cutting the sheath of insulating material (see description par. **[001]**).

The connector described has a hinged cover connected to a connector body. To electrically connect an insulated cable to the contact element, the cable is guided into the cover when the latter is in an open position and, when the cover is closed, the cable is pressed by the cover between the blades so that the blades cut through the sheath of the cable until they are in electrical contact with the electrical conductor of the cable, as shown in Figs. 2-4. In general, it is necessary to arrange that the cable is positioned over the blades before the cover is closed.

1.2 Prior art

The communication from the EPO cites documents D1 and D2 which, in common with the application, describe electrical connectors having an electrical contact element comprising a pin contact and blades for cutting the sheath of insulating material, as well as a hinged cover, the latter causing the cable to be pressed between the blades when it is moved to the closed position.

D1 discloses an electrical connector having the hinge at the end of the body where the cable is inserted (par. **[002]**). Before it is inserted into the connector, the insulated cable must be bent, then it is inserted into the straight tube of a guide which is provided on the cover. When the cover is closed, protrusions on the cover are forced into the sheath of the cable, so that the cable is securely held in the connector (par. **[005]**).

D2 describes a connector which has a passageway in the rear wall of its body through which the cable is inserted and a ramp on the bottom wall of its body for bending the cable upwards so that the cable is positioned above the blades. A guide for a screwdriver is provided in the cover and, with a screwdriver inserted into the straight tube of the guide and abutting against the stop of the guide, the increased leverage thereby obtained enables the connection of an insulated cable having a sheath made of a hard material (par. **[006]**).

1.3 The invention as presented in the application as filed

Claim 1 as filed concerns an electrical connector for connecting to an insulated cable having a sheath of insulating material and an electrical conductor, the electrical connector comprising:

a) a body (2) comprising a front wall (4), two side walls (6), a rear wall (8), and a bottom wall (10);

b) a cover (12) for closing the body (2) when the cover (12) is in a closed position;

c) a hinge (14) arranged along the front wall (4) of the body (2) and connecting the cover (12) to the body (2);

d) an electrical contact element (20) having a pin contact (22) and blades (24) for cutting the sheath, the pin contact (22) protruding out of the body (2) and the blades (24) being disposed in the body (2),

e) wherein the cover (12) comprises a guide (30) for guiding the insulated cable (C), the guide (30) having a straight tube (32) and a stop (34), the straight tube (32) being orientated towards the hinge (14).

Although the electrical connector set out in claim 1 as filed is known from the prior art cited in the communication from the EPO, the invention described in the application differs from the prior art with regard to the arrangement of the components of the connector.

1.4 The challenges of the paper

The main challenges of the paper were to:

a) Amend the client's draft claim set according to the wishes of the client to fulfil the requirements of the EPC and giving the client the broadest possible protection;
b) write a reasoned letter of reply
- explaining the basis for the amendments of the claims
- arguing that the claims are clear and that the requirement of unity of invention is fulfilled; and to
c) present arguments that the subject matter of the amended independent claim is new and involves an inventive step in the light of the cited prior art.

1.5 The marking scheme

Answer papers are marked on a scale of 0 to 100 marks:

Appropriate amendments to the draft set of claims: Max. **30** marks, min. **0** marks. Marks were awarded for the candidate’s amendments to the client’s draft set of claims, rather than for the claim set as a whole. However, from the marks awarded for the amendments, marks were deducted for non-compliances with the EPC or unnecessary limitations. The overall number of marks *per claim* cannot be negative.

Letter of reply: Max. **70** marks, min. **0** marks.

Unless otherwise stated, the individual marks referred to in the various sections of this report apply to the example set of claims.

Although the marking scheme is divided into separate sections, such as the marks awarded for amendments to the claims and marks awarded for argumentation, the answer paper as a whole is considered and the scheme reflects this.

2. Example claim set

See Section 10 for an example set of amended claims. In the marked-up version of this example set of claims which follows, the starting point is the client's draft claim set (underscoring and ~~strike through~~ show where amendments add and ~~delete~~ text, respectively).

1. Electrical connector (1) for connecting to an insulated cable (C) having a sheath of insulating material and an electrical conductor, the electrical connector (1) comprising:

a) a body (2) comprising a front wall (4), two side walls (6), a rear wall (8), and a bottom wall (10);

b) a cover (12) for closing the body (2) when the cover (12) is in a closed position;

c) a hinge (14) arranged along the front wall (4) of the body (2) and connecting the cover (12) to the body (2);

d) an electrical contact element (20) having a pin contact (22) and blades (24) for cutting the sheath, the pin contact (22) protruding out of the body (2) and the blades (24) being disposed in the body (2);

e) wherein the cover (12) comprises a guide (30) for guiding the insulated cable (C), the guide (30) having a straight tube (32) and a stop (34), the straight tube (32) being orientated towards the hinge (14);

f) the connector (1) being configured so that, when the cover (12) is in the closed position and the insulated cable (C) is located in the straight tube (32) and abuts against the stop (34), the electrical conductor of the insulated cable (C) is in electrical contact with the blades (24); characterised in that ~~the pin contact (22) protrudes out of the front wall (4) or out of the bottom wall (10) of the body (2) and in that~~

g) the stop (34) is disposed between the straight tube (32) and the hinge (14).

~~2. Electrical connector (1) according to claim 1,the connector (1) being preferably configured so that, when the cover (12) is in the closed position and the insulated cable (C) is located in the straight tube (32) and abuts against the stop (34), the electrical conductor of the insulated cable (C) is in electrical contact with the blades (24)~~.

2.~~3~~ Electrical connector (1) according to claim 1, wherein an opening of the straight tube (32) is funnel-shaped.

3~~4~~. Electrical connector (1) according to claim 1 or 2, wherein the stop (34) comprises ~~an insulated cable (C) is received in~~ a blind hole (36) for receiving the insulated cable (C).

4. Electrical connector according to any of claims 1 to 3, wherein the pin contact (22) protrudes out of the front wall (4) of the body (2).

Notes:

1. This example claim 1 comprises the device features of original claim 1 (features a) – e)), original claim 2 (feature f)), and feature g) is derived from the second part of original claim 3, the description par. [007], Figs. 3,4.

2. The feature f) which is proposed by the client narrows the scope unnecessarily ("the pin contact protrudes out of the front wall") and introduces added subject matter ("protrudes out of the bottom wall"). The amended feature f) rectifies these problems by removing the client's features. Furthermore, the amended feature f) renders the claim new with respect to D2, since the electrical connector described in D2 is configured differently – if an insulated cable were to be located in the straight tube and abut against the stop, with the cover closed the cable would clearly not be in electrical contact with the blades.

3. Feature g) is the amendment made by the client to render the claim new with respect to D1.
4. Full marks could also be obtained with a different wording. A single independent claim was expected.

3. Expected amendments to the draft claim set

The draft set of claims from the client contains features which result in a claim, or claims, which do not conform to the EPC. Marks were awarded for making appropriate amendments to the draft claim set to bring it into conformance with the EPC and to best satisfy the wishes of the client.

No marks *are awarded for merely filing the client's draft set of claims.* Amendments that differ from those of the example claim set can still earn full marks provided the scope of the claims is comparable. This is considered on a case by case basis. In such cases the marks awarded for the dependent claims are adapted correspondingly.

Examples:

- An electrical connector comprising the features of claim 1 of the example claim set but instead of the feature g), the alternative wording: "*the electrical connector (1) is configured so that, when the cover (12) is an open position, an insulated cable (C) can be guided through the straight tube (32) towards the hinge (14) until it abuts against the stop (34), which prevents the insulated cable from reaching the hinge*." Such a functional definition is allowable and renders the claim novel over D1, so could attract full marks. Functional device features with different wording however had to be clear (Art. 84 EPC) and originally disclosed to attract full marks.

- An electrical connector comprising the features a) to e) and g) of claim 1 of the example claim set but instead of the feature f), the alternative wording: "*the stop is between the hinge and the blades when the cover is in the closed position"*. Argumentation would be necessary to explain where this feature was originally disclosed and that it is clear.

The following amendments were expected with respect to the client's draft claim set (note: full marks for renumbering/deleting claims could be achieved by any self-consistent claim set):

3.1 Claim 1

For removal of the client's feature (f): "*the pin contact protrudes out of the front wall .. of the body*" **5 marks** were available. For removal of the client's feature (f): "*the pin contact protrudes out of the .. bottom wall of the body*" **3 marks** were available. For adding the features of claim 2 (new feature f), **10 marks** were available, subject to the term "*preferably*" being deleted.

3.2 Claims 2 and 3

Deletion of claim 2 and renumbering claim 3 as claim 2 (**1 mark**).

3.3 Claim 4 (new claim 3)

For removal of the wording "*an insulated cable is received in a blind hole*", **3 marks** were available. For adding the feature that "*the stop comprises a blind hole for receiving the insulated cable*", **3 marks** were available.

3.4 New Claim 4

For adding a claim to the feature "*the pin contact protrudes out of the front wall of the body*" (this feature having been removed from the client's claim 1) **5 marks** were available.

4. Claims differing from the example set of claims

Note: The overall number of marks per claim cannot be negative.

4.1 Unnecessary limitations

Where an independent claim (claim 1) of an answer paper differs from that of the example solution and results in a claim which is considered to be inappropriate for protecting the client's invention, for example because it does not give the applicant the broadest possible protection for their invention, it may not receive full marks for the amendments.

4.1.1 For an *independent* claim of an answer paper having one or more additional features that were considered to limit the claim unnecessarily, then **3 marks** per unnecessarily limiting feature are deducted from the total marks awarded for the claims.

Example:

Claim 1 according to the example claim set, with the additional feature that *the pin contact projects from the front wall (or bottom wall) of the connector body* (**-3 marks**).

4.1.2 For a *dependent* claim of an answer paper having one or more additional features that were considered to limit the claim unnecessarily, then **2 marks** per unnecessarily limiting feature per claim are deducted from the total marks awarded for the claims.

4.2 Non-conformity with EPC

Claim sets which have been amended so that they differ from the client's draft set of claims, but which result in claims which do not fulfil the requirements of the EPC, e.g. because they result in an unclear claim, do not receive full marks for the amendments.

4.2.1 For an *independent* claim of an answer paper not fulfilling the requirements of the EPC, e.g. due to lack of novelty, added subject matter, or lack of clarity, up to **3 marks per issue** are deducted from the total marks awarded for the claims.

Examples:

(i) An electrical connector comprising the features a) to g) of claim 1 of the example claim set but with the term "*preferably*" retained in feature f) is not new vis à vis D2.

(ii) An electrical connector comprising the features a) to e) and g) of claim 1 of the example claim set (ie lacking the feature f)) lacks novelty over D2. As the examiner's communication states in point 2.1, the guide in D2 is suitable for guiding the insulated cable, thus D2 is novelty destroying for the original claim 1 (in this regard, see the Guidelines for Examination at the EPO, F-IV 4.13). Some claims of answer papers, whilst lacking feature f), included additional structural features of the connector derived from claim 3 or para. [007] of the description (eg "*the connector is configured such that the cable is guidable through the straight tube towards the hinge*"), however, such claims were generally still not novel over D2. It is pointed out that even if an insulating cable were connected in the connector in the proper, intended manner (ie one end of the cable attached to the connector by being on the blades etc), the *other end of the cable* would be free and *could* be inserted in the guide intended for the screwdriver.

(iii) "*The straight tube (32) guides the insulated cable (C) towards the hinge (14) until it abuts against the stop (34), which prevents the insulated cable from reaching the hinge.*" This feature is unclear as it formulated as a method step.

(iv) The feature "when the cover is in an open position, *the straight tube (32)* is configured to guide the insulated cable towards the hinge (14) until it abuts against the stop (34), which prevents the insulated cable from reaching the hinge." This formulation is unclear since the *electrical connector* is configured so that, when the cover (12) is in an open position, an insulated cable (C) can be guided through the straight tube (32) towards the hinge (14) until it abuts against the stop (34), which prevents the insulated cable from reaching the hinge.

(v) "*The stop serves to position the cable relative to the blades."* This merely states the desired result to be achieved and lacks clarity, it being possible to define the invention in terms of structural device features.

(vi) A claim including a feature stating that the "*insulating cable is located in the straight tube*" lacks clarity as the insulating cable is not part of the electrical connector and this relates to the use of the electrical connector.

(vii) A claim where feature e) is amended as follows: "*a guide ~~for~~ guiding the insulated cable*". This is a method feature.

(viii) The feature "*The pin contact projects from the bottom wall of the connector body*" infringes Art. 123(2) EPC.

4.2.2 For a *dependent* claim of an answer paper not fulfilling the requirements of the EPC **2 marks per issue** are deducted from the total marks awarded for the claims.

Example:

The client's claim 4 lacks clarity and should be clarified. The following dependent claim 4 still lacks clarity: "*Electrical connector according to claim 1 wherein an insulated cable is received in a blind hole of the electrical connector".* The insulated cable is not a part of the electrical connector.

4.3 Formal matters (up to -2 marks)

For an answer paper having an independent claim according to the example solution it is considered appropriate to use the two-part form.

Examples:

- An independent claim having a one-part form, or a two-part form of claim which is not consistent with any single prior art disclosure, loses **1 mark** from the total marks awarded for the amendments.

- For missing or very incomplete reference signs in the claims, **1 mark** is lost.

4.4 Solutions not based on the client's draft claim set

4.4.1 The client provides a draft claim set that she proposes for filing, subject to any necessary amendments for fulfilling the requirements of the EPC, whilst giving her the broadest possible protection. Answer papers which have claim sets not based on the draft claim set are not considered likely to be in the interest of the client and such claims may therefore receive fewer or no marks.

4.4.2 For a claim directed to an assembly of an electrical connector and an insulated cable, no marks were available because the client stated that she was only interested in protection for the electrical connectors.

4.4.3 *Additional dependent* claims were not expected.

4.4.4 For *amendments to the description*, no marks are available.

5. Letter of reply to the EPO (up to 70 marks available)

5.1 General remark

It is noted that the examples for sections of a letter of reply given in the following are, unless otherwise stated, appropriate for the example claim set. For an answer paper having a different claim set, the letter of reply may differ and the answer paper is considered accordingly.

No marks are available for

- a letter to the applicant
- a letter to the marker (eg with justifications for choosing particular features)

All the necessary information should be contained in the letter of reply to the EPO.

5.2 Source of amendments showing Art. 123(2) EPC compliance (up to 24 marks)

The amendments made in the claims are to be identified and a basis for them in the application as filed is to be indicated. Brief explanations may be necessary. For an answer paper having claims which differ substantially from the example claim set, full marks could be awarded in this section, this being considered on a case-by-case basis.

5.3 Claim 1 (18 marks)

For indicating and explaining a basis for claim 1, **18 marks** were available. For the example claim 1, these marks were awarded according to the following scheme:

Basis for features a) to e) (**2 marks**)

Basis for feature f) "*the connector (1) being configured so that, when the cover (12) is in the closed position and the insulated cable (C) is located in the straight tube (32) and abuts against the stop (34), the electrical conductor of the insulated cable (C) is in electrical contact with the blades (24)*" (**4 marks**).

For explaining the basis for the addition of feature g) "*the stop is disposed between the straight tube and the hinge*" (**6 marks).**

For explaining the basis for introducing only the second feature of original claim 3 in the absence of the first feature thereof that "*the pin contact protrudes out of the front wall of the body*". (**6 marks**)

Example:

Features a) – e)
In the new claim 1 features a) – e) correspond to features a) – e) of claim 1 as originally filed. (**2 marks**)

Feature f)
Original dependent claim 2 has been incorporated into claim 1 as feature f), namely "*the connector (1) being arranged so that, when the cover (12) is in the closed position and the insulated cable is located in the straight tube (32) and abuts against the stop (34), the electrical conductor of the cable is in electrical contact with the blades (24)",* whereby the term "*preferably*" has been deleted. (**4 marks**)

Feature g)
The wording *"the stop (34) is disposed between the straight tube (32) and the hinge (14)"* is supported by the method feature in original dependent claim 3, namely "*wherein with the cover in an open position an insulated cable (C) is fed into the guide (5) by feeding it through the straight tube (8) towards the hinge (6) until it abuts against the stop (9) which prevents the insulated cable from reaching the hinge (6)"* which although formulated as a method feature implies the device feature that the stop is attached to the cover between the straight tube and the hinge (**4 marks**). This is also supported by the description, par. **[007]**, page 3, lines 1-4 and Figs. 3, 4 where the above sequence is unambiguously described and shown (**2 marks**).
The feature "*the pin contact projects from the front wall (4) of the connector body (2)*" of original dependent claim 3 is however not included in the new claim 1. Splitting of the features of original claim 3 is allowable in the sense of the Guidelines H-V, 3.2.1. In this regard:

- the feature relating to the relative positions of the stop, straight tube and hinge is not related to or inextricably linked to the non-included feature;

- the removal of the feature from the embodiment passes the three-point ("essentiality") test described in H-V 3.1; and

- the overall disclosure justifies the generalising isolation of the included feature and its introduction into claim 1.

Regarding the above-mentioned three-point test, it is clear that the skilled person would directly and unambiguously recognise that:

(i) It is nowhere explained as being essential in the disclosure in pars. [005] – [007] that the pin contact protrudes from the front wall (**2 marks**);

(ii) the feature is not as such indispensable for the function of the invention in the light of the technical problem the invention serves to solve (viz easier cable insertion) (**1 mark**), because the location of the pin contact and the location of the hinge have entirely different technical effects and the invention can be clearly carried out with a pin contact protruding from a wall other than the front wall; that is, the configuration of the connector specified in feature f) and the relative positions of the stop, straight tube and hinge in feature g) do not require a particular position of the pin contact (**1 mark**); and

(iii) the removal of the feature requires no modification of the other features to compensate for the change (**1 mark**). The remaining features of the connector are independent of the feature concerning the contact pin protruding from the front wall and are unchanged by the removal of this feature (**1 mark**).

For an answer paper where the basis for the amendment in feature g) relied only on the description, par. [007] and Figures 3 and 4, and did not refer to claim 3 as filed, full marks could be achieved if it was convincingly argued that leaving out the opening of the straight tube being *funnel-shaped* (par. [007], page 3, lines 11-13) did not constitute a non-allowable intermediate generalisation. When claim 3 as filed is referred to as the source, it can be pointed out that the funnel-shaped opening was clearly separate and optional by virtue of being presented in dependent claim 4 which was dependent on claim 3.

5.4 Dependent claims (up to 6 marks)

6 marks were available for stating correctly and completely the basis for each of the dependent claims of an answer paper.

Basis for dependent claim 2 is found in original claim 4 and whilst that claim was not dependent on original claim 2, whose features are now in claim 1, basis for the combination with the features of claim 1 is found in the description (see par. **[007]**) and Figs. 3 and 4. (**2 marks**)

Basis for dependent claim 3 is found in original independent claim 5 taken together with par. **[007]** and Fig. 3 and 4. (**2 marks**)

Basis for dependent claim 4 is found in original claim 3, supported additionally by par. **[006]** and Figs. 2-4. (**2 marks**)

6. Unity (Art. 82 EPC) (up to 4 marks)

In point 5 of the examiner's communication an objection of lack of unity is raised. A statement and an explanation as to why the new set of claims overcomes this objection were therefore expected. (**4 marks**)

Example:

The objection of lack of unity raised in point 5 of the communication has been overcome by deleting the invention in original claim 5. An electrical connector is now the only invention claimed, therefore the requirement of Art. 82 EPC is now met. (**4 marks**)

7. Clarity (Art. 84 EPC) (up to 4 marks)

The EPO examiner objected to original claim 3 because the feature “an insulated cable (C) is guided...” is a method step in a device claim (see communication, point 3). Furthermore, the examiner objected to original claim 4 because of its dependency on claim 3 (see communication, point 4). Answer papers should have included a response to these issues. This may have been presented in combination with an argument for justifying the basis for the amendment.

Example:

In order to overcome the clarity objection raised in point 3 of the communication, the method step (“*an insulated cable (C) is guided*”) of original claim 3 has been replaced in present claim 1 by the structural device feature g). Consequently, the clarity objection raised in point 4 of the communication with respect to dependent claim 4 (now renumbered as dependent claim 2) due to its dependency on original claim 3 has also been overcome. (**4 marks**)

8. Novelty (up to 6 marks)

The examiner objected to original claim 1 because of a lack of novelty in the light of D1 and D2. It was sufficient to mention a single feature which renders claim 1 novel with respect to D1 and D2.

Examples:

(1) Claim 1 is novel with respect to D1 because D1 does not disclose an electrical connector having a stop which is disposed between a straight tube and a hinge (feat. g)). (**2 marks**)

(2) Claim 1 is novel with respect to D2 because D2 does not disclose an electrical connector which is arranged so that, when the cover is in the closed position and the insulated cable is located in the straight tube and abuts against the stop, the electrical conductor of the cable is in electrical contact with the blades. In this regard, although attached to the cover and suitable for guiding an insulated cable, the straight tube is not suitable for guiding an insulated cable *such that the cable can be connected to the connector*. This condition is not met by the construction in D2. Namely, it can be seen clearly in Figs. 2 and 3 of D2 that if a cable were to be inserted in the straight tube (232) it would stop at the stop (234) which is in front of the insulation-cutting blades (224) and when the cover is closed the electrical conductor of the cable would not be in electrical contact with the blades. On the other hand, although the passageway (215) in D2 does guide an insulated cable and can be considered to be a straight tube, it is not attached to the cover (212). Furthermore there is no stop associated with

the passageway that can function as a stop of a guide in the sense of the amended claim. In this regard the ramp disclosed in D2, although it can be said to guide an insulated cable towards the hinge, is not a stop against which the cable abuts. (**4 marks**)

9. Inventive Step argumentation for the independent claim (up to 32 marks)

It was appropriate to provide arguments which are structured to follow the problem solution approach (see Guidelines G-VII, 5).

9.1 Identifying the closest prior art (7 marks)

In selecting the closest prior art, the first consideration is that it should be directed to a similar purpose or effect as the invention, or at least belong to the same or a closely related technical field as the claimed invention.

9.1.1 Stating the closest prior art (1 mark)

For stating an item of prior art as being the closest prior art in a consistent manner with the two-part form of the independent claim, **1 mark** was available.

For the example independent claim, D1 is considered to represent the closest prior art, since it is directed to a similar purpose as the invention; for a clear statement to this effect, **1 mark** was available.

For a statement identifying D2 as closest prior art, no marks have been awarded

9.1.2 Arguments justifying the choice of the closest prior art (6 marks)

Discussing D1 (**3 marks**); discussing D2 (**3 marks**).

Example for the example independent claim:

Both D1 and D2, in common with the application, describe an electrical connector having an electrical contact element comprising a pin contact and blades for cutting the sheath of insulating material, as well as a hinged cover, the latter causing the cable to be pressed between the blades when it is moved to the closed position.

D1, like the present application, describes a cover comprising guide with a straight tube configured such that an insulated cable which has been inserted in the straight tube and abuts against a stop is electrically connected to the connector when the cover is in the closed position (see par. **[004]**). This arrangement implicitly provides the precise positioning of the insulated cable relative to the blades, which is stated in the application as filed as being its objective (see pars. **[002]** and **[003]** of the application). Furthermore the cable connectors of D1 and the application have in common the feature that the cable is released from the blades when the cover is opened, making removal of a cable easier (see par. **[008]** of the application and par. **[006]** of D1). (**3 marks**)
In the connector known from D2, in common with the application, the cover is hinged along the front wall of the body. In contrast, D2 discloses that the cable is fed, not into the cover, but into the bottom of the connector body (202)

through a passageway (215) in the rear wall (208) of the body (see par. **[005]** of D2). The cover has a guide with a straight tube and a stop but the guide does not have the function of *guiding the cable* to a position above the blades. Instead, the guide is provided for inserting a screwdriver to help close the cover (see par. **[005]**). That is, D2 does not disclose the feature of claim 1 that the connector is configured so that, when the cover is in a closed position and the insulated cable is located in the straight tube and abuts against the stop, the electrical conductor of the insulated cable is in electrical contact with the blades. Although it is clearly not the intended use in D2, the straight tube being capable in theory of guiding an insulated cable, it is clear from the description of the function of the electrical connector of D2 and especially Figs. 2 and 3 that this straight tube is not in a position suitable for attaching the cable to the cable connector using the blades as defined in the amended claim. In the electrical connector of D2 the cable is not removed from the blades when the cover is opened, thus D2 lacks a further feature (easy cable removal) that is common to the application and D1. The passageway and the ramp on the bottom wall of the body serve to guide an insulated cable to the required position above the blades but there is no precise positioning of the cable. Thus D2 is not considered to be the most promising starting point for arriving at the invention. (**3 marks**)

Thus D1 is closer in function to the invention and shares the most features with the present application and represents the most promising starting point for arriving at the invention.

9.2 Formulation of the objective technical problem (7 marks)

The next stage is to establish in an objective way the technical problem to be solved.

This requires the steps of:

(1) identifying, in terms of features, the difference between the claimed invention and the closest prior art, i.e. the distinguishing features of the claimed invention (**1 mark**);
(2) stating the technical effects or the advantages of the difference (**3 marks**); and
(3) formulating a problem which is solved by these technical effects (**3 marks**).

Example:

D1 lacks the following feature of claim 1: "*the stop is disposed between the straight tube (32) and the hinge (14)".* In contrast, in D1 the straight tube is arranged between the stop and the hinge. (**1 mark**)

In other words, whereas in D1 the hinge is provided at the end of the connector body of the connector where the cable is fed in (viz cable fed away from hinge), in the invention the hinge is provided at the end opposite to the end where the cable is inserted (viz cable fed towards hinge). The insertion of the insulated cable in D1 requires the end of the cable to be bent beforehand, which is an additional step (see par. **[004]**).

The technical effect of the difference is that the cover, being hinged at the opposite end from that where the cable is fed in, has a greater separation from the connector body at that point, allowing a cable to be inserted without bending the end of cable. Thus the insertion of the cable is made easier. (**3 marks**)

The technical problem as originally presented in the application was to provide an electrical connector whereby precise positioning of the cable is facilitated (see par. **[003]**). It is appropriate to reformulate the technical problem in view of the prior art of D1.

The objective technical problem can be deduced from the application as filed by a skilled person in the light of the prior art (see Guidelines G-VII, 5.2) as follows: The objective technical problem is how to improve the insertion of an insulated cable in an electrical connector with insulation cutting blades of the type having a hinged cover with a cable guide for precise positioning of the cable. (**3 marks**)

Marks could be redistributed accordingly between the formulation of the effect/advantages of the invention and the formulation of the problem as long as they have been consistent overall.

9.3 Arguments in support of inventive step (18 marks)

Arguments should support the features of the independent claim. They should be convincing and well structured. In order to obtain full marks in this section, arguments which fully answer the question as to why the skilled person, knowing the teaching of the prior art as a whole, would not arrive at the claimed subject matter had to be presented. Such arguments can be structured to consider the following aspects:

- Would the skilled person arrive at the subject matter of the claim by considering the teaching of the closest prior art on its own?
- Would the skilled person consider combining the teaching of the closest prior art with that of other prior art documents in order to solve the objective technical problem?
- If the skilled person were to combine the teaching of the closest prior art with other items of prior art, would they arrive at the subject matter of the claim?

9.3.1 Considering D1 on its own (6 marks)

It is arguably a normal problem to make the cable connection easier in the field of electrical cable connectors and the formulation of this problem thus cannot in itself contribute to an inventive step. However, the solution set out in amended claim 1 is not obvious to the skilled person in view of the cited prior art.

The problem is not recognised in D1.

The skilled person would not consider reversing the direction of hinging of the cover. If the skilled person was faced with problem of improving cable insertion, he/she would probably consider one or more of the following measures:

- Adapting the straight tube (making the diameter larger, adjusting the funnel-shaped end) or the size/shape of the protrusions

- Increasing the distance between the hinge and the blades.

On the other hand, since the gripping protrusions are provided close to the hinge in D1 (emphasised in D1, par. **[004]**), the skilled person would not consider having the hinge in a different position where the protrusions could not grip the cable.

Arguably the skilled person faced with the above-mentioned problem might not be motivated to redesign the connector of D1 but would try an alternative way of attaching the cable, such as partially inserting the unbent cable into the opening in the rear wall of the connector with the cover nearly closed, followed by opening the cover to insert the cable fully as far as the stop, and finally closing the cover to make the electrical connection between the blades and the conductor of the cable. This alternative mounting method may avoid the necessity of redesigning the D1 connector.

9.3.2 Considering D1 in combination with D2 (12 marks)

D2 relates to a cable connector having the connector body and cover hinged at the first end of the connector body. However, there is no mention of the above-mentioned problem of easier cable insertion caused by the need to pre-bend the cable. Moreover, D2 does not provide precise positioning of the cable. In this regard D2 teaches to provide a cable guide in the form of (i) passageway in the rear wall of the connector body and (ii) a ramp on the bottom wall of the connector body, the cable sliding over the ramp and being (bent) deflected above the blades as it is inserted to the required position in preparation for the step of closing the cover and forcing the cable onto the blades. Thus, although the cable is not bent in D2 prior to inserting it, the cable is bent inside the connector body. This may provide for easier insertion of the cable, but without precise positioning of the cable. Thus D2 leads away from the application and the skilled person would not consider it when trying to solve the above-mentioned technical problem.

Even if the skilled person starting from D1 and addressing the problem of easier cable insertion were to look to D2, he/she would not arrive at the claimed subject matter for the following reasons. He/she would consider having a ramp on the bottom wall of the connector body of D1, which avoids having to pre-bend the cable, and would have no motivation to more extensively modify the D1 connector by moving the hinge to the front wall of the connector body and reversing the positions of the straight tube and stop of the guide. D2 may teach having the connector body and cover hinged at the front wall of the connector body but it teaches this in combination with feeding the cable into the body and having no stop for precise positioning. Thus a combination of D1 and D2 would not lead to the present invention.

D2 does by coincidence have a guide on the cover having a straight tube and a stop but this is for a screwdriver and the skilled person would consider this to be a guide for an insulated cable only with hindsight knowledge of the invention. Anyway, even if the examiner’s point of view that the size of the straight tube of

the screwdriver guide in D2 might be suitable for inserting an insulated cable were to be accepted, so that at least in theory a cable could be accidentally inserted into it as far as the stop, it is submitted that the screwdriver guide is completely unsuitable for connecting an insulated cable to the connector for at least the following two reasons. Firstly, as is clear from Fig. 3, the stop (234) serves to prevent a cable inserted into the guide (230) from reaching a position where, when the cover is closed, the blades (224) can cut through the sheath of the cable. Secondly the screwdriver guide in D2 is vertically so far spaced from the blades that closing the cover could not possibly bring a cable in the screwdriver guide down onto the blades (Fig. 3). In fact, since in D2 the hole for the screwdriver guide in effect occupies the position on the cover in D1 used for the cable entry, the skilled person contemplating a combination D1 and D2 would have to redesign the connector to find a suitable new position for the screwdriver guide in addition to the cable guide on the cover (or he/she would have to abandon the idea of using a screwdriver to close the connector) and this would further deter the skilled person from arriving at the inventive combination of features.

Furthermore, in the D1 connector, the gripping protrusions (150) which press onto the insulation of the cable to anchor the cable when the cover is closed are specifically provided close to the hinge to obtain the advantage of the increased lever effect (par. **[005]**). Thus, if the cover opening direction were to be reversed as proposed in D2, this advantage would clearly be lost. The connector would have to be redesigned to position the protrusions elsewhere. This would further deter the skilled person from combining D1 and D2.

Thus in summary although the skilled person could combine the teachings of D1 and D2, he would not do so in a way which results in the claimed cable connector. To conclude that he would do so, extracting features piecemeal from the two documents to arrive at the claimed invention, can only be achieved using ex post facto analysis.

It is concluded that the invention defined in claim 1 involves an inventive step.

All the other claims are dependent on claim 1 and therefore also relate to inventive subject matter.

It was not expected that candidates provided all the above-listed arguments. With a convincing reasoning comprising many of the above-listed arguments full marks could be achieved. On the other hand the above-listed arguments are not exhaustive and other convincing arguments could attract marks.

10. Example set of claims

1. Electrical connector (1) for connecting to an insulated cable (C) having a sheath of insulating material and an electrical conductor, the electrical connector (1) comprising:

    a) a body (2) comprising a front wall (4), two side walls (6), a rear wall (8), and a bottom wall (10);

    b) a cover (12) for closing the body (2) when the cover (12) is in a closed position;

    c) a hinge (14) arranged along the front wall (4) of the body (2) and connecting the cover (12) to the body (2);

    d) an electrical contact element (20) having a pin contact (22) and blades (24) for cutting the sheath, the pin contact (22) protruding out of the body (2) and the blades (24) being disposed in the body (2);

    e) wherein the cover (12) comprises a guide (30) for guiding the insulated cable (C), the guide (30) having a straight tube (32) and a stop (34), the straight tube (32) being orientated towards the hinge (14);

    f) the connector (1) being configured so that, when the cover (12) is in the closed position and the insulated cable (C) is located in the straight tube (32) and abuts against the stop (34), the electrical conductor of the insulated cable (C) is in electrical contact with the blades (24);

    characterised in that

    g) the stop (34) is disposed between the straight tube (32) and the hinge (14).

2. Electrical connector according to claim 1 wherein an opening of the straight tube (32) is funnel-shaped.

3. Electrical connector according to either of claims 1 or 2, wherein the stop (34) comprises a blind hole (36) for receiving the insulated cable (C).

4. Electrical connector according to any of claims 1 to 3, wherein the pin contact (22) protrudes out of the front wall (4) of the body (2).

EXAMINATION COMMITTEE I

Candidate No. _____

Paper B (Electricity/Mechanics) 2014 - Marking Sheet

Category		Maximum possible	Marks awarded	
Claims		30		
Arguments	Basis for Amendments	24		
	Unity	4		
	Clarity	4		
	Novelty	6		
	Inventive Step	32		
Total		100		

Examination Committee I agrees on ..... marks and recommends the following grade to the Examination Board:

☐ PASS (50-100)

☐ COMPENSABLE FAIL (45-49)

☐ FAIL (0-44)

24 June 2014

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Chairman of Examination Committee I