EUROPEAN QUALIFYING EXAMINATION 2025

Examiners' Report – Paper B

Purpose and extent of the examiners' report

The Examiners' report sets out one expected solution, explains why this solution was expected, and shows how the marks were distributed for this solution. In addition, it highlights some of the most common mistakes and explains which deductions were made for these mistakes.

The purpose of the present examiners' report is to enable candidates to prepare for future examinations (cf. Article 6(6) of the Regulation on the European qualifying examination for professional representatives).

1. General considerations

It is noted that any references in this text to the Guidelines for Examination at the European Patent Office (GL) refer to the version valid at the date of the examination according to Rule 22(1) REE.

1.1. Introduction

The present invention according to Paper B 2025 relates to a magnetically coded locking system having a magnetic key and a reading appliance which reads the locking code of the magnetic key and which is used to electrically operate a latch.

As described in paragraph [002] of the application, it is generally known to use a magnet acting as a key to magnetically operate a magnetic switch. When the magnet acting as a key is introduced in the housing, two contacts of the switch are attracted to each other. This creates a conductive electrical pathway between two terminals of the switch, thereby closing it. When the key is taken out of the housing, spring forces of the two contacts let them separate. Hence, the electrical path between the two terminals is broken and the switch is then open again. This arrangement can then be used together with another electrical circuitry to lock or authorize the access to a device.

This type of locking system is very simple and effective. However, it is also very easy to tamper with the locking device as any kind of magnet strong enough and brought in proximity to the magnetic switch can actuate it. This may lead to unauthorized access to the device.

Therefore, the object of the disclosed invention in the application is to provide a novel access control system that allows an authorized individual access to a locked or deactivated device and which improves the security of a locking system.

1.2. The invention as presented in the application as filed

The application as filed initially claims two different main embodiments. Firstly, a locking system comprising an elongated key with magnets, a housing, one or a plurality of magnetic field detectors, an actuatable latch and an electronic circuit (independent claim 1). Secondly an access system comprising a portable keycard with magnets, a housing, a sensing circuit with at least one Hall-effect transducer, an actuatable latch and an electronic circuit (independent claim 7).

1.3. The prior art

In the examination report three documents according to Article 54(2) EPC are cited against the application: D1 (DE123321A), D2 (EP987789A1) and D3 (US45653223A).

D1 is directed to an electrical switching apparatus having a test function which may only be activated by an authorized user which is in possession of an appropriate magnetic tool, i.e. a magnetic key. As in the application, it also aims at improving the security of the authorized activation by using a more complicated geometry for the key- shape and by using several magnets and detectors.

D2 is directed to improvements in keycards including magnets and of related locks, where the introduction of the keycard into the lock provides a signal related to a combination of magnetic poles of the magnets that is used to actuate a latch of the lock. The keycard includes a body having a set of recesses in which respective magnets are positioned or that can be left empty. Once a configuration of magnets positioned in the recesses is chosen, the keycard is built by sliding and fixing the body into a lid. The related lock is adapted to receive the keycard and includes magnetic sensors (for instance Hall-effect transducers) in correspondence to the recesses of the keycard. Based on the signals generated by the sensors a code is generated. This code is compared with a pre-established combination and a latch is activated accordingly.

D3 is directed to a contactless switching device which can be used to start/open or stop/lock a vehicle or apparatus. D3 discloses two main embodiments, the first one in the form of an arrangement using a push-button, the second one in the form of a rotary switch. The push-button embodiments disclose a contactless switching device which uses one magnet and several transducers or alternatively one transducer and several magnets in order to detect different positions of the push-button. The rotary switch embodiments comprise several transducers and several magnets while fewer transducers than magnets are used.

1.4. The communication

The examining division raised an objection of lack of novelty of the subject-matter of independent claim 1 with respect to D1 and D3 and of the subject-matter of claim 7 with respect to D2.

Furthermore, it was also stated that the subject-matter of dependent claims 2 (D3), 3, 4 (D1), 8, 9 (D2) lacks novelty.

The examining division also raised an objection of lack of clarity (Art. 84 EPC) against the subject-matter of claims 7 and 11 due to an inconsistent use of Hall-effect transducer and magnetic field detector. An objection against claim 10 was also made due to the use of the term “substantially”.

The examining division provided also some comments concerning the subject-matter of claim 5 and claim 6 being dependent on claim 5 as well as claim 10 and claim 11 being dependent on claim 10 by stating that they would appear to be patentable. However, the examining division also expressed the view that the allowable claims might then be directed to a non-unitary set of claims.

1.5. The client’s letter

The client proposed a set of claims attempting to address most objections raised by the examining division. However, the proposed independent claims are not satisfying for the client as they are too limited in relation to its needs as the whole production of locking and access system is focused on the serial reading aspect which is having a great commercial success due to the reduced cost of having fewer magnetic detectors. The embodiments with consecutive magnets having different polarities or with magnets of different strength are of secondary importance for the client.

The client also indicated that it was not wished to file a divisional application nor adding additional dependent claims.

1.6. The draft set of claims

The client files two independent claims by combining original claim 1 with claims 5 and 6 as well as by combining original independent claim 7 with claims 10 and 11 thereby covering the two main embodiments for the locking system based on the key and the access system based on a keycard.

By doing so the draft set of claims would have been patentable according to the comment of the examining division and would be potentially unitary due to the common subject-matter of original claims 6 and 11.

However, as mentioned in the client's letter, this solution is too limited for the client. Furthermore, the objections under Art. 84 EPC were not solved and the client has forgotten part of original claim 11 in new independent claim 5. Furthermore, the client has forgotten to renumber the new claims dependent on new claim 5 and to add reference signs in them.

1.7. The challenges of the paper

The main challenges of the paper were to:

a) draft a claim set fulfilling the requirements of the EPC whilst conforming to the client's wishes

b) write a reasoned letter of reply

- explaining the basis for the amendments of the claims

- providing convincing arguments that the claims are clear and the amended independent claim is new and involves an inventive step in the light of the cited prior art. A justification concerning unity of the set of claims was also expected in view of the communication of the examining division and the fact that two independent claims were present.

It was expected that the candidate on one hand combines original claim 1 with the additional features of claim 6, leaving claim 5 as a dependent claim and on the other hand that the candidate combines original independent claim 7 with the additional features of claim 11, here also leaving original claim 10 as a dependent claim. For isolating original claim 6 from claim 5 and original claim 11 from claim 10, basis for the intermediate generalisation (GL, H-V, 3.2.1) is provided in the description (paragraphs [020], [025]).

An inconsistent terminology had also to be removed in new claim 6 ("Hall-effect transducer" vs "magnetic field detector") and an incorrect dependency had to be amended in new claims 7-10. All modifications of the original claims had to be discussed in the letter of reply and basis had to be provided. Furthermore, new claim 9 had to be amended to solve the objection concerning "substantially" (GL, F-IV, 4.7) in relation with paragraph [024].

Reference signs had also to be introduced in new claims 7 and 8.

1.8. 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.

Again, this year, not the claim set as a whole but the amendments carried out as compared to the client's proposal received marks. From the marks awarded for the amendments of a claim, marks were deducted for further unnecessary limitations or for introducing in the claim further non-compliances with the EPC. For instance, a claim that was not novel over the prior art after amendment was awarded no marks, i.e. it had all of the marks gained deducted. If however a non-compliance was already present in the claim of the client and was not remedied by the candidate by amendment (e.g. claim 6 which contravened Art. 84 EPC because of the inconsistency of the terminology used by the client was not modified), the claim was only penalised by not receiving the marks for the expected modification, without further deductions (e.g. for infringing Art. 84 EPC) so that no double penalisation was applied. The overall number of marks for the independent claims as a group could not be negative. The same applies for the dependent claims as a group. It is noted that deductions could also be made from the total marks awarded to the claim set in case the candidate worsened the client's positions in other ways, e.g. by introducing a deficiency or an unnecessary limitation in a claim that was not modified by the client.

As in previous years, the number of available marks corresponds to the difficulties of each challenge or the complexity of the expected amendment. In other words, more difficult challenges were awarded more marks than easier challenges.

For the argumentation in the letter of reply: Max. **70** marks and min. **0** marks were available. A large share of these marks was available for the inventive step argumentation.

No marks were available for formulating a letter to the client setting out reasons why the claim set proposed by the client was further amended.

Unless otherwise stated, the individual marks referred to in the various sections of this document apply to the example set of claims. Marks were only deducted once for the same error and thus no double penalisation is to be applied.

2. Example set of Claims

See APPENDIX.

It is noted that it is not expected that the candidates file both a clean and a marked up set of claims. A marked up copy is sufficient and eases the marking of the candidate's paper.

3. Expected amendments in the claims (up to 30 marks available)

The draft set of claims proposed by the client contains features which result in a claim, or claims, which are considered not to be consistent with the EPC and which do not fulfil the wishes as expressed in the letter. Marks were awarded for making appropriate amendments to the draft set of claims for bringing it into accordance with the EPC.

No marks were awarded for merely filing the claim set proposed by the client or for the formulation of additional dependent claims.

Apart from any claims explicitly requested by the client, drafting additional claims was not expected. The client stated in the last sentence of paragraph [004] of its letter that it expects no further dependent claims.

It is noted that full marks could be awarded for amendments that differ from those of the example claim set, provided that their scope is equivalent. This is considered on a case-by-case basis. Marking of the dependent claims was adapted accordingly.

In general, a claim that contains alternatives, preferred or optional features is assessed based on the worst alternative. However, when both independent claims were merged into one claim covering both alternatives (key and keycard) this claim was assessed by looking at each alternative separately as well as their relationship with the dependent claims.

3.1. Independent claims 1 and 6 (max. 21 marks)

- Removing the additional features of original claims 5 and 10 from claims 1 and 5 of the proposal of the client in the context of keeping the additional features of claims 6 and 11 (**5 marks** for each independent claim, i.e. **10 marks** in total);
- Reinstating the missing feature of original claim 11 “and a plurality of magnets pass in proximity of one of the magnetic field detectors” in claim 6 (**5 marks**);
- Using two-part form in both independent claims where appropriate (**2 marks**);
- Consistent use of “magnetic field detector”, two times in claim 6 (**4 marks**). If only one of the two occurrences of the “Hall-effect transducer” was amended, only **2 marks** were given. Solving the clarity issue by replacing “magnetic field detectors” with “Hall-effect transducers” when taking the additional features of original claim 11 was considered to be a more limited solution and attracted **2 marks**.

To summarise, out of the 21 marks for the independent claims, up to 6 marks are allocated to independent claim 1 and up to 15 marks for independent claim 6.

3.2. Dependent claims 2-5, 7-9 (max. 9 marks)

- Amending new claim 9 (not deleting original claim 10) to solve the objection concerning “substantially” (**5 marks**);
- Having a correct numbering and dependency structure, for instance renumbering and adapting the dependencies of new claims 6-9 of the model solution (**2 marks**);
- Introducing reference signs in the set of claims where deemed necessary (e.g. new claims 7 and 8) (**2 marks**).

4. Claims differing from the example claims

4.1. Deductions for too “narrow” claims or inferior solutions

Where an independent claim of an answer paper differed from that of the example solution and resulted in a claim which is considered to be inappropriate for protecting the client’s invention or wishes, marks were deducted. However, an amended claim having the same scope as the proposed solution would not lose marks.

4.1.1. Independent claims

It was expected that the candidates keep the structure with two independent claims as these two claims cover the two main embodiments of the invention and no objection to the presence of two

independent claims was made by the examiner. No marks were deducted for merging original claims 1 and 7 into a single independent claim. In view of the fact that the original claims used a different wording and related to different embodiments such claims had to be carefully assessed regarding **Art. 123(2) and 84 EPC**.

An independent claim that was inappropriately limited, with respect to the client´s wishes and to what could be claimed whilst respecting the requirements of the EPC, was penalised. **3, 5 or 10 marks** per unnecessary limitation and depending on the severity in the independent claim were deducted. There was no double penalisation for the same mistake.

A set of claims which would be new and inventive but would be non-unitary would result into a deduction of **10 marks**.

Leaving the independent claims as provided by the client would be a new and inventive solution but very limited and not good for the client as mentioned in the letter. Hence, such solution would attract **0 mark**.

No penalisation if the candidate uses a more precise formulation concerning the reference to a serial reading of said detectors, e.g. “implement a serial reading of said one or plurality of detectors’ electrical signals”.

Further unnecessary limitations – examples

See below under section 4.2.

4.1.2. Dependent claims

If unnecessary limitations were introduced into the dependent claims, **3 marks** were deducted per unnecessary limiting feature. New dependent claims were not rewarded and did not lead to any deduction if the existing independent or dependent claims were not further limited or rendered unclear.

Deleting the additional features corresponding to some dependent claims, e.g. original claim 5 from the amended set of claims was considered to be inferior as some fallback positions were lost by doing so. For each deletion **2 marks** were deduced in such cases.

The standard interpretation of the expression "substantially differs" is “differs within the measurement precision” or “produced within the technical tolerance of the method used to manufacture” (GL F-IV, 4.7.1). The description, however, defines this term differently in the context of the application (see paragraph [024]). An amendment was thus required to solve the objection of the examiner (introducing the limit of 20%). In addition, this limit is linked with a technical effect (to reliably distinguish different strength of magnetic field) which improves the suitability of the claim as a fallback position.

4.2. Deductions

Marks were deducted if, in addition or in substitution of the expected amendments, the claims were modified so that a new deficiency was introduced.

3 or 5 marks were deducted for each **clarity** issue in the independent claims, depending on the severity.

2 marks were deducted for each **clarity** issue in the dependent claims.

5 marks were deducted for each issue under **Art. 123(2) EPC** in the independent claims.

3 marks were deducted for each issue under **Art. 123(2) EPC** in the dependent claims.

If the set of claims did not encompass the serial reading this was considered to be a serious deficiency as the client wished to have this aspect protected. Such a set of claims would attract a maximum of **10 marks**.

Examples:

Some examples are given below. These examples mostly refer to claim 1 but some of these examples may also apply to the other independent claim. If an issue was present twice, e.g. in both independent claims, only one deduction was done (no double penalisation).

- Introducing in claim 1, in addition to the features of original claim 6, that one specific magnetic field detector is used to detect the sequence of magnets on the row along the axis of the key that passes in proximity of this detector as it is being inserted into the cylinder until fully inserted (from paragraph [018], **3 marks** deducted). This feature is considered partly implicit in the second part of original claim 6 and partly unduly limiting as it requires a full insertion of the key.
- As mentioned in section 1.8 a non novel independent claim attracts **0 marks**.
- Specifying what is detected (polarity, strength) in addition to original claim 6 is considered to be an unnecessary limitation, **3 marks** deducted.
- In case the feature “wherein there are fewer magnetic field detectors than magnets” was not included in independent claim 1 or claim 6 but left as a dependent claim of claim 1 or 6, **5 marks** were deducted as this separation is considered to introduce an unallowable intermediate generalisation (no double penalisation). Although paragraph [019] mentions that the number of magnetic field detectors **can** be reduced, this is to be understood in the context of the whole embodiment starting at paragraph [017] which seeks to improve manufacturing of the locking system by reducing the number of components.
- Introducing in claim 1 that a specific magnetic field detector is positioned at the entrance to the passage of the cylinder so that no further downstream magnetic field detectors are required (paragraph [018]). Unnecessary limitation, **5 marks** deducted.
- Deleting one of the independent claims without trying to claim both embodiments in the remaining independent claim (i.e. without the merging mentioned above) or without arguing additionally why the remaining independent claim covers both embodiments. This is considered to be a severe limitation, **10 marks** deducted. This had also consequences in the argumentation part.

- Introducing in claim 1 that the locking system comprises only one magnetic field detector, **5 marks** deduced.
- Deleting in claim 1 that there might be several magnetic field detectors in the claimed system. Although in view of the open wording of the claim several detectors are not excluded, this deletion could be seen as loss of a fallback position. Unnecessary, **3 marks** deducted.
- Introducing in claim 1 only the second part of original claim 6, while keeping the first part ("wherein there are fewer magnetic field detectors than magnets") in an amended dependent claim is not considered to have a basis in the original application. **5 marks** deduced. The same applies to new claim 6. In addition, if the first part was not kept as a dependent claim, **3 marks** were additionally deducted as the client's letter mentioned that it was interested in the reduced cost of having fewer magnetic field detectors. It is also noted that such a solution would require a different line of argumentation with regard to inventive step.
- Introducing in new claim 9 not only that the magnetic field of at least one of the plurality of magnets differs in strength from another one of the plurality of magnets by at least 20% but in addition that it is "in order that the magnetic field detector can reliably distinguish the different strengths" was considered unnecessary. **2 marks** deducted.

4.3. Formal matters

The section 7 of the communication requested that the new set of claims should fulfil the requirements of Rule 43(1) and (7) EPC.

For an answer paper having an independent claim 1 according to the example solution it was considered appropriate to use the two-part form, because it was possible to delimitate the two portions based on the closest prior art D3 without having to do a complicated redrafting of the independent claim. The same applies for independent claim 6 according to the example solution with D2 as closest prior art. If a candidate was using a single document, e.g. D3, as closest prior art for both independent claims, it was acceptable to have claim 6 in the one-part form as D3 does not disclose a portable keycard. In such case, the candidate would also get **2 marks** provided that a short explanation is provided in the argumentation part why the two-part form is not considered appropriate. A wrong subdivision of the features in the two-part form caused a deduction of **1 mark**, i.e. if the two-part form was not arranged correctly with respect to any of D1-D3. No two-part form at all was penalised by not getting **2 marks**; however, again if convincing explanations were given in the letter of answer why in the specific case of the solution proposed by the candidate (e.g. different claims than the model solution, another starting point as closest prior art) such a two-part form would not be appropriate the **2 marks** could be recovered in the argumentation part (GL, F-IV, 2.3).

For missing reference signs in other claims than claims 7 and 8, **1 mark** was lost (no double penalisation). It was not expected to add reference signs to claims 2 and 3 as they relate to the shape of the section and not to the discs which are described. However, introducing the reference signs of the discs in the corresponding features in claims 2 and 3 was not penalised as it did help understanding the claims. Reference signs without brackets were penalised with **2 marks** as the missing brackets are against Rule 43(7), first sentence, EPC and could possibly lead to a clarity issue and/or a narrower interpretation of the claim as being a direct reference to the specific embodiment of the corresponding drawing or part of the description.

4.4. Other solutions

As already mentioned, for dependent claims in addition to the dependent claims provided by the client, **no marks** were available, because the client explicitly requested no new, i.e. further, dependent claims are added.

For amendments to the description, **no marks** were available.

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

5.1. General remarks

It was necessary to provide arguments demonstrating that the objections raised by the examining division have been overcome, providing a basis for all the amendments made, and explaining why the subject matter is both novel and inventive.

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 were available for a letter to the client or for a letter to the marker.

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

A total of **70 marks** was available for the arguments. The arguments were assessed on the basis of the actual set of claims submitted. Thus, for example, if additional claims were formulated, a full basis needed to be provided for all the claims. In case of independent claims unduly limited or strongly differing from the expected solution (e.g. not claiming the serial reading aspect against the wish of the client) no full marks were given.

5.2. Basis for the amendments (max. 16 marks)

A full basis had to be provided for all amendments. It was necessary to identify all the amendments made in the set of claims filed as compared to the original set of claims. The basis needed to be provided irrespective of whether the amendment was proposed in the client's letter or is a further amendment to the draft set of claims. Amendments proposed by the client, but which were not present in the set of claims submitted should not be discussed.

Arguments were required if features were combined from different parts of the application. Similarly, if the wording used in the application was modified or if a feature was taken from an example, detailed arguments were needed in support of these amendments.

5.2.1. Explaining amendments and providing basis for independent claims 1 and 6. (10 marks)

- New claim 1 is a combination of original claim 1 and the additional features of claim 6 (**1 mark**).
- New claim 6 is a combination of original claim 7 and the additional features of claim 11 (**1 mark**).
- It is allowable, for new claim 1, to isolate the additional features of original claim 6 from the those of original claim 5 despite the fact that original claim 6 refers back to original claim 5.

These features are not inextricably linked together but on the contrary can be implemented independently of each other. This can be seen from paragraph [016] which mentions the variant corresponding to original claim 5 while paragraph [020] mentions that the methods and variant described above can be used independently or in combination. The last two sentences of paragraph [020] explicitly makes reference to the embodiments corresponding to original claims 5 and 6. Hence there is no unallowable intermediate generalisation. Similarly, for new claim 6, a basis for isolating the additional features of original claim 11 from those of original claim 10 (which corresponds to the variant described in paragraph 24) can be found in paragraph [025] (**6 marks** for both claims together).

- Alternatively, in case the independent claims have been merged, a precise justification was expected and was valued with up to **8 marks.**
- Amending in new claim 6 “Hall-effect transducer” into “magnetic field detector” based on paragraph [010], last sentence, and original claim 11 (**2 marks**).

  Alternatively, in case new claim 6 was consistently using “Hall effect transducer” and not “magnetic field detector” marks were also given if the basis was given, i.e. based on paragraph [023], second sentence together with original claim 7 (**2 marks**).

5.2.2. Explaining amendments and providing basis for the dependent claims. (6 marks)

- Replacing “substantially” with “at least 20%” based on paragraph [024] for amended claim 9 (**3 marks**).
- Renumbering of claims based on original set of claims. Claims 2 to 4 correspond to original claims 2 to 4 with the additional features of claim 6 and without the additional features of claim 5 (basis paragraph [020] and the multiple dependencies of original claims 5 and 6), claims 7 and 8 corresponds to original claims 8 and 9 with the additional features of claim 11 and without the additional features of claim 10 (basis paragraph [025] and the multiple dependencies of original claims 10 and 11). Claim 5 corresponds to original claim 6, Claim 9 corresponds to original claim 11 (**3 marks**).

5.3. Clarity Art. 84 EPC (6 marks)

- Clarity issue concerning Hall-effect transducer in new claim 6 solved e.g. by using consistently either “Hall-effect transducer” or “magnetic field detectors”. (**3 marks**).
- Clarity issue concerning “substantially” in new claim 10 solved by using the definition given in the description at paragraph [024], lines 10 to 11 (GL F-IV, 4.7). (**3 marks**).

5.4. Novelty Art. 54 EPC (10 marks)

- The candidates are expected to identify at least one difference between the subject-matter of amended independent claims 1 and 6 and the cited documents to receive these marks. Especially, it was expected that the candidate answers the objections in the communication of the examiner i.e. D1 and D3 for claim 1 and D2 for new claim 6. In case a clearly wrong argument was provided together with a good argument **no marks** were given. Merely stating

that a feature is not disclosed in a document without explaining why it is so did not attract full marks.

- D1 vs claim 1 (**3 marks**)

  This document does not disclose serial reading in connection with several magnets, or having fewer detectors than magnets. In D1 the magnetic field detector detects the presence of a magnet and sends a corresponding signal. Several detectors can also be used in correspondence with several magnets. It is acceptable to argue that D1 does not explicitly disclose a plurality of permanent magnets spaced axially apart in a predetermined magnet arrangement as D1 rather discloses using several magnets having different polarities inside corresponding radially outwardly open recesses of the shape 139 and positioned about the axis of the key.

- D2 vs claim 6 (**3 mark**)

  This document does not disclose a serial reading as claimed or having fewer detectors than magnets. In D2 there are detectors in correspondence with recesses wherein some recesses may be left empty, i.e. there are as many magnets as detectors or possibly fewer magnets than detectors.

- D3 vs claim 1 (**4 marks**)

  No serial reading is explicitly disclosed in any of the embodiments mentioned in D3. It is noted that paragraph 004, 2nd sentence, does not explain how the embodiment with one transducer and several magnets is implemented. The aim of this embodiment is to detect the position of the push-button (open, closed or intermediate). One possibility to do so would be to use magnets of different polarity and/or different strength in order to detect the position of the push button based on which magnet is at proximity of the detector (see also paragraph 002, lines 14-15). The claimed elongated key is understood by the examiner as being the push-button 2. This interpretation can be followed as the subject matter of claim 1 does not specify that the elongated key should be removable or portable, hence the fact that claim 1 defines an elongated key cannot be seen as a difference between D3 and claim 1.

5.5. Inventive Step Art. 56 EPC (30 marks)

5.5.1. Closest prior art: (8 marks)

- Claim 1

  D3 is considered to be the closest prior art for assessing inventive step for claim 1 of the expected solution. According to paragraph [001], the invention of D3 relates to a contactless switching device to e.g. start/open or stop/lock vehicle and or apparatus which, hence, can be understood as a locking system like the one claimed. It further discloses all the other features of original claim 1 which are listed in the preamble of new claim 1, see especially the second sentence of paragraph [004]. (**2 marks**)

  It could be argued that **D2** discloses all the features of original claim 1 but it does not disclose that there are fewer magnetic field detectors than magnets, contrary to D3 which mentions one of its alternative embodiment as being so (paragraph [004], second sentence). Hence, D3 discloses more features of new claim 1 than D2 and can be seen as being closer than D2. (**2 marks**)

According to paragraph [001], the invention of **D1** concerns a test function of an electrical switching apparatus which can only be activated by an authorised user in possession of an appropriate key so that it also concerns a locking system as in claim 1. However, D1 does not disclose at least the features of a serial reading in connection with several magnets as yet claimed as well as having fewer detectors than magnets. Hence, D1 is considered as a less promising starting point than D3 for claim 1 as it discloses fewer features of claim 1 than D3. (**2 marks**)

- Claim 6

  According to paragraph [001], the invention of **D2** relates to improvements in keycards so that it concerns an access system comprising a keycard as claimed. This is the only document directed to a keycard which is hence considered more relevant than D1 or D3 to assess the patentability of claim 6. Indeed, starting from D1 or D3 would require a first structural modification which renders them less suitable than D2, i.e. modifying the elongated key of D1 or the pushbutton of D3 into a keycard. This appears from the outset not credible. (**2 marks**)

- It is noted that there are sometimes several equally valid starting points for assessing inventive step, e.g. if the skilled person has a choice of several workable solutions, i.e. solutions starting from different documents, which might lead to the invention. If a patent is to be granted, it may be necessary to apply the problem-solution approach to each of these starting points in turn, i.e. for all these workable solutions. Hence, if a candidate would choose another starting point than the one mentioned above, the loss marks could be partly recovered if the argumentation covered the other starting possibilities.

5.5.2. Distinguishing features: (2 marks)

- Claim 1 / D3

  the electronic circuit means are configured to implement a serial reading of said detectors' electric signals as the key is being inserted into the housing and a plurality of magnets pass in proximity to one of the magnetic field detectors. (**1 mark**)

- Claim 6 / D2

  there are fewer magnetic field detectors than magnets and

  wherein the electronic circuit is configured to implement a serial reading of said detectors' electric signals as the keycard is being inserted into the housing and a plurality of magnets pass in proximity to one of the magnetic field detectors. (**1 mark**)

- Alternative: a reference to the characterizing portion of independent claims 1 and 6 if the drafting in the two-part form was adopted and correct or to the novelty discussion of the documents if the essential differences were listed. These options are also be awarded full marks under this heading if correct.

- The same number of marks for this section were given if the candidate had a different set of claims and/or chosen other starting point(s) for assessing inventive step, provided the assessment was correct.

5.5.3. Technical effect: (4 marks)

- Claim 1 / D3. The electronic circuit means are configured to implement a serial reading of said detectors' electric signals as the key is being inserted into the housing. (**2 marks**)
- Claim 6 / D2. Fewer magnetic field detectors than magnets are used while providing simple means to detect the position of magnets, for instance not needing several different types of magnets or orientation (polarity). (**2 marks**)

5.5.4. Objective technical problem: (8 marks)

- Claim 1 / D3. D3 also provides an embodiment in which fewer magnetic field detectors than magnets are used (paragraph [004], second sentence) so that the problem to be solved cannot be defined in how to simplify the manufacturing of the locking system. Hence, the objective technical problem may be defined in how to implement the embodiment of paragraph [004], second sentence. (**4 marks**)
- Claim 6 / D2. In case of D2 as closest prior art for independent claim 6, the problem to be solved may be seen in how to simplify the construction of the locking system while still keeping a secure environment. (**4 marks**)
- Again if a different set of claims and/or starting documents have been chosen by the candidate, it was assessed whether the derived problem(s) chosen were credible in the light of the stated difference(s) and the same number of marks could be awarded.
- For instance, in case the feature “wherein there are fewer magnetic field detectors than magnets” was left in a dependent claim it could not be argued anymore that a simplification of the construction necessarily takes place. In such case, the problem to be solved had to be formulated in a less ambitious manner i.e. finding an alternative solution to the one disclosed (e.g. with regard to D1 in case of claim 1 different than the expected one or in D2 for a claim 6 different than the expected one).

  It is also noted that the client mentions reduced cost in its letter: formulating a problem such as how to reduce costs is not considered to be a technical problem and attracts **0 mark**.

5.5.5. Solution is inventive (8 marks)

- Claim 1. D3 itself discloses several possibilities to actuate a latch and provides a solution having fewer detectors than magnets (paragraph [004], second sentence or also paragraph [006] in an alternative embodiment). However, these embodiments do not disclose the serial reading as claimed but rather the detection of different positions of the switch. In the other alternative embodiment at paragraph [003] it is merely mentioned that the transducer can

detect the magnet when it passes at proximity of a single magnet so that no serial reading in connection with several magnets can be inferred from that teaching. (**4 marks**)

Furthermore, neither D1 nor D2 discloses a hint to the above stated problem or to the serial reading solution either so that a combination of D3 with D1 or D2 cannot lead to the claimed subject matter either. Indeed D1 merely discloses a solution with as many detectors as magnets. D2 discloses also an embodiment with as many detectors as magnets or an embodiment with fewer magnets than detectors and not with fewer detectors than magnets. The same applies with a combination of D3 with D1 and D2. (**2 marks**)

- Claim 6. Starting from D2 for claim 6, again D3 does not provide a hint to the solution claimed because no teaching of serial reading is disclosed. The combination of D2 and D3 does not therefore lead to the subject-matter of claim 6. D1 is further away as it discloses several magnets in correspondence with several detectors and does not provide any hint to the claimed solution either as it also does not disclose any teaching of the serial reading aspect. (**2 marks**)

Mentioning only that the starting point does not have any hint to the claimed solution does not in principle attract any marks as it has to be assessed whether the prior art as a whole would have prompted the skilled person, when faced with the objective technical problem, to modify or adapt the closest prior art in the light of that teaching in such a way as to arrive at something falling within the terms of the claims.

5.6. Alternative: D1 or D2 instead of D3 as closest prior art for claim 1, D2 as closest prior art for claim 6 (25 marks)

D1 or D2 are considered less relevant than D3 for claim 1 so that a discussion of inventive step starting with one of these documents attracts fewer marks, i.e. all together for claims 1 and 6 up to 25 marks, following a scheme similar as the one described above starting from D3.

Claim 1:

Closest prior art being D1 or D2 (**5 marks**), distinguishing features (**1 mark**), technical effect (**2 marks**), objective technical problem (**4 marks**), argumentation (**2 marks**)

Claim 6 (same as in section 5.5):

Closest prior art (**2 marks**), distinguishing features (**1 mark**), technical effect (**2 marks**), objective technical problem (**4 marks**), argumentation (**2 marks**)

5.7. Alternative: claims set differing from the expected solution (up to 30 marks)

Depending on the claims submitted by the candidate and differing from the expected solution, arguments relating to inventive step were assessed in a similar manner as in the previous sections 5.5 and 5.6 above (however, see remark at the end of section 5.1 above).

5.8. Unity (8 marks)

- The new set of claims is unitary due to the amended independent claims being unitary (**2 marks**), the common matter of both independent claims includes the same special technical feature i.e. some means configured to implement a serial reading of said detectors' electric signals as the key/keycard is being inserted into the housing and a plurality of magnets pass in proximity to one of the magnetic field detectors (the serial reading aspect, **2 marks**). This feature has been shown in the inventive step argumentation as contributing to an inventive step, thus a single general inventive concept is present thus fulfilling the requirements of unity (**4 marks**).

Arguing only that new dependent claims 5 and 9 are unitary receives **no marks** as the argumentation has to be on the independent claims.

6. APPENDIX

Marked up amended sets of claims in all three languages (compared to original set of claims).

EN

Draft set of claims (marked up)

1. A locking system (50) comprising:

an elongated key (10) extending along a key axis and having a plurality of permanent magnets (15) spaced axially apart in a predetermined magnet arrangement;

a housing (30) defining a passage (34) complementary to said key and extending along an insertion axis of said key;

one or a plurality of magnetic field detectors (37, 37') spaced axially apart in said housing relative to said insertion axis in a detector arrangement positioned in relation to said magnet arrangement, each of said one or plurality of detectors being configured to change state on juxtaposition with a magnet and to generate one or several electrical signals in accordance therewith;

an actuatable latch; and

electronic circuit means connected to said latch and said one or plurality of detectors for actuating said latch based on the one or several electrical signals generated by the one or plurality of magnetic field detectors,

wherein there are fewer magnetic field detectors than magnets and

characterized in that

the electronic circuit means are configured to implement a serial reading of said detectors' electric signals as the key is being inserted into the housing and a plurality of magnets pass in proximity to one of the magnetic field detectors.

2. A locking system according to claim 1 wherein the elongated key has a circular-shaped section.

3. A locking system according to claim 1 wherein the elongated key has a square-, T-, hexagon- or any other polygon-shaped section.

4. A locking system according to claim 2 or 3 wherein the elongated key further comprises a plurality of radially outwardly open recesses (16) to position and attach the permanent magnets.

5. A locking system according to any of claims 1 to 4 wherein the locking system comprises at least two magnetic field detectors and two corresponding consecutive magnets positioned along the insertion axis, the magnetic fields of said magnets as sensed by corresponding magnetic field detectors differing in polarity.

~~6. A locking system according to claim 5 wherein there are fewer magnetic field detectors than magnets and wherein the electronic circuit means are configured to implement a serial reading of said detectors' electric signals as the key is being inserted into the housing and a plurality of magnets pass in proximity to one of the magnetic field detectors.~~

~~7.~~ 6. An access system (150) comprising:

a portable keycard (110) having a plurality of permanent magnets (120) embedded therein, said magnets being located at predetermined locations within said keycard;

a housing (140) having an external surface and an interior chamber, said interior chamber including a channel which is sized and shaped to receive according to an insertion direction said keycard to a fully inserted position;

a sensing circuit disposed within said interior chamber, said sensing circuit including at least one ~~Hall-effect transducer~~ magnetic field detector (162a-162f) positioned adjacent to said channel, each of said at least one ~~Hall-effect transducer~~ magnetic field detector being configured to change state on juxtaposition with a magnet and to generate one or several output signals in accordance therewith;

an actuatable latch; and

a processing circuit disposed within said interior chamber, said processing circuit being electrically connected to said sensing circuit and said processing circuit actuating said latch in response to said one or several output signals;

and characterized in that

there are fewer magnetic field detectors than magnets and wherein the processing circuit is configured to implement a serial reading of said detectors' electric signals as the keycard is being inserted into the housing and a plurality of magnets pass in proximity to one of the magnetic field detectors.

~~8.~~ 7. An access system according to claim ~~7~~ 6 wherein the keycard comprises a top section (112) and a bottom section (114) sized and shaped to mate and be attached to each other.

~~9.~~ 8. An access system according to claim ~~8~~ 7 wherein the top and/or bottom section further comprise(s) a plurality of recesses (118a-118f) to position and attach the permanent magnets.

~~10.~~ 9. An access system according to any of claims ~~7 to 9~~ 6 to 8 wherein the magnetic field of at least one of the plurality of magnets ~~substantially~~ differs in strength from another one of the plurality of magnets by at least 20%.

~~11. An access system according to claim 10 wherein there are fewer magnetic field detectors than magnets and wherein the processing circuit is configured to implement a serial reading of said detectors' electric signals as the keycard is being inserted into the housing and a plurality of magnets pass in proximity to one of the magnetic field detectors.~~

DE

1. Verriegelungssystem (50) umfassend:

einen länglichen Schlüssel (10), der sich entlang einer Schlüsselachse erstreckt und mehrere Dauermagnete (15) hat, die sich in einer vorab festgelegten Magnetanordnung axial voneinander beabstandet befinden;

ein Gehäuse (30), das einen zu diesem Schlüssel komplementären Durchgang (34) definiert und sich entlang einer Einschubachse dieses Schlüssels erstreckt;

einen oder mehrere Magnetfelddetektoren (37, 37'), die sich axial beabstandet voneinander in diesem Gehäuse relativ zur Einschubachse in einer Detektoranordnung befinden, die im Verhältnis zur Magnetanordnung positioniert ist, wobei jeder dieses einen oder dieser mehreren Detektoren so konfiguriert ist, dass er, wenn er sich gegenüber einem Magneten befindet, seinen Zustand ändert und dementsprechend ein oder mehrere elektrische Signale erzeugt;

eine betätigbare Verriegelung; und

elektronische Schaltkreismittel, die mit dieser Verriegelung und diesem einen oder diesen mehreren Detektoren verbunden sind, damit sie diese Verriegelung basierend auf den von dem einen oder den mehreren Magnetfelddetektoren erzeugten einen oder mehreren elektrischen Signalen betätigen,

wobei weniger Magnetfelddetektoren als Magnete vorhanden sind und

dadurch gekennzeichnet, dass

die elektronischen Schaltkreismittel so konfiguriert sind, dass ein serielles Lesen der elektrischen Signale dieser Detektoren implementiert wird, wenn der Schlüssel in das Gehäuse hineingeschoben wird und mehrere Magnete in der Nähe eines der Magnetfelddetektoren vorbeigeführt werden.

2. Verriegelungssystem nach Anspruch 1, bei dem der längliche Schlüssel einen Querschnitt mit einer runden Form hat.

3. Verriegelungssystem nach Anspruch 1, bei dem der längliche Schlüssel einen Querschnitt mit einer quadratischen, einer T-, einer sechseckigen oder einer sonstigen vieleckigen Form hat.

4. Verriegelungssystem nach Anspruch 2 oder 3, bei dem der längliche Schlüssel außerdem mehrere radial nach außen offenen Vertiefungen (16) umfasst, um die Dauermagnete zu positionieren und zu befestigen.

5. Verriegelungssystem nach einem der Ansprüche 1 bis 4, bei dem das Verriegelungssystem mindestens zwei Magnetfelddetektoren und zwei entsprechende aufeinanderfolgende Magnete umfasst, die entlang der Einschubachse positioniert sind, und bei dem sich die Magnetfelder dieser Magnete, so wie sie von den entsprechenden Magnetfelddetektoren erfasst werden, in der Polarität unterscheiden.

~~6. Verriegelungssystem nach Anspruch 5, bei dem weniger Magnetfelddetektoren als Magnete vorhanden sind und bei dem die elektronischen Schaltkreismittel so konfiguriert sind, dass ein serielles Lesen der elektrischen Signale dieser Detektoren implementiert wird, wenn der Schlüssel in das Gehäuse hineingeschoben wird und mehrere Magnete in der Nähe eines der Magnetfelddetektoren vorbeigeführt werden.~~

~~7.~~ 6. Zugangssystem (150) umfassend:

eine tragbare Schlüsselkarte (110) mit mehreren darin eingebetteten Dauermagneten (120), bei der diese Magnete an vorab festgelegten Stellen innerhalb dieser Schlüsselkarte angeordnet sind;

ein Gehäuse (140) mit einer externen Oberfläche und einer internen Kammer, bei dem diese interne Kammer einen Kanal einschließt, der so dimensioniert und geformt ist, dass er diese Schlüsselkarte entlang einer Einschubrichtung bis zu einer vollständig hineingeschobenen Position aufnimmt;

eine innerhalb dieser internen Kammer angeordnete Sensorschaltung, die mindestens einen ~~Hall-Effekt-Wandler~~ Magnetfelddetektor (162a - 162f) einschließt, der neben diesem Kanal positioniert ist, bei der jeder dieser mindestens einen ~~Hall-Effekt-Wandler~~ Magnetfelddetektoren so konfiguriert ist, dass er, wenn er sich gegenüber einem Magneten befindet, seinen Zustand ändert und dementsprechend ein oder mehrere Ausgangssignale erzeugt;

eine betätigbare Verriegelung; und

eine innerhalb der internen Kammer angeordnete Verarbeitungsschaltung, die mit der Sensorschaltung elektrisch verbunden ist und die in Abhängigkeit von diesem einen oder von diesen mehreren Ausgangssignalen diese Verriegelung betätigt;

dadurch gekennzeichnet, dass

weniger Magnetfelddetektoren als Magnete vorhanden sind und dass die Verarbeitungsschaltung so konfiguriert ist, dass ein serielles Lesen der elektrischen Signale dieser Detektoren implementiert wird, wenn die Schlüsselkarte in das Gehäuse hineingeschoben wird und mehrere Magnete in der Nähe eines der Magnetfelddetektoren vorbeigeführt werden.

~~8.~~ 7. Zugangssystem nach Anspruch ~~7~~ 6, bei dem die Schlüsselkarte einen oberen Bereich (112) und einen unteren Bereich (114) umfasst, die so dimensioniert und geformt sind, dass sie ineinander passen und miteinander verbunden werden können.

~~9.~~ 8. Zugangssystem nach Anspruch ~~8~~ 7, bei dem der obere und/oder der untere Bereich außerdem mehrere Vertiefungen (118a-118f) umfassen, um die Dauermagnete zu positionieren und zu befestigen.

~~10.~~ 9. Zugangssystem nach einem der Ansprüche ~~7~~ 6 bis ~~9~~ 8, bei dem sich mindestens einer der mehreren Magnete in der Stärke seines Magnetfelds ~~im Wesentlichen~~ von einem anderen der mehreren Magnete um mindestens 20 % unterscheidet.

~~11. Zugangssystem nach Anspruch 10, bei dem weniger Magnetfelddetektoren als Magnete vorhanden sind und bei dem die Verarbeitungsschaltung so konfiguriert ist, dass ein serielles Lesen der elektrischen Signale dieser Detektoren implementiert wird, wenn die Schlüsselkarte in das Gehäuse hineingeschoben wird und mehrere Magnete in der Nähe eines der Magnetfelddetektoren vorbeigeführt werden.~~

FR

1. Un système de verrouillage (50) comprenant :

une clé allongée (10) s'étendant le long d'un axe de clé et ayant une pluralité d'aimants permanents (15) séparés axialement dans un arrangement d'aimants prédéterminé ;

un boîtier (30) définissant un passage (34) complémentaire à ladite clé et s'étendant le long d'un axe d'insertion de ladite clé ;

un ou une pluralité de détecteurs de champ magnétique (37, 37') séparés axialement dans ledit boîtier par rapport audit axe d'insertion dans un arrangement de détecteurs positionné par rapport audit arrangement d'aimants, ledit détecteur ou chacun desdits détecteurs étant configuré pour changer d'état une fois juxtaposé à un aimant et pour générer un ou des signaux électriques en conséquence ;

un verrou actionnable ; et

des moyens de circuit électronique connectés audit verrou et audit détecteur ou à ladite pluralité de détecteurs pour actionner ledit verrou sur la base du ou des signaux électriques générés par le ou la pluralité de détecteurs de champ magnétique,

dans lequel il y a moins de détecteurs de champ magnétique que d'aimants et

caractérisé en ce que

les moyens de circuit électronique sont configurés pour mettre en œuvre une lecture en série des signaux électriques desdits détecteurs pendant que la clé est insérée dans le boîtier et qu'une pluralité d'aimants passe à proximité de l'un des détecteurs de champ magnétique.

2. Un système de verrouillage selon la revendication 1 dans lequel la clé allongée a une section de forme circulaire.

3. Un système de verrouillage selon la revendication 1 dans lequel la clé allongée a une section en forme de carré, de « T », d'hexagone ou de tout autre polygone.

4. Un système de verrouillage selon la revendication 2 ou 3 dans lequel la clé allongée comprend en outre une pluralité de renfoncements (16) ouverts radialement vers l'extérieur pour positionner et attacher les aimants permanents.

5. Un système de verrouillage selon l'une quelconque des revendications 1 à 4 dans lequel le système de verrouillage comprend au moins deux détecteurs de champ magnétique et deux aimants consécutifs correspondants positionnés le long de l'axe d'insertion, les champs magnétiques desdits aimants tels que captés par les détecteurs de champ magnétique correspondants ayant des polarités différentes.

~~6. Un système de verrouillage selon la revendication 5 dans lequel il y a moins de détecteurs de champ magnétique que d'aimants et dans lequel les moyens de circuit électronique sont configurés~~

~~pour mettre en œuvre une lecture en série des signaux électriques desdits détecteurs pendant que la clé est insérée dans le boîtier et qu'une pluralité d'aimants passe à proximité de l'un des détecteurs de champ magnétique.~~

~~7.~~ 6. Un système d'accès (150) comprenant :

une carte clé portable (110) ayant une pluralité d'aimants permanents (120) enchâssés dedans, lesdits aimants étant situés à des emplacements prédéterminés dans ladite carte clé ;

un boîtier (140) ayant une surface externe et une chambre intérieure, ladite chambre intérieure comprenant un canal qui est dimensionné et formé pour recevoir selon une direction d'insertion ladite carte clé jusqu'à une position de pleine insertion ;

un circuit de détection disposé dans ladite chambre intérieure, ledit circuit de détection comprenant au moins un ~~transducteur à effet Hall~~ détecteur de champ magnétique (162a-162f) positionné de manière adjacente audit canal, chaque au moins un ~~transducteur à effet Hall~~ détecteur de champ magnétique étant configuré pour changer d'état une fois juxtaposé à un aimant et pour générer un ou des signaux de sortie en conséquence ;

un verrou actionnable ; et

un circuit de traitement disposé dans ladite chambre intérieure, ledit circuit de traitement étant connecté électriquement audit circuit de détection et ledit circuit de traitement actionnant ledit verrou en réponse au ou auxdits signaux de sortie ;

et caractérisé en ce que

il y a moins de détecteurs de champ magnétique que d'aimants et en ce que le circuit de traitement est configuré pour mettre en œuvre une lecture en série desdits signaux électriques des détecteurs pendant que la carte clé est insérée dans le boîtier et qu'une pluralité d'aimants passe à proximité de l'un des détecteurs de champ magnétique.

~~8.~~ 7. Un système d'accès selon la revendication ~~7~~ 6 dans lequel la carte clé comprend une section supérieure (112) et une section inférieure (114) dimensionnées et formées pour s'imbriquer et être attachées l'une à l'autre.

~~9.~~ 8. Un système d'accès selon la revendication ~~8~~ 7 dans lequel la section supérieure et/ou inférieure comprend ou comprennent également une pluralité de renfoncements (118a-118f) pour positionner et attacher les aimants permanents.

~~10.~~ 9. Un système d'accès selon l'une quelconque des revendications ~~7~~ 6 à ~~9~~ 8 dans lequel le champ magnétique d'au moins un aimant de la pluralité d'aimants diffère ~~sensiblement~~ d'au moins 20 % en force d'un autre aimant de la pluralité d'aimants.

~~11. Un système d'accès selon la revendication 10 dans lequel il y a moins de détecteurs de champ magnétique que d'aimants et dans lequel le circuit de traitement est configuré pour mettre en œuvre une lecture en série desdits signaux électriques des détecteurs pendant que la carte clé est insérée~~

~~dans le boîtier et qu'une pluralité d'aimants passe à proximité de l'un des détecteurs de champ magnétique.~~