Examiners' Report Paper A 2022

The examiners’ report sets out the expected solution, explains why this solution was expected, and shows how the marks were distributed. In addition, it highlights 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

The invention described in the client's letter pertains to the manufacturing of durable, high-quality paper for important paper records meant for long-term retention without deterioration [001], [006].

Rag paper is the term for paper made from paper pulp produced by beating cotton and linen cloth rags, possibly also additionally including hemp and flax [003]. Rag paper is known to be exceptionally durable [004].

In contrast, wood pulp paper, made from lignin-containing wood, exhibits poor characteristics and deteriorates rapidly [005].

The client’s company manufactures neither rag paper nor wood pulp paper. In the client’s letter it is clearly indicated that cotton and linen cloth rags are not used for paper pulp making; nor is wood used either. Instead, only raw plant material which does not contain lignin, such as flax, hemp, straw, hay, thistles or nettles, or mixtures thereof (lignin-free raw plant material) is used, in order to avoid environmental issues associated with bleaching, as well as drawbacks of wood pulp paper [008].

The client’s technology basically sticks to the traditional method of paper pulp making by stamper beating using a stamper machine [006], [007], [013].

The prior art cited in the client's letter shows that methods of paper pulp making by stamper beating of cotton and linen cloth rags (D1), and stamper beating of raw plant material such as straw, hay, thistles, or nettles (D2) have been known for centuries [006]. Further, D1 describes known suitable stamper machine set-ups (Figures 1 and 2).

2. Challenges of Paper A 2022

2.1 Client's technology and contribution

Is there anything patentable in a traditional technology that has been known for centuries? The client in Paper A 2022 has some doubts expressed in his letter [006]. Yet, he indisputably manufactures a valuable industrial product, namely durable paper having unique properties [006], [025], [026] deserving patent protection. It was for the patent expert (candidate) to provide a convincing patent application tailored to the client's needs.

D1 and D2 show that in traditional (state-of-the art) papermaking techniques, the formed sheets of paper must undergo a separate process of sizing by coating with a glue, such as starch or gelatin, to provide the required paper strength and smoothness (D1 [004]; D2 [004], [005]).

Sizing is particularly necessary when making the paper pulp from raw plant material instead of cotton and linen cloth rags; otherwise, the formed paper sheets have poor strength and surface quality. This issue is very much emphasised in the client's letter [015], [016].

In this regard, the technical contribution over D1 and D2 described in the client's letter lies in making paper pulp from raw plant material while adding the glue directly during stamper beating [018], thereby omitting the need for a cumbersome separate step of sizing the paper sheets after these have been formed [017].

Importantly, due to increase of viscosity following glue addition [018], the client's technology requires adaptation of the set-up of traditional stamper machines (as described in D1) to ensure effective pulp circulation during beating and a homogeneous distribution or intermixing of the glue in the viscous pulp [019], [023].

The details of the required stamper machine design, in particular the construction of the hammer, are explained in paragraphs [019]-[022] and Figure 1 of the client's letter.

The hammer construction according to the invention has the surprising advantage of allowing enhanced circulation of more than 90% of the pulp volume with each stroke despite the increased viscosity. This is essential to homogeneously intermix the glue in the viscous pulp stock, and thus to ultimately achieve the desired paper quality [023].

While the technique for making paper sheets described in the applicant's letter is known per se [024], the use of the paper pulp with homogeneously intermixed glue according to the invention [023] allows manufacturing paper sheets with excellent endurance and age-resistant features [006], [025], [026], outperforming traditional rag paper.

Adding glue during stamper beating of paper pulp was not disclosed in the state of the art. Nor was the feasibility or relevance of a modification of the construction features of traditional stamper machines as regards the hammer head-to-shaft angle mentioned.

2.2 Scope of the expected claims

A reasonable application protecting all aspects of the client's technology requires several independent claims in various categories [006].

Candidates were expected to draft claims directed to:

- a method of paper pulp making by stamper beating [007] (from lignin-free raw plant material with direct addition of the glue during beating)
- paper pulp so obtained, or made by that method (intermediate product) [019]-[023]
- a method of manufacturing paper sheets using this paper pulp [024]

- paper sheets so obtained, having unique endurance properties (client's commercial product) [025], [026]
- an apparatus (Figure 1) especially adapted for the client's process of paper pulp making [019]

in order to attract full marks.

One challenge in Paper A 2022 was to draft suitable independent claims in all these claim categories clearly deriving from the client's instructions.

Claims to the starting materials (raw plant material) in the client's technology were not possible [008] and were not expected.

By the same token, a claim to paper pulp making from cotton and linen cloth rags, or from wood, both excluded from client's technology, as well as a claim to rag paper, are against the client's explicit instructions [008].

As mentioned above, a paper pulp with intermixed glue is disclosed neither in D1 nor in D2. Yet, a paper pulp without homogeneous intermixing (according to the technology described in the client's letter) is unsuitable for the client's purposes [018].

The best strategy to protect the entire client's technology is to obtain patent protection for a method of making paper pulp and for an apparatus with the required construction adaptations for the process of stamper beating according to the client's invention. These claims afforded more than 50 marks.

Additional suggestions and indications for the expected claim categories and claim wording can be found in D1 and D2.

It is emphasised that candidates are encouraged to take advantage of technical information provided throughout Paper A, including the prior art, and not only in the client's letter.

3. Independent claims

A total of **80 marks** were available for the independent claims.

Claims that were not novel attracted no marks. Marks were deducted for claims lacking inventive step. Unnecessary limitations were characterised as severe or less severe, and marks were deducted accordingly. Further deductions were made for missing essential features and clarity issues.

As a matter of principle, no double penalisation was applied. Thus, no marks were deducted in the method claims for features already subject to a mark deduction in the product claim, or vice versa. Similarly, a mark deduction applied to one method claim was not applied to another method claim.

The set of claims must meet the requirements of Rule 43(2) EPC. In the case that more than one claim was directed to the same subject matter, only the worst claim was marked.

3.1 Apparatus (stamper machine)

A maximum of **28 marks** could be awarded for an independent apparatus claim directed to a stamper machine. The claim could read:

Stamper machine for making paper pulp comprising:
a vat (1)
fitted with a hammer comprising a hammer head (2), a hammer shaft (3), and a hammer face (4),
characterised in that the hammer head (2) is positioned at a slant to the hammer shaft (3)
[or characterised in that the head-to-shaft angle (α) is set at a fixed angle deviating from 90°]

A stamper machine comprising an adapted hammer construction (head-to-shaft angle) provides the means to ensure effective circulation of the paper pulp, and hence homogeneous glue intermixing, as required in the process of stamper beating of paper pulp according to the client's invention [023].

Some candidates realised that the adapted hammer is the most basic element of an apparatus or device that could be claimed as a distinct entity having novelty over D1. Thus, there was basis in the client's letter for an independent claim to a hammer for a stamper machine.

However, the client's letter suggests that the purported technical effect cannot be achieved where the hammer as such is not arranged in connection to the rest of elements of a traditional stamper machine set-up, notably a vat (1) fitted with said hammer [014], as shown in Figure 1 of the client's letter.
Thus, it was reasonable to claim the adapted hammer construction in connection with the stamper machine, and not alone.

A set of claims comprising as an apparatus claim only a claim to a hammer for a stamper machine alone, i.e. not arranged in connection to the other elements of a stamper machine, attracted up to 22 marks for this claim. However, a set of claims comprising both a claim to a hammer and a claim to a stamper machine could attract the full 28 marks awarded for the apparatus.

Major undue limitations, such as indicating a specific angle range (e.g. 82 to 60 degrees), or the hammer face comprising nails, were penalised with a deduction of 8 marks each.

Up to 5 points were deducted for each clarity issue e.g. claiming an angle of "less than 90 degrees", instead of "deviating from 90 degrees".

3.2 Method of paper pulp making

A maximum of **28 marks** could be awarded for an independent claim to a process of making paper pulp by stamper beating. The claim can read:

Method of making paper pulp comprising the steps of:
a) providing raw plant material which does not contain lignin [or lignin-free raw plant material],
b) treating [or mixing] the raw plant material with quicklime for at least 5 days,

c) stamper beating [or beating in a stamper machine],

c1) while adding glue to the pulp during beating, and

c2) wherein the pulp is circulated during beating so that over 90% of the pulp volume is swept/displaced with each stroke [of the stamper machine]

[or c2) so that differences in viscosity throughout the pulp volume (between top layer samples and bottom samples) during the beating step are not greater than 1%]

Step a)

The term raw plant material as used in the client's letter is not meant to embrace wood. Though D2 [002] uses different kinds of wood and bark, wood does not work for the purpose of the client's invention [005], [008]. Candidates were not expected to bring in any knowledge in plant biochemistry. The client's letter unambiguously indicates that wood is not used, but only raw plant material which does not contain lignin (lignin-free) is used [008]. A claim that does not exclude wood lost 10 marks.

Step b)

In the method of paper pulp making, the lignin-free raw plant material is initially treated with quicklime [009]-[011] according to an old method disclosed in D2. The conditions for the treatment with quicklime, such as the specific amounts or weight ratios of ingredients [010], do not appear to play any role, or to be essential. The duration of the treatment with quicklime for at least 5 days is, however, an essential feature of the claim, otherwise cellulose extraction is not complete [012]. Missing this essential feature led to a deduction of 5 marks.

Step c)

The client's invention basically follows the traditional method of making paper pulp by stamper beating [007] as described in D1. The stamper machine striking 40 blows/min appears to be a typical feature in traditional stamper machines functioning properly [014], D1 [011], and these are the conditions under which the desired preservation of the length of the cellulose fibres, as in rag paper, is achieved [002], [007], D1 [005]. Whether or not the stamper beating speed in traditional stamper machine set-ups can be modified; whether or not lower or higher stamper beating speeds would work; or whether or not long cellulose fibres might be destroyed at higher speed; remains mere speculation. Candidates were not expected to engage in

speculative considerations. Stamper beating under typical conditions of the traditional method appears to preserve the long fibres of cellulose [007], D1 [005]. Hence, indicating the stamper beating speed of traditional stamper machine set-ups in the claim is not essential.

According to D1 [011], the duration of the process of stamper beating of pulp varies between 12 to 24 hours or longer. In turn, according to the client's letter, the time that the paper pulp takes to soften and plasticise by stamper beating using the conditions of traditional stamper machine set-ups is at least 12 hours or longer [014]. This is thus typical for the performance of traditional stamper machine set-ups. Further, the beating time may depend on the starting material and type and amount of glue. Thus, neither the beating time [014] nor the typical concentration of glue solutions [016] are essential features of the claim.

The information provided in the client's letter allows the definition of the method of paper pulp making in functional terms [020]-[023]. Candidates were expected to realise this, and to propose apparatus and method claims of distinguishable scope. This constituted one of the challenges in Paper A 2022.

When drafting a claim to the method of paper pulp making, candidates were expected to think of the processes being performed by the (especially adapted) apparatus, i.e. the functions performed, rather than the specific structures (apparatus construction features) used in the method described in the client's letter. Thus, candidates were expected not to simply draft a virtually identical method counterpart to the apparatus claim (method performed by the apparatus, or method of using the apparatus), but to draft a method claim of broader scope.

The homogeneous intermixing of the glue in the paper pulp needed according to the client's technology can be achieved by any means that ensure the required degree of pulp circulation during stamper beating (over 90% of pulp volume swept or displaced with each stroke), which can be verified by simple, known tests (measurement of viscosity differences throughout the pulp volume) as described in [023].

An independent claim referring only to a method of using the (especially adapted) apparatus described in the client's letter [019]-[022] thus amounts to an undue restriction of the scope of the client's invention. The apparatus features (especially adapted construction) belong to an apparatus claim (specific means of carrying out the client's process of paper pulp making); whereas to the method claim belong rather the functions performed by means of said construction, but which could in principle also be performed with alternative equivalent means.
Furthermore, the skilled reader is provided with clear technical instructions (means of distinction) to verify whether the claimed function is satisfied, the requirements in the consolidated case law of the EPO for an allowable functional feature are met (Case law, 9th Ed., 2019, II.A.3.4).

It goes without saying that the method claim was expected to include active steps or actions to perform a function, not a mere statement of a *desideratum*. Thus, an independent claim to a method of making paper pulp comprising only a step of *"homogeneously intermixing the glue"* was regarded as a mere recitation of a result to be achieved, Guidelines (F-IV 4.10).

A non-inventive claim, for example a claim missing a functional definition of the required % of volume circulation of the paper pulp necessary for achieving the homogeneous intermixing of glue, was awarded a maximum of 8 marks. Claiming only that the glue was homogeneously intermixed was regarded as a result to be achieved and a serious clarity issue justifying a 14-mark deduction.

Each missing essential feature, such as not limiting the starting material to lignin-free raw plant material, or not excluding wood and cotton/linen cloth rags, received a 10-mark deduction.

Major unnecessary limitations e.g. referring to the use of a stamper machine with a specific construction, or referring back to the stamper machine claim, lead to a 10-mark deduction.

Additional method steps relating to the treatment with quicklime, or method steps relating to the making of the paper sheets, were regarded as unnecessary limitations

of the method of making paper pulp, thereby receiving a deduction of at least 5 marks.

Up to 5 marks were deducted for any clarity issues present in the claim.

A claim to the use of the (especially adapted) apparatus does not appear to afford any additional patent protection over the apparatus claim itself, and therefore it received no marks.

3.3 Paper pulp (intermediate product)

A maximum of **4 marks** could be awarded for an independent claim to paper pulp obtained or made by the method of paper pulp making by stamper beating according to the client's invention. The claim could read:

Paper pulp [made from lignin-free raw plant material and comprising homogeneously intermixed glue] obtainable by the method of any one of claims X to…

The paper pulp obtainable by the client's technology is an intermediate product in paper manufacturing, and might find further interesting or future applications, e.g. manufacturing of other types of paper different from that presently claimed [024].

There is no way to define that product structurally. Therefore, a product-by-process claim for protection of an intermediate product in the client's technology was expected.

It is to be noted that full marks were also given for a product-by-process claim referring back to a method claim that was not perfectly defined.

3.4 Method of manufacturing paper (sheets)

A maximum of 4 **marks** could be awarded for a subsidiary independent claim directed to a method of manufacturing paper (sheets) using the paper pulp according to the invention. The claim could read:

Method of manufacturing paper (sheets) comprising the steps of:

a) providing paper pulp according to any one of claims X to…,
b) pouring the pulp onto a screen,
c) filtering through the water,
d) pressing, drying, stripping (the sheets) from the screen, cutting, and flattening

The method of manufacturing paper (sheets) corresponds to the traditional method [024], and is only characterised and distinguished by using the paper pulp according to the client's invention.

A method comprising conventional sizing after forming the sheets [016] is not novel over D2 even if the paper pulp is made by stamper beating employing the especially adapted hammer according to the client's invention, because as far as no glue is intermixed in the pulp no particular effect associated with the stamper beating, and no distinguishable properties of the paper pulp, can be recognised.

Full marks were also available for any alternative claim of a similar scope, for example a claim dependent on the method for producing paper pulp.

Some candidates did not have a claim for making paper pulp, but instead presented a method for making paper also comprising all the steps of making the paper pulp. In such cases, those claims were considered to be wrongly formulated claims for a method for making the paper pulp and were marked as a method for making the paper pulp that could only attract a maximum of 22 marks.

3.5 Paper (sheets)

A maximum of **16 marks** could be awarded for an independent claim directed to the paper (sheets) obtained with the client's technology, having unique quality in terms of endurance and age-resistant properties (client's commercial product). The claim could read:

Paper (sheets) made from lignin-free raw plant material and comprising homogeneously intermixed glue, and having a tensile strength of 1 900 N/m or more as measured according to the standard method ISO 1924-2

As explained above, it is the combination of using lignin-free raw plant material (instead of cotton/linen cloth rags or wood) and homogeneously intermixing glue during stamper beating of the paper pulp that is essential to confer the new and inventive properties (sustainability, endurance, age-resistance) of the paper (sheets) suitable for the client's commercial purposes and applications.

Therefore, formally establishing novelty over the prior art only (e.g. paper sheets comprising cellulose fibres and homogeneously intermixed glue), but missing these essential features, was regarded as covering non-inventive embodiments, thereby justifying a deduction of 6 marks for each missing feature.

According to the client's letter, the paper (sheets) can be defined in terms of usual parameters in the art (tensile strength), but also to some extent structurally (technical properties deriving from the starting materials and/or the process of manufacture). Both types of features, parametric and structural, were thus expected for a complete characterisation of the product.

Product-by-process claims are allowable only if it is impossible to define the claimed product other than in terms of a process of manufacture (Guidelines F-IV 4.12).
A claim for paper (sheets) defined only in terms of the process of manufacture (product-by-process) was regarded as an undue limitation of the most valuable independent product claim through process features relating to a specific way of manufacturing the paper pulp, thereby receiving a 6-mark deduction.

The client characterises his commercial product in terms of tensile strength, measured according to a standard ISO norm. Therefore, 4 marks were deducted when the reference to the ISO standard was missing, or for any other clarity issues.

Limiting the client's independent product claim to paper (sheets) having only a very specific grammage of 70 g/m^2 resulted in a severe restriction of the scope of protection, and therefore 8 marks were deducted.

4. Dependent claims

Up to **10 marks** were available for dependent claims providing reasonable fall-back positions. For example:

Hammer head-to-shaft angle (α) between 82 and 60 degrees

Stamper machine with hammer head-to-shaft angle (α)< 70 degrees and 5-degree downslope of hammer shaft (3) in resting position

Paper sheets having tensile strength of 2 600 N/m or more

Paper sheets having grammage of 70 g/m^2

Paper A should not be regarded as an artificial exercise but reflect real practice. Accordingly, not only solid fall-back positions clearly indicated in the client's letter and having novelty over D1 and D2 were expected. Many features known in the art (e.g. relating to details of the hammer in traditional stamper machines, such as hammer face provided with various types of nails, etc.) could be claimed in connection with the novel (adapted) apparatus and the novel methods of paper and paper pulp making. 1 to 2 marks, up to a maximum of 10 marks, were given for any reasonable dependent claim.

It is to be noted that marks awarded for dependent claims were reserved for additional, optional or preferred technical features, and not for essential features that should have been included in an independent claim but were missed (these marks were lost).

Similarly, features indicated as "for example" or "preferably" (but not mandatory) in an independent claim, or as further features of dependent claims, did not attract any marks.

The client's letter indicates that the European application should not incur the payment of claims fees. In view of this, claims 16 and above, if present, were disregarded and did not attract any marks.

5. Description

Up to **10 marks** were available for a proper description of the invention.

The requirements for the description (Guidelines F-II 4) are different and separate from the requirements for the claims. A description providing full support to the claims (Art. 84 EPC) was expected. As per Rule 42(1)(c) EPC, the description must disclose the invention as claimed in such terms that the technical problem and its solution can be understood, and state any advantageous effects of the invention with reference to the background art. The description must therefore disclose how the invention can be understood as the solution to a technical problem.

In this regard, emphasis had to be given to D1 in order to identify and discuss the construction modifications or adaptations of the hammer in the stamper machine, which make the technical contribution described in the client's letter, in terms of their impact in performing the functionality (required degree of pulp circulation during stamper beating and the resulting homogeneous intermixing of glue in the paper pulp) underlying the client's inventive process of paper pulp making.

For example, the definition of the problem solved by the invention can read:

The present invention solves the problem of providing durable paper sheets having improved endurance and age-resistant properties as compared to traditional paper (rag paper or wood-based paper) by a simplified, sustainable and more efficient method requiring neither bleaching of the starting materials nor final sizing with glue of the formed paper sheets as in traditional methods. According to the invention, this is solved by providing a method of making paper pulp using lignin-free raw plant material treated with quicklime and comprising homogeneously intermixing the glue into the paper pulp during the stamper beating stage. Further, according to the invention the stamper machine set-up is modified as to the construction of the hammer (hammer head-to-shaft angle) to especially adapt it to the change in properties of the paper pulp (sharp increase of viscosity) arising from adding the glue to the pulp at the stamper beating stage.