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Datasheet for the decision of 1 March 2019

Case Number: T 1822/14 - 3.4.03

Application Number: 06024349.0

Publication Number: 1752932

IPC: G07D7/12

Language of the proceedings: EN

Title of invention:
Optical sensing device for detecting optical features of valuable papers

Patent Proprietor:
JAPAN CASH MACHINE CO., LTD.

Opponent:
Crane Payment Innovations, Inc.

Headword:

Relevant legal provisions:
EPC 1973 Art. 54, 56, 76(1), 84, 87(1), 100(a), 100(b), 100(c)
EPC Art. 52(1), 123(2)
EPC R. 80
RPBA Art. 15(1)

This datasheet is not part of the Decision.
It can be changed at any time and without notice.

Keyword:
Amendments - added subject-matter (no)
Inventive step - main request (no) - auxiliary request (yes)

Decisions cited:
T 1019/99

Catchword:

This datasheet is not part of the Decision.
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Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 1822/14 - 3.4.03

D E C I S I O N
of Technical Board of Appeal 3.4.03
of 1 March 2019

Appellant: (Patent Proprietor)	JAPAN CASH MACHINE CO., LTD. 3-15, Nishiwaki 2-chome, Hirano-ku Osaka-shi, Osaka 547-0035 (JP)
Representative:	Flach Bauer Stahl Patentanwälte Partnerschaft mbB Adlzreiterstraße 11 83022 Rosenheim (DE)
Respondent: (Opponent)	Crane Payment Innovations, Inc. 3222 Phoenixville Pike, Suite 200 Malvern, PA 19355 (US)
Representative:	Peterreins Schley Patent- und Rechtsanwälte Hermann-Sack-Strasse 3 80331 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 3 July 2014 revoking European patent No. 1752932 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman	G. Eliasson
Members:	S. Ward
	W. Van der Eijk

Summary of Facts and Submissions

I. This is an appeal against the decision of the Opposition Division to revoke the European patent EP 1 752 932 on the grounds that the subject-matter of claim 5 of the main request and claim 4 of the first auxiliary request extended beyond the content of the earlier (parent) application as filed (Article 100(c) EPC) and that the subject-matter of the second and third auxiliary requests was not new (Article 100(a) EPC).

II. The patent is based on European application EP 06 024 349, which is divided from parent application EP 03 768 359, originally filed as international application JP2003/017006 and published as WO 2004/061784 A1.

The opposition had been filed against the patent in its entirety. Grounds for the opposition were lack of novelty, lack of inventive step, insufficient disclosure and unallowable extension of subject-matter (Articles 100(a), (b) and (c), 52(1), 54 and 56 EPC).

III. At the end of the oral proceedings held before the Board the appellant-proprietor (hereinafter, the proprietor) requested that the decision under appeal be set aside and the patent be maintained on the basis of its main request or, alternatively, on the basis of one of auxiliary requests 1-7, all filed on 25 January 2019. The documents of the third auxiliary request were as follows:

- claims 1 and 2 of the third auxiliary request, filed on 25 January 2019;

- description: page 2, filed on 1 March 2019 during oral proceedings before the Board and pages 3-7 as in the published patent specification;
- drawings: sheets 1/9-9/9 as in the published patent specification.

The respondent-opponent (hereinafter, the opponent) requested that the appeal be dismissed.

IV. The following documents are referred to in this decision:

D2: EP 1 321 904 A1
D3: WO 01/37226 A1
D4: US 5 923 413
D5: US 6 486 464 B1
D6: JP 3037946 U
D6a: Partial English translation of D6.
D7: WO 96/10808 A2
D8: GB 1 470 737
D9: EP 1 357 522 A2
D10: GB 2 355 522 A

V. (i) Claim 1 of the main request (including the feature numbering used in the statement of grounds of appeal) reads as follows:

"(a) An optical sensing device for detecting optical features of valuable papers, comprising first and second fourfold assemblies longitudinally arranged before and behind along a passageway (13) for guiding the transported valuable paper (64);
(b) said first fourfold assembly comprising first and second photocouplers (5, 6) positioned in the vicinity of and on the opposite sides of the passageway (13); and

(c) said second fourfold assembly comprising third and fourth photocouplers (9 and 10) positioned in the vicinity of and on the opposite sides of the passageway (13);
(d) wherein the first and third photocouplers (5 and 9) are arranged in vertically spaced relation to and in alignment to respectively the second and fourth photocouplers (6 and 10);
(e) said first photocoupler (5) comprises a first light emitting element (20) for emitting a first light and a first light receiving element (21) adjacent to said first light emitting element (20);
(f) said second photocoupler (6) comprises a second light emitting element (22) located in alignment with the first light receiving element (21) for emitting a second light of the wavelength different from that of the first light, and a second light receiving element (23) located in alignment with the first light emitting element (20) and adjacent to said second light emitting element (22);
(g) the first light receiving element (21) can selectively receive the first light reflected on the valuable paper (64) and the second light emitted vertical to the passageway (13) and straight penetrating the valuable paper (64);
(h) the second light receiving element (23) can selectively receive the second light reflected on the valuable paper (64) and the first light emitted vertical to the passageway (13) and straight penetrating the valuable paper (64);
(i) said third photocoupler (9) comprises a third light emitting element (30) for emitting a third light and a third light receiving element (31) adjacent to the third light emitting element (30);
(j) said fourth photocoupler (10) comprises a fourth light emitting element (32) located in alignment with

the third light receiving element (31) for emitting a fourth light of the wavelength different from that of the third light, and a fourth light receiving element (33) located in alignment with the third light emitting element (30) and adjacent to the fourth light emitting element (32);
(k) the third light receiving element (31) can selectively receive the third light reflected on the valuable paper (64) and the fourth light emitted vertical to the passageway (13) and straight penetrating the valuable paper (64); and
(l) the fourth light receiving element (33) can selectively receive the fourth light reflected on the valuable paper (64) and the third light emitted vertical to the passageway (13) and straight penetrating the valuable paper (64)."

(ii) Claim 1 of auxiliary request 1 comprises the following additional features (continuation of the feature numbering added by the Board):

"(m) the first and second photocouplers (5, 6) are positioned in vertically spaced relation to each other across the passageway (13);
(n) the third and fourth photocouplers (5, 6) are positioned in vertically spaced relation to each other across the passageway (13)".

(iii) Compared with claim 1 of auxiliary request 1, claim 1 of auxiliary request 2 comprises the following additional features (continuation of the feature numbering added by the Board):

"(o) the first and second light emitting elements (20, 22) are turned on at the different points in time from each other;

(p) the third and fourth light emitting elements (30, 32) are turned on at the different points in time from each other".

(iv) Compared with claim 1 of auxiliary request 2, claim 1 of auxiliary request 3 comprises the following additional features (continuation of the feature numbering added by the Board):

"(q) one of the first and second lights is infrared ray and the other of the first and second lights has a wavelength other than the wavelength of infrared ray; (r) one of the third and fourth lights is infrared ray and the other of the third and fourth lights has a wavelength other than the wavelength of infrared ray; (s) the infrared ray penetrating the valuable paper (64) and received by the receiving elements provides reference or basic light data for detecting a light amount level of light other than infrared ray."

VI. The proprietor's arguments, in so far as they are relevant to the present decision, were essentially as follows:

(i) The current requests represented a legitimate response both to a change of view on the part of the Opposition Division during the oral proceedings, and to the provisional opinion of the Board, and they should therefore be admitted into the proceedings.

(ii) The amendments to the dependent claims of the main request were made with a view to overcoming the objections of the Opposition Division on the ground of Article 100(c) EPC, hence these amendments complied with the requirements of Rule 80 EPC.

(iii) The Opposition Division correctly concluded that the subject-matter of claim 1 of the then main request did not extend beyond the content of the earlier (parent) application as originally filed, and the new features added also had a clear basis in the parent application. The dependent claims had been recast in a manner which overcame the objections of the Opposition Division to claim 5.

(iv) It followed, by virtue of the similarity of the priority application to the parent application, that the priority of claim 1 of the main request was valid. Hence, documents D2 and D9 were prior art only within the meaning of Article 54(3) EPC.

(v) The amendments to features (f), (g), (h), (j), (k), and (l) of claim 1 of the main request ("located in alignment with", "emitted vertical to the passageway" and "straight penetrating the valuable paper") overcame the novelty objection of the Opposition Division in relation to D2.

(vi) Starting from D6/D6a as the closest prior art, claim 1 of the main request differed firstly in defining fourfold assemblies (the unit shown in Fig. 3A of D6 comprised six elements), secondly in defining a multi-wavelength arrangement (the second and fourth lights having wavelengths different from those of the first and third lights, respectively), and thirdly in defining that the first and second fourfold assemblies were "longitudinally arranged before and behind". These differences provided a compact arrangement with a minimum of elements offering accurate and secure validation.

(vii) The additional features of the auxiliary requests further differentiated the claimed subject-matter from the closest prior art.

VII. During the oral proceedings, the opponent stated that it did not wish to maintain the objection based on the ground of Article 100(b) EPC. The opponent's other arguments, in so far as they are relevant to the present decision, were essentially as follows:

(i) The appeal was inadmissible. The proprietor had not explained why the decision was wrong, but had merely filed new requests.

(ii) The requests filed with the statement of grounds of appeal could have been filed before the department of first instance and should not be admitted into the proceedings.

(iii) At least some of the amendments to the dependent claims of the main request were mere clarifications and were not occasioned by a ground of opposition, for example, amending "element" to "elements" in claim 4. Such amendments did not comply with the requirements of Rule 80 EPC.

(iv) The feature that the first light emitting element could receive the second light "emitted vertical to the passageway" had no basis in either the parent application or the application as originally filed. While the photocouplers were disclosed as being "in vertically spaced relation to each other across the passageway", there was no corresponding disclosure for the light emitting and receiving elements. The same objection applied to the other pairs of elements. The features "a second light emitting element (22) located

in alignment with the first light receiving element (21)" and "a fourth light emitting element (32) located in alignment with the third light receiving element (31)" were also not originally disclosed. The dependent claims similarly comprised added subject-matter.

(v) Several of the dependent claims filed with the statement of grounds of appeal were unclear. According to current claim 4 "the infrared ray penetrating the valuable paper" (singular) was received by "receiving elements" (plural), which was not clear.

(vi) The claimed priority was not valid. The priority application did not include any independent claim defining fourfold assemblies analogous to claim 8 of the parent application (nor dependent claims analogous to claims 9 and 10). Furthermore, the term "selectively", which appeared in claim 1 of the main request, was not disclosed anywhere in the priority application. The priority document disclosed that the "first and second light emitting elements are turned on at the different points in time from each other", but the formulation of claim 1 ("selectively") was broader.

(vii) Document D2 was prior art at least under Article 54(3) EPC, and anticipated all features of claim 1. The claimed feature "in alignment" simply meant that light from an emitter could be received by the corresponding receiver, and "vertical" did not mean "perpendicular" to the passageway.

(viii) D6 was the closest prior art. The unit shown in Fig. 3A comprised six elements, arranged as three pairs of light emitting and receiving elements, and any two of these pairs constituted a "fourfold assembly", hence the first alleged difference identified by the

proprietor was in fact disclosed in D6. Claim 1 therefore differed from D6 firstly in the multi-wavelength aspect and secondly in that the fourfold assemblies were "longitudinally arranged before and behind". The use of multiple wavelengths and time sequencing was common knowledge in the art, as exemplified in documents D2, D8, D4 and D3. The second difference would not provide greater compactness, as alleged by the proprietor, and the technical problem could only be seen as providing an alternative arrangement, the claimed arrangement being one obvious solution.

(ix) The additional feature of claim 1 of auxiliary request 1 was disclosed in D6. The additional feature of claim 1 of auxiliary request 2 merely represented the manner in which multi-wavelength arrangements were routinely implemented in the prior art. The additional feature of claim 1 of auxiliary request 3 was known from documents D9, D4 or D10.

(x) Other starting points and combinations could also be used to demonstrate a lack of inventive step, for example, D2 alone or in combination with D6; D4 alone or in combination with D5 or D3; and D3 alone, or in combination with D4 or D2.

VIII. With the summons to oral proceedings, the Board sent the parties a communication under Article 15(1) RPBA. The Board stated *inter alia* its provisional views that: the appeal was admissible, the new requests should be admitted into the proceedings, the subject-matter of claim 1 of the main request did not appear to extend beyond the content of the parent application as filed, but it was doubtful whether this was the case for some of the dependent claims (as then on file), the

invention appeared to be sufficiently disclosed, and D2 did not appear to anticipate the subject-matter of claim 1 of the main request. It was envisaged that the questions of priority and inventive step would be discussed at oral proceedings.

Reasons for the Decision

1. *Admissibility of the appeal*

1.1 In its communication under Article 15(1) RPBA the Board expressed the provisional opinion that, contrary to the view of the opponent, the appeal was admissible. The statement of grounds contained reasoning explaining why the proprietor considered that its *current* requests overcame the objections of the Opposition Division, and this was sufficient to satisfy the requirements for admissibility of the appeal.

1.2 This matter was not further pursued by the Opponent, and the Board sees no reason to deviate from this opinion. The appeal is admissible.

2. *Admission of the present requests into the proceedings*

2.1 The opponent also argued in the written proceedings that the proprietor's then current requests should not be admitted into the proceedings. These requests have now been superseded by the requests on which the present decision is based.

2.2 Formally, the question whether the current requests should be admitted into the proceedings has not been

raised by the opponent, and the Board sees no reason to raise it of its own motion. The main request and auxiliary requests 1-7, all filed on 25 January 2019, are therefore admitted into the proceedings.

3. *Rule 80 EPC*

3.1 The amendments made to the dependent claims of the main request represent an attempt to overcome the objections of impermissible added subject-matter in both the contested decision and in the Board's communication. Such amendments are occasioned by the ground of Article 100(c) EPC 1973, and therefore comply with the requirements of Rule 80 EPC.

3.2 Consequential amendments required for reasons of consistency with amendments occasioned by a ground for opposition (for example, replacing "element" with "elements" in claim 4, to take account of the fact that claim 2 now defines two infrared rays) also comply with the requirements of Rule 80 EPC.

4. *Article 76(1) EPC 1973 and Article 123(2) EPC*

4.1 Claim 1 of the main request is chiefly based on claims 8-10 of the parent application. The opponent objects that the following features of claim 1 (in bold) were not present in these claims and have no basis in the parent application as originally filed:

(A) *"a second light emitting element (22)* ***located in alignment with the first light receiving element (21) ..."*** (and similarly for the other light emitting/ receiving elements, *mutatis mutandis*); and

(B) *"the second light receiving element (23) can selectively receive the second light reflected on the valuable paper (64) and the first light* ***emitted vertical to the passageway (13) and straight*** *penetrating the valuable paper (64)"* (and similarly for the other lights, *mutatis mutandis*).

4.2 For feature (A), the proprietor cites passages on pages 7-8 of the parent application and Figs. 5 and 6 as basis. According to the passage on page 7, lines 15-17:

"First light emitting element 20 is apposed to first light receiving element 21 transversely to the transported direction of bill 64 and in alignment with second light receiving element 23 across passageway 13."

Analogous dispositions of the other elements are described on page 7, lines 17-20 and page 8, lines 20-25.

4.3 There is therefore a literal basis for the first light emitting element and the second light receiving element (on the opposite side of the passageway) being "in alignment", as in feature (A).

4.4 Regarding feature (B), there is no explicit definition in the application of what precisely is meant by the "vertical" direction. However, in the described embodiments, the term "vertically" is used (in relation to the photocouplers and triplex assemblies) to refer to a direction which can be seen in the associated drawings to be perpendicular to the plane of the passageway (or equivalently, to the plane of the valuable paper). Hence, in the contested patent, the disclosed devices are described within the context of a

frame of reference in which the direction perpendicular to the plane of the passageway is taken to be the vertical direction (and therefore the plane of the passageway is the horizontal plane).

4.5 In the passage cited above under point 4.2, no reference is made to light beams emitted or received by the elements, or to *optical* alignment (or optical axes or an optically coaxial arrangement). Rather, this passage concerns the *positional* relationships between the elements. The first light emitting element (20) is apposed to a first light receiving element (21) (i.e. the two elements are in juxtaposition, or side by side) in a direction transverse to the transported direction of the bill. The first light emitting element (20) is in alignment with second light receiving element (23) across passageway (13), the most plausible reading of which is simply that they face each other directly across the passageway, in other words, they are positioned along a line perpendicular to the passageway. This is consistent with the drawings, and there is nothing to indicate any other intended meaning.

4.6 As noted above, the direction perpendicular to the plane of the passageway is referred to in the patent as the "vertical" direction, and hence the above passage defines that, within the meaning of the terminology used in the patent, the first light emitting element and the second light receiving element are positioned along a vertical line, so that the second light receiving element would receive the first light emitted vertical (i.e. perpendicular) to the passageway and penetrating the valuable paper. This light is also referred to in the description as "straight penetrating bill 64" or "straight going through bill 64", (page 7,

lines 23 and 27). The Board is therefore satisfied that feature (B) also has a basis in the parent application as originally filed.

4.7 The Board is not persuaded by the argument that claim 1 of the main request represents an inadmissible intermediate generalisation. It is true that features (A) and (B) are taken from the description and drawings where they are disclosed in combination with other features, for example a housing and mounting means. However, according to consistent case law of the Boards, such an amendment introduces subject-matter which extends beyond the content of the application as filed only if there is a clearly recognizable functional or structural relationship between features which have been imported into the claim and other features which have not, i.e. if these features are inextricably linked (see *Case law of the Boards of Appeal of the European Patent Office*, 8th edition 2016, II.E.1.7).

4.8 In the present case the Board finds that no such inextricable link has been demonstrated between, on the one hand, features (A) and (B), and on the other, the housing, mounting arrangements or the specific layout depicted. Claim 1 of the main request therefore has a satisfactory basis in the parent application as originally filed.

4.9 The provisional opinion of the Board was that some of the opponent's objections to the dependent claims concerning extension of subject-matter appeared to be valid. The Board is satisfied that these objections have been overcome by amendment, and the matter was not further pursued at oral proceedings by the opponent.

The main request therefore complies with the requirements of Article 76(1) EPC.

4.10 Claims 1-3 of the application as originally filed correspond to claims 8-10 of the parent application as originally filed, and the two descriptions are essentially the same. Hence, the main request also complies with the requirements of Article 123(2) EPC.

5. *Main request: Clarity*

5.1 In the reply to the statement of grounds of appeal several clarity objections were raised against dependent claims. The claims have since been significantly amended, rendering some of these objections moot, and it was therefore for the opponent to indicate which objections it wished to pursue against the claims as amended.

5.2 At oral proceedings an objection of lack of clarity was pursued only against claim 4, in that the use of the singular "infrared ray" was said to be incompatible with the plural "receiving elements". However, from claim 2, on which claim 4 depends, it is apparent that there are two infrared rays, and the receiving elements in claim 4 are those receiving each respective infrared ray. The Board therefore finds no lack of clarity in claim 4, and sees no other reasons to believe that the claims are unclear. The main request therefore complies with the requirements of Article 84 EPC 1973.

6. *Priority of claim 1 of the main request*

6.1 The opponent argued that the priority claim for claim 1 of the main request was invalid, as the (translation of the) priority application lacked claims corresponding

to independent claim 8 and dependent claims 9 and 10 of the parent application, which defined arrangements having first and second fourfold assemblies.

6.2 Dependent claim 5 of the priority document defines "at least two fourfold assemblies longitudinally arranged before and behind along a passageway for guiding the transported valuable paper", and due to the structure of the dependencies, the subject-matter of claims 1-6 is disclosed in combination, and comprises most of present claim 1. Moreover, subject-matter corresponding to that of claim 1 of the main request can also be found in the description and drawings of the priority document (including the light emitting and receiving elements being in vertically spaced relation to each other, see e.g. paragraph [0011], lines 11-14). The Board does not therefore believe that the opponent has made a persuasive case for the invalidity of the priority of claim 1 of the main request on the basis that claims precisely corresponding to claims 8-10 of the parent application are not present.

6.3 The term "selectively", which appears in claim 1 of the main request, does not appear in either the claims or the description of the translation of the priority application. The closest corresponding feature in the priority application is that the "first and second light emitting elements are turned on at the different points in time from each other" (claim 7 and paragraph [0031]).

6.4 The Board can accept that "selectively receiving" light from first and second light emitting elements implies some form of temporal switching: the light is received from the first light emitting element or from the

second light emitting element, but not from both at the same time.

It would, however, be immediately apparent to a skilled reader that providing selective reception of light at a detector could be achieved by means other than turning the first and second light emitting elements on and off at different points in time, for example, by providing switchable or movable spectral or polarisation filters in the optical path.

6.5 The term "selectively receiving" therefore goes beyond the disclosure of the priority document in this respect, and hence the inventions defined in claim 1 of the main request and in the priority document do not represent "the same invention" within the meaning of Article 87(1) EPC 1973. The claims of the main request do not, therefore, enjoy the claimed right of priority. The consequence for the present procedure is that, for the main request, documents D2 and D9 are prior art within the meaning of Article 54(2) EPC 1973.

7. *Main request: Novelty*

7.1 In the statement of grounds of appeal, claim 1 of the main request was attacked for lack of novelty over D2. As explained above (point 4.6), the Board's interpretation of claim 1 is that "light emitted vertical to the passageway" means light emitted perpendicularly to the passageway and the paper (the proprietor explicitly confirmed in oral proceedings that this was also its understanding of this feature).

7.2 The opponent accepted that vertical emission understood in this sense was not disclosed in D2, and this objection was not pursued. The subject-matter of claim

1 of the main request is therefore found to be new within the meaning of Article 52(1) EPC and Article 54 EPC 1973.

8. *Main request: Inventive step*

8.1 In the oral proceedings, the opponent was of the view that D6 was the closest prior art and the Board sees no reason to dispute this. Claim 1 differs from D6 in defining:

(i) a fourfold arrangement (the unit shown in Fig. 3A of D6 comprises six elements);

(ii) a multi-wavelength arrangement (the second and fourth lights having wavelengths different from those of the first and third lights, respectively); and

(iii) "first and second fourfold assemblies longitudinally arranged before and behind".

The Board does not accept the opponent's argument that feature (i) is in fact disclosed in D6. In the context of the language of patent claims, it may be the case that a device defined as "comprising four elements" would be anticipated by an otherwise identical device having six such elements, on the grounds that the latter device does indeed comprise four elements, plus a further two elements. However, the formulation "a fourfold assembly" clearly conveys that precisely four elements are present.

8.2 Concerning feature (ii), the associated problem can be seen as that proposed in paragraph [0001] of the patent: "to improve validation performance of the valuable paper".

8.3 D6 discloses a "bill validation sensor", which implicitly would be employed in an optical sensing device as defined in feature 1 of claim 1. D6 (or at least that part of it for which a translation has been provided by the opponent) appears to be almost exclusively concerned with the responses of the sensor 13 depicted in Fig. 3(A) to the test object shown in Fig. 3(D) (a sheet of white paper having a narrow black line on one surface 31, and being blank on the opposite surface 30) under the following conditions:

(a) light sources 2 and 3 activated, with surface 30 on the side of sensor 13 (Fig. 4(E));
(b) light sources 2 and 3 activated, with surface 31 on the side of sensor 13 (Fig. 4(F));
(c) only source 3 activated (Fig. 4(G));
(d) only source 3 activated, cylindrical lenses 8, 10 omitted (Fig. 4(H)).

8.4 D6 is entirely silent on how the sensor arrangement would actually be operated in a bill validation device. Even if it is considered implicit (from Figs. 4(E) and 4(F)) that the sensor may be operated in both transmission and reflection, there is no indication whether one or more wavelengths should be used, which wavelength(s) to use, or whether light is to be received from emitting elements simultaneously (as it would be in the tests from which Figs. 4(E) and 4(F) are derived) or selectively (e.g. sequentially).

8.5 The skilled person looking to put the bill validation sensor of D6 to practical use in a bill validator device would, however, be aware that such devices routinely employ multiple wavelengths as reflected, for example, in the following cited prior art:

- D2, which discloses a banknote validator using multiple wavelength LEDs such as red, green, blue and infra-red (paragraph [0025]) in a time-sequential manner (paragraph [0028]).

- D8, which discloses an apparatus for optically testing the authenticity of bank notes using sources of red, yellow or green and "light in the invisible range" (page 4, lines 48-56) operated cyclically (e.g. claim 5).

- D4, which discloses a device for identifying the denomination and authenticity of banknotes using emitters including red, green, blue and infrared which are selectively operable (column 3, lines 4-12; column 5, lines 56-67; column 6, lines 27-44). This "enables the gathering of much more data concerning the note image and material properties than prior types of note denominators and validaters" (column 7, lines 23-30), hence implicitly improving discrimination.

- D3, which discloses a banknote verification apparatus successively exposing a note to several light sources with different spectral properties (abstract) including infrared (page 15, lines 21-26; page 17, line 22 - page 18, line 12).

8.6 Even where the reason for employing multiple wavelengths sequentially is not explicitly stated in the prior art documents, it would be clear to the skilled person that the purpose is to increase the amount and variety of data collected, to thereby improve validation performance of the device. It would therefore be obvious for the skilled person to

incorporate the distinguishing feature (ii) into the device of D6.

8.7 The technical effect of distinguishing features (i) and (iii) is seen by the proprietor as providing a compact arrangement with a minimal number of elements.

8.8 The Board accepts that providing a more compact arrangement can represent a genuine technical problem. For example, a device providing the same functionality as devices of the prior art, but requiring less space or fewer elements could be seen as providing a solution to a technical problem. However, there is no evidence that the device of the present invention achieves compactness in this sense, nor has this been argued by the proprietor.

In the absence of a specific problem plausibly solved by features (i) and (iii), the Board can only regard the problem as providing an alternative arrangement of light emitters and receivers.

8.9 D6 discloses, in Fig. 3A, elements 2, 13, 4, which may be considered to constitute a "first photocoupler", and elements 14, 3, 15, which may be considered to constitute a "second photocoupler", the first and second photocouplers constituting a single sixfold assembly of elements. By contrast, claim 1 defines first and second photocouplers each comprising two elements, to thereby form a fourfold assembly, and defines that there are (at least) two such fourfold assemblies "longitudinally arranged before and behind", hence there are eight elements in total.

The skilled person would understand that choosing a larger number of emitters and detectors would provide a

greater quantity and variety of data, and that selecting a smaller number might be cheaper and less complex, but would gather a correspondingly reduced quantity of data. Both alternatives would have entirely foreseeable advantages and disadvantages, and selecting the claimed arrangement would require no inventive activity.

8.10 Moreover, the Board sees no plausible reason why providing emitter and detector assemblies upstream and downstream ("longitudinally arranged before and behind") should be considered an invention, especially given that such arrangements are known in the art (see D2, Figs. 5, 7 and 8; D7, Fig. 1).

8.11 The Board therefore concludes that features (i) and (iii) merely represent one obvious possible solution among many to the problem of providing an alternative arrangement of light emitters and receivers. Moreover, no synergistic effect is apparent between these features and feature (ii). Consequently, the subject-matter of claim 1 of the main request does not involve an inventive step within the meaning of Article 52(1) EPC and Article 56 EPC 1973.

9. *First auxiliary request*

The only new feature in claim 1 of the first auxiliary request is that the photocouplers are positioned in vertically spaced relation to each other across the passageway, which is also disclosed in D6 (see Fig. 3A). Hence the subject-matter of claim 1 of the first auxiliary request does not involve an inventive step within the meaning of Article 52(1) EPC and Article 56 EPC 1973.

10. *Second auxiliary request*

10.1 Claim 1 of auxiliary request 2 comprises the following additional feature:

"the first and second light emitting elements (20, 22) are turned on at the different points in time from each other;
"the third and fourth light emitting elements (30, 32) are turned on at the different points in time from each other".

10.2 As a result of the inclusion of this feature, the conclusions reached above under points 6.3 to 6.5 on the priority claim for the main request are not applicable to the second auxiliary request, and hence, for this request, the claimed priority is valid. A consequence is that D2 and D9 are prior art under Article 54(3) EPC only, and not relevant for the question of inventive step.

10.3 The Board has already concluded (points 8.2 to 8.6, above) that it would be obvious for the skilled person to incorporate prior art multi-wavelength arrangements into the device of D6 to improve the validation performance. The prior art documents cited above in this regard (D8, D4 and D3) all disclose that the individual wavelengths are switched on and off in a time-sequential manner to avoid mutual interference. It would therefore be entirely natural for the skilled person to incorporate this feature also into the arrangement of D6. The subject-matter of claim 1 of the second auxiliary request does not, therefore, involve an inventive step within the meaning of Article 52(1) EPC and Article 56 EPC 1973.

11. *Third auxiliary request*

11.1 Claim 1 of the third auxiliary request comprises the following additional features (with feature numbering added by the Board as under point V(iv), above):

"(q) one of the first and second lights is infrared ray and the other of the first and second lights has a wavelength other than the wavelength of infrared ray; (r) one of the third and fourth lights is infrared ray and the other of the third and fourth lights has a wavelength other than the wavelength of infrared ray; (s) the infrared ray penetrating the valuable paper (64) and received by the receiving elements provides reference or basic light data for detecting a light amount level of light other than infrared ray."

11.2 The Board has concluded above that the claimed priority of the second auxiliary request is valid, and it is not disputed that the additional features of claim 1 of the third auxiliary request are disclosed in the priority document. The claimed priority of the third auxiliary request is therefore also valid. As a consequence, documents D2 and D9 are prior art under Article 54(3) EPC only.

11.3 The main request has been found to meet the requirements of Article 76(1) EPC 1973 and Article 123(2) EPC, and no further specific objections under these articles have been raised against the present third auxiliary request. The third auxiliary request therefore meets the requirements of Article 76(1) EPC 1973 and Article 123(2) EPC.

11.4 Features (q), (r) and (s) are not disclosed in the closest prior art (D6). However, the use of infrared

radiation *per se* is well known in the art (see the references to D8, D4 and D3 under point 8.5, above), and hence features (q) and (r) are not inventive. The question of inventive step therefore turns on feature (s). The technical effect of this feature is explained in paragraph [0030] of the patent as follows:

"When infrared ray penetrates bill 64, it can be received by a light receiving element with less impact by colored ink printed on bill 64 but with impact by paper quality of bill 64, and therefore, received infrared ray can provide reference or basic light data for detecting a light amount level of light other than infrared ray, such as red, green, yellow, blue or ultraviolet light. In this case, difference between received light amounts of infrared ray and light other than infrared ray provides good optical data without influence by paper quality of bill 64."

11.5 The Board endorses the view taken in T 1019/99 that:

"the correct procedure for formulating the problem is to choose a problem based on the technical effect of exactly those features distinguishing the claim from the prior art that is as specific as possible without containing elements or pointers to the solution" (T 1019/99, point 3.3 of the Reasons).

11.6 In the present case, the general purpose of the claimed invention is to detect optical features, in particular "optical patterns for different colors printed on valuable paper" (paragraphs [0007], [0008]), and the specific problem solved by feature (s) is to ensure that the detection of optical features of valuable papers is not influenced by the paper quality of the bill. The Board sees this as a reasonable objective

technical problem, given that a validation device would be expected to accurately detect optical features of, for example, brand new banknotes as well as banknotes which are soiled, worn or otherwise displaying signs of deterioration in paper quality.

11.7 In arguing that the claimed solution to this problem is obvious, the opponent invoked documents D9, D4 and D10. However, since D9 has been found to be prior art only within the meaning of Article 54(3) EPC, it is not relevant for the question of inventive step.

11.8 Document D4 discloses an apparatus for indicating a banknote type having spot sensing assemblies including selectively operable blue, green, red and infrared LEDs, and photocells for detecting transmitted and reflected radiation. The type of banknote is determined by evaluating the degree of correlation between a set of sensed values and a set of stored reference values by means of a formula given at line 20 in column 8. For each set of sensed data (representative of the reflectance or transmission values from the note) the correlation is calculated using *inter alia* the average value (μ_x) and the standard deviation (σ_x) of the sensed data (x_i).

The opponent argues that the parameters μ_x and σ_x correspond to the claimed "reference or basic light data", and that some embodiments calculate the correlation using the average and standard deviation obtained from *all* of the measured data, including the transmitted infrared light, as reference data for *each* of the measured values, including those of the non-infrared radiation. Hence, the claimed feature (s) is disclosed.

11.9 The Board does not agree. In the optical sensing device of claim 1 of the third auxiliary request, infrared and non-infrared radiation are detected in both transmission and reflection, and:

"the infrared ray penetrating the valuable paper (64) is received by the receiving element for providing reference or basic light data for detecting a light amount level of light other than infrared ray".

A skilled person reading the claim would derive that, in operation, the transmitted infrared ray plays a particular role in the device, namely to provide a calibration level, by reference to which the level of non-infrared light is evaluated. A feature formulated in this way cannot credibly be understood to mean (or to include the possibility) that the transmitted infrared ray plays no special role in this regard, and that in fact all rays (transmitted and reflected, infrared and non-infrared) are used, on an equal footing, to provide reference or basic light data, as is said to be the case in D4.

11.10 In the Board's view the only reasonable understanding of the claim is that, for each cycle of data acquisition, the level of non-infrared radiation is evaluated by reference to the detected level of the transmitted infrared radiation, for example as a difference or ratio. Hence, even if the skilled person were motivated to incorporate the correlation calculation of D4 into the device of D6 (which is questionable), this would not lead to the claimed device.

11.11 Document D10 discloses a banknote validator in which light from blue (or ultraviolet) and infrared sources

is detected in both transmission and reflection. According to the various possibilities set out on page 17 (points 1-4) for combining the measured data, the transmitted infrared radiation may be used as a reference level for the transmitted blue radiation.

11.12 However, D10 is concerned with verifying the authenticity of a banknote or the like by determining the authenticity of the paper substrate. In particular, the device enables banknote paper to be distinguished from photocopier paper (which "most counterfeiters use" for their forgeries) on the basis of their respective short wavelength spectral responses.

D10 is therefore not concerned with the problem set out above under point 11.4, namely ensuring that the detection of optical features is not influenced by variations in the paper quality, and in fact is not concerned with detecting optical features at all, but aims to solve the different problem of determining whether a banknote is made from genuine banknote paper. The skilled person would not therefore be led in an obvious manner to the claimed subject-matter on the basis of the combination of D6 and D10.

11.13 Since none of the available prior art is considered to render feature (s) obvious, the alternative inventive step attacks set out in the written procedure based on different starting points (e.g. D4 or D3) must also fail. The Board therefore judges that the subject-matter of claim 1 of the third auxiliary request involves an inventive step within the meaning of Article 52(1) EPC and Article 56 EPC 1973.

Order

For these reasons it is decided that:

1. The decision under appeal is set aside.

2. The case is remitted to the department of first instance with the order to maintain the patent in amended form on the basis of the following documents:

   Claims:
   claims 1 and 2 of the third auxiliary request, filed on 25 February 2019;

   Description:
   page 2, filed on 1 March 2019 during oral proceedings before the Board;
   pages 3-7 as in the published patent specification;

   Drawings:
   sheets 1/9-9/9 as in the published patent specification.

The Registrar: The Chairman:

S. Sánchez Chiquero G. Eliasson

Decision electronically authenticated

Europäisches Patentamt
European Patent Office
Office européen des brevets

Beschwerdekammern

Boards of Appeal

Chambres de recours

Boards of Appeal of the
European Patent Office
Richard-Reitzner-Allee 8
85540 Haar
GERMANY
Tel. +49 (0)89 2399-0
Fax +49 (0)89 2399-4465

Case Number: T 1822/14 - 3.4.03

D E C I S I O N
of the Technical Board of Appeal 3.4.03
of 11 September 2019
correcting an error in the decision
of 1 March 2019

Appellant: (Patent Proprietor)	JAPAN CASH MACHINE CO., LTD. 3-15, Nishiwaki 2-chome, Hirano-ku Osaka-shi, Osaka 547-0035 (JP)
Representative:	Flach Bauer Stahl Patentanwälte Partnerschaft mbB Adlzreiterstraße 11 83022 Rosenheim (DE)
Respondent: (Opponent)	Crane Payment Innovations, Inc. 3222 Phoenixville Pike, Suite 200 Malvern, PA 19355 (US)
Representative:	Peterreins Schley Patent- und Rechtsanwälte Hermann-Sack-Strasse 3 80331 München (DE)
Decision under appeal:	**Decision of the Opposition Division of the European Patent Office posted on 3 July 2014 revoking European patent No. 1752932 pursuant to Article 101(3)(b) EPC.**

Composition of the Board:

Chairman:	G. Eliasson
Members:	S. Ward
	W. Van der Eijk

1. The appellant's request, dated 8 August 2019, for a correction of an error pursuant to Rule 140 EPC in the decision T 1822/14, dated 1 March 2019, is allowed.

2. In the order, the text: "claims 1 and 2 of the third auxiliary request, filed on 25 February 2019" is an obvious mistake within the meaning of Rule 140 EPC, and is hereby corrected to "claims 1 and 2 of the third auxiliary request, filed on 25 January 2019".

The Registrar: The Chairman:

S. Sánchez Chiquero G. Eliasson

Decision electronically authenticated