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D E C I S I O N
of 21 January 1998

Case Number: T 0724/96 - 3.4.2
Application Number: 85112715.9
Publication Number: 0180792
IPC: G01N 35/06, G01N 33/52,
B65H 5/00, G01N 1/12

Language of the proceedings: EN

Title of invention:

Method and apparatus of automatic continuous analysis using analytical implement

Applicant/Patentee:

Kabushiki Kaisha Kyoto Daiichi Kagaku

Opponent:

Boehringer Mannheim GmbH Patentabteilung

Headword:

-

Relevant legal provisions:

EPC Art. 84; 54, 56, 102(3)

Keyword:

"Main request: clarity (no)"

"Auxiliary request 1: clarity (yes); novelty (yes); inventive step (yes)"

Decisions cited:

-

Catchword:

-



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Boards of Appeal

Chambres de recours

Case Number: T 0724/96 - 3.4.2

D E C I S I O N
of the Technical Board of Appeal 3.4.2
of 21 January 1998

Appellant:
(Opponent)

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Decision under appeal:

Interlocutory decision of the Opposition Division
of the European Patent Office posted 24 June 1996
concerning maintenance of the European patent
No. 0 180 792 in amended form.

Composition of the Board:

Chairman: E. Turrini
Members: M. Chomentowski
B. J. Schachemann

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Summary of Facts and Submissions

I. The respondent is proprietor of European patent No. 0 180 792. The patent, citing inter alia D1 = GB-A-2 014 113 as prior art document, had been granted with ten claims on the basis of European patent application No. 85 112 715.9. The only independent claim as granted read as follows:

"1. An automatic continuous analysis apparatus (1) which utilizes analytical implements (2) such as test strips, said apparatus comprising an automatic implement carrier (77) which transfers the implements (2) one by one to an automatic measuring device (76) and an automatic implement supply device (4) with a storage section (37), said apparatus being characterized by means (27, 28, 70) to remove the implements (2) one by one from said storage section (37) and transfer them to a picking up position (D) and an automatic analytical implement handling device (3) having a movable arm (12) adapted to be displaced into different positions, the arm having a grip device (11) at its free end by which the implements (2) may be picked up from the picking-up position (D) and moved to a vessel (73) where they are dipped into a sample solution and thereafter moved from said vessel (73) to the implement carrier (77)."

II. The appellant filed an opposition to the European patent on the grounds that in particular the subject-matter of claim 1 was not new having regard to E1 = DE-B-2 437 332 and that the subject-matter of claim 2 was either not new with respect to E1 or did not involve an inventive step having regard to E1 and E2 = Analytical Chemistry, vol. 55, No. 11, September 1983, pages 1100A-1102A, Raymond Dessy ed., "Robots in the laboratory, Part I".

III. The European patent was maintained in amended form.

The amended claim 1 found allowable by the Opposition Division comprised a combination of the features of claims 1 and 2 as granted, thereby specifying that means were arranged in said handling device to drive the arm up and down, left and right and rotatively; said amended claim further indicated, on the basis of the apparatus illustrated by Figure 1 of the patent as granted, that the transferring automatic implement carrier was a reaction table which carried the implements one by one to a measuring section of the automatic measuring device after receiving the implements dipped into the sample, and that the action of each of the handling device, supply device and automatic measuring device was controlled by a microcomputer of a control section so that the implements were dipped by the handling device into the vessel for a specified time and were measured by the measuring device after a specified time.

In its decision, the Opposition Division reasoned as follows with respect to this text of the claim for maintaining the patent as amended:

The subject-matter of amended claim 1 was not known in the art and was thus new. The closest prior art was represented by the apparatus shown in Figure 59 of E1.

The apparatus of amended claim 1 comprised, in addition to the apparatus of this embodiment of E1, a reaction table that moved the implements to a measuring device and, moreover, the feature that the handling device moved the arm "up and down, left and right and rotatively"; it was also noted that, after the

immersing stage, said handling device moved the implement to the reaction table and not directly to the measuring section as was the case with the known apparatus.

The object of the claimed apparatus was to optimize both the dipping process, by controlling the dipping time, and the reaction time needed for the various reagents on the implement to react with the sample. This objective was achieved using, in addition to a movable arm with a grip device at its end, a reaction table, so that the work performed, i.e. the movement of the implements to various positions, could be optimally divided by these two transferring parts, whereby these means could control the dipping time and the reaction time on the reaction table before measuring, respectively. In addition, by using an arm having three degrees of freedom, a more efficient dipping could be achieved; by controlling the movement of these means by a microcomputer, a more efficient operation of all the parts of the apparatus was also obtained. Neither the different forms of the analysis apparatus E1, which could comprise devices wherein the implement was not dipped into the sample, but sample droplets were provided on the implement, nor a combination of E1 and E2, showing robots in the laboratory, would hint to the use of both an arm and a reaction table or to the control by a microcomputer of the action of these means, with the resulting optimization of both the dipping time and the reaction time. D1 was mentioned as being relevant, but not commented, specifically. Therefore, the subject-matter of the amended claim was found to involve an inventive step.

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IV. The opponent lodged an appeal against this decision.

V. During the oral proceedings of 21 January 1998, which had been requested by way of an auxiliary request by the appellant, the respondent filed a **main request** comprising a claim 1 which read as follows:

"1. An automatic continuous analysis apparatus (1) which utilizes analytical implements (2) such as test strips, said apparatus comprising an automatic measuring device (6) which comprises an automatic implement carrier (77) which transfers the implements (2) one by one to a measuring section (76) of the automatic measuring device (6) and an automatic implement supply device (4) with a storage section (37), means (27, 28, 70) to remove the implements (2) one by one from said storage section (37) and transfer them to a picking up position and an automatic analytical implement handling device (3) having a movable arm (12) adapted to be displaced into different positions, the arm having a grip device (11) at its free end by which the implements (2) may be picked up from the picking-up position (X) and moved to a vessel (73) where they are dipped into a sample solution, wherein means (18, 20, 14) are arranged in said handling device (3) to drive the arm (12) up and down, left and right and rotatably whereby the implements (2) may be dipped into the vessel (73) and into a sample solution contained therein and thereafter moved from said vessel (73) to the implement carrier (77), said implement carrier is a reaction table (77) which carries the implements (2) to the light measuring section (76) after receiving the implements (2) dipped into the sample, and the action of handling device (3), supply device (4) and automatic measuring device (6)

are controlled by a microcomputer of a control section (7) so that the implements (2) are dipped by the handling device (3) into the vessel (73) for a specified time and are measured by the measuring device (6) after a specified time."

Moreover, the respondent filed ,inter alia, an **auxiliary request 1** comprising claims 2 to 9 filed with respondents's letter dated 19 December 1997 as first auxiliary request and a new claim 1 which specifies that the implement carrier is a reaction **turntable** (77) which is provided radially thereon with a plurality of grooves (78) for putting an analytical implement (2) therein and **rotated intermittently by a motor** (79), and which carries the implements (2) to the light measuring section (76) after receiving the implements (2) dipped into the sample. This claim, which is the only independent claim of **auxiliary request 1**, reads as follows:

"1. An automatic continuous analysis apparatus (1) which utilizes analytical implements (2) such as test strips, said apparatus comprising an automatic measuring device (6) which comprises an automatic implement carrier (77) which transfers the implements (2) one by one to a measuring section (76) of the automatic measuring device (6) and an automatic implement supply device (4) with a storage section (37), means (27, 28, 70) to remove the implements (2) one by one from said storage section (37) and transfer them to a picking up position and an automatic analytical implement handling device (3) having a movable arm (12) adapted to be displaced into different positions, the arm having a grip device (11) at its free end by which the implements (2) may be picked up from the picking-up position (X) and moved to a vessel (73) where they are dipped into a sample solution, wherein means (18, 20, 14) are arranged in said

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handling device (3) to drive the arm (12) up and down, left and right and rotatingly whereby the implements (2) may be dipped into the vessel (73) and into a sample solution contained therein and thereafter moved from said vessel (73) to the implement carrier (77), said implement carrier is a reaction turntable (77) which is provided radially thereon with a plurality of grooves (78) for putting an analytical implement (2) therein and rotated intermittently by a motor (79), carries the implements (2) to the light measuring section (76) after receiving the implements (2) dipped into the sample, and the action of handling device (3), supply device (4) and automatic measuring device (6) are controlled by a microcomputer of a control section (7) so that the implements (2) are dipped by the handling device (3) into the vessel (73) for a specified time and are measured by the measuring device (6) after a specified time."

VI. The respondent (proprietor) requested that the decision under appeal be set aside and the patent maintained in amended form according to the main request or, inter alia, to the auxiliary request 1, and he submitted the following arguments in support of his requests:

There is enough disclosure in claim 1 of the main request and in the patent in suit for the reader to obtain a clear definition of the apparatus and its reaction table carrying the implements to the measuring section. Thus, this claim clearly defines the matter for which protection is sought.

Concerning auxiliary request 1, which is based on the embodiment illustrated by Figure 1 of the patent in suit, there is no need for the coordinates of the movements of the gripping arm to be specified more precisely, since the movements of the arm which are allowed are sufficiently defined; therefore, claim 1 is

clear. Starting from Figure 59 of E1, which represents the closest prior art and which shows no supplementary means for carrying the implements, after dipping them in the sample vessel, to the measuring section of the apparatus, there is no derivable incentive for the skilled person to look for a better control of, in particular, the reaction time of said implement, in accordance with the object of the patent in suit; D1 indeed shows a transporting roller for carrying the dipped implement, but for improving the frequency of measurement, and not for regulation of the reaction time; in any case, this roller is not a turntable. It is also to be noted that the movements of the arm of E1 are controlled mechanically and are limited, as compared with the control of the movable arm by a microcomputer proposed by the patent in suit. Therefore, the subject-matter of auxiliary request 1 is not obvious in view of the prior art and thus involves an inventive step.

VII. The appellant (opponent) requested that the decision under appeal be set aside and the patent be revoked, and he argued in substance as follows in support of his request:

Claim 1 of the main request does comprise a feature referring to "the reaction table" carrying the implements to the measuring section of the apparatus, which is ambiguous in that sense that, due to the broadness of this term, it is not clear what kind of devices other than the embodiment with turntable illustrated by Figure 1 could be covered by the claim, even if it is interpreted in the light of the whole specification; therefore, this claim is not clear.

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Claim 1 of auxiliary request 1 also lacks clarity because the coordinates of the movements of the gripping arm are not defined clearly enough in relation with the remaining parts of the apparatus and, thus, it is ambiguous, which movements of the arm are covered by the claim. Starting from Figure 59 of E1, it would be obvious to the skilled person to improve the mechanical control therein by taking into account a robot arm, i.e. controlled by a microcomputer, as shown in E2. A roller transporting the dipped implements to the measuring section of the apparatus is known from D1 and presented there as an improvement, in particular for increasing the frequency of measurement; therefore, since a turntable is an obvious alternative thereof which is advantageous because, as generally known to the skilled person, it allows easy picking up of objects on its surface according to the choice of the operator, the combination of E1, E2 and D1 leads in an obvious way to the apparatus of auxiliary request 1, which thus lacks an inventive step.

Reasons for the Decision

1. The appeal is admissible.
2. *Main request*
 - 2.1 Clarity of claim 1
 - 2.1.1 Claim 1 of the main request concerns an automatic continuous analysis apparatus (1) which utilizes analytical implements such as test strips (2) and which is shown in Figure 1 of the patent in suit. The apparatus comprises an automatic implement supply device (4) with a storage section (37), means (27, 28, 70) to remove the implements (2) one by one from said storage section (37) and transfer them to a picking up

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position. The apparatus also comprises an automatic analytical implement handling device (3) having a movable arm (12) adapted to be displaced into different positions, the arm (12) having a grip device (11) at its free end by which the implements (2) may be picked up from the picking-up position (X) and moved to a vessel (73) where they are dipped into a sample solution; means (18, 20, 14) are arranged in said handling device (3) to drive the arm (12) up and down, left and right and rotatingly whereby the implements (2) may be dipped into the vessel (73) and into a sample solution contained therein and thereafter moved from said vessel (73) to an implement carrier (77), which is part of an automatic measuring device (6) of said apparatus. The automatic implement carrier (77), which transfers the implements (2) one by one to said measuring section (76) of said automatic measuring device (6), is a reaction table (77) which carries the implements (2) to the light measuring section (76) after receiving the implements (2) dipped into the sample. The action of handling device (3), supply device (4) and automatic measuring device (6) are controlled by a microcomputer of a control section (7) so that the implements (2) are dipped by the handling device (3) into the vessel (73) for a specified time and are measured by the measuring device (6) after a specified time.

2.1.2 As derivable from the patent in suit (see column 1, lines 50 to 60; column 9, line 61 to column 10, line 41; column 11, lines 12 to 31; Figure 1), there is a difficulty in prior art analysis apparatus related to the time which passes between the dipping of the implement into the sample and the start of the measurement, respectively, which may result in measurement errors, the difficulty being related in

particular to standardizing said interval of time, i.e. to avoid unintentional variations of said interval; another object of the invention is the automatization of the measuring procedure; according to the indicated text locations, the only embodiment provided to solve this problem comprises an optical measurement device having a light measuring section (76) and a reaction **turntable** (77) provided with grooves (78) for leading the analytical implements (2) placed therein to the light measuring section (76) by **rotating intermittently** a motor (79).

2.1.3 However, as the appellant convincingly argued in this respect, the definition of the implement carrier in claim 1 of the main request, comprising a reaction table (77) which transfers the implements (2) one by one to a measuring section (76) of the automatic measuring device (6), is in any case much broader than the only embodiment illustrated in the patent in suit, wherein said implement carrier is a reaction **turntable** (77) which is provided radially thereon with a plurality of grooves (78) for putting an analytical implement (2) therein and **rotated intermittently by a motor** (79). There is no indication about any other way a reaction table could function without, in particular, using "rotating" means so that the implements (2), which are dipped by the handling device (3) into the vessel (73) for a specified time and are measured by the measuring device (6) after a specified time, should be "carried to" the measuring section.

2.1.4 Therefore, the amendments provided to claim 1 as granted result in a definition of the implement carrier (77) which is not restricted to the turntable of the apparatus illustrated by Figure 1 but can comprise a reaction table which "carries" in an undefined way the

implements "to the measuring section", not corresponding to the illustrated apparatus nor to any other specific indication in the patent in suit. Moreover, it is to be noted that the patent in suit (see column 1, lines 44 to 50) stresses the time consuming procedures of the prior art, and there is no indication that the result of the amendments to the granted patent, which is an ambiguous definition of the apparatus, allows to meet this drawback while achieving the other, above-mentioned objects of the invention. Therefore, the amendments of claim 1 according to the main request are not clear in the sense of Article 84 EPC. Thus, the main request cannot be maintained as not satisfying the requirements of the Convention (Article 102(3) EPC).

2.2 Auxiliary request 1

2.2.1 Allowability of the amendments

Claim 1 of auxiliary request 1 comprises a combination of the features of claims 1 and 2 as granted, thereby specifying that the means (18, 20, 14) are arranged in said handling device (3) to drive the arm (12) up and down, left and right and rotatingly; the claim further specifies, on the basis of the apparatus illustrated by Figure 1 of the patent as granted, that the automatic implement carrier (77) is comprised in an automatic measuring device (6) and transfers the implements (2) one by one to a measuring section (76) of the automatic measuring device (6), said implement carrier being a reaction turntable (77) which is provided radially thereon with a plurality of grooves (78) for putting an analytical implement (2) therein, said turntable being rotated intermittently by a motor (79) for carrying the implements (2) to the light measuring section (76)

after they have been dipped in the sample vessel. The apparatus of claim 1 of auxiliary request 1 thus represents subject-matter more restricted than that of claim 1 as granted and moreover corresponds to the apparatus illustrated by Figure 1 of the application as filed (Articles 123(3) and (2) EPC).

2.2.2 Clarity of claim 1

The Board is of the opinion that it is directly and unambiguously derivable from the whole content of the patent in suit that, taking into account the generally known advantages of turntables for carrying objects, a time consuming measuring procedure is avoided by these features of claim 1 of auxiliary request 1. Concerning appellant's objection according to which the specific feature that means (18, 20, 14) are arranged in the handling device (3) to drive the arm (12) up and down, left and right and rotatingly, whereby the implements (2) may be dipped into the vessel (73) and into a sample solution contained therein and thereafter moved from said vessel (73) to the implement carrier (77), was ambiguous because the exact coordinates for the movement of the arm with respect to the other features of the apparatus were not indicated, the following is to be noted: the findings in the decision of the Opposition Division that the person skilled in the art would immediately see the reference co-ordinates needed and that it would be an unjustified limitation to define more specifically the arm movements can be also accepted with respect to the present version of claim 1, so that, since otherwise the apparatus is unambiguously defined and corresponds in particular to the apparatus illustrated by Figure 1, claim 1 of auxiliary request 1 is clear in the sense of Article 84 EPC.

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2.2.3 Novelty and inventive step

It has not been disputed that the subject-matter of claim 1 of auxiliary request 1 is not part of the state of the art and is thus new in the sense of Article 54 EPC.

The closest prior art is represented by the apparatus shown in Figure 59 of E1 (see column 44, line 39 to column 45, line 44; see also column 1, line 46 to column 3, line 4 and claim 1; see also Figure 60) because, as in claim 1 of auxiliary request 1, implements (test strips) are dipped into the sample before being submitted to an optical measurement.

Indeed, another apparatus is known from Figure 48 of the same E1; however, it concerns a different technique wherein there is no dipping of the implement in the sample, but wherein the sample is dropped onto the implements which are transported underneath the sample vessel, so that it is not relevant as a starting point for the present invention. Although in the technique of D1 (see in particular the apparatus illustrated by Figures 1 and 2) the implements are also dipped into a sample liquid to be analysed before being submitted to optical measurement, this other known apparatus comprises no arm controlled by a microcomputer for transporting the implements; moreover, the means for carrying these "dipped" implements to a light measuring section with a measuring head (17) is a rotating roller (1) provided with grooves (9) parallel to the axis of rotation (3) of the roller and not a turntable provided radially thereon with a plurality of grooves (78) for putting the analytical implements. Having regard to the

apparatus of E2, it consists only of a robot including a gripping arm with three degrees of freedom for the manipulation of samples, associated with further parts of an appliance in a laboratory, but without any indication about specific further means.

The apparatus of Figure 59 of E1 has an arm (562) for gripping the implement and transporting it to the light measuring section (491), but said arm has no means arranged to drive the arm up and down, left and right and rotatingly; moreover, this known apparatus has no supplementary means for carrying the implements to the light measuring section, and especially no reaction turn table which is provided radially thereon with a plurality of grooves for putting an analytical implement therein and rotated intermittently by a motor. It is also to be noted that, as convincingly argued by the respondent, there is no microcomputer of a control section for controlling the action of the different parts of this known apparatus, but only a mechanism including a specifically designed cam (568) in contact with the axis part (567) of the moving arm (562).

It is credible that, as submitted by the respondent, with the apparatus known from Figure 59 of E1 and its simple mechanism controlled by a cam, it is difficult to control the different period of time needed for particular operations, e.g. the dipping time, the reaction time and the measuring time, especially for different types of tests with different samples such as blood or urine whereby, in particular, the dipping times and the reaction times can be different; the apparatus of claim 1 of auxiliary request 1 has as an object the optimisation of these different operation times, especially for different kinds of tests, as can be seen for instance from the patent in suit (see in particular column 11, lines 12 to 37).

Starting from the apparatus of Figure 59 of E1, the person skilled in the relevant technical field can derive from this document no incentive for achieving the object referred to above. D1 (see page 1, lines 53 to 75) proposes a rotating drum as carrying member, but for increasing the measurement frequency, and not for optimisation of operation times. Thus, for the skilled person, there is no incentive either to further look for other forms of carrying means and in particular not for those with other characteristics such as those of turntables allowing an operator to pick objects from this turntable according to his choice. It is also to be noted that, to arrive at the presently claimed apparatus, it would be necessary to additionally take into account E2 and its robot arm for laboratory application. Therefore, having regard to the state of the art, the subject-matter of claim 1 of auxiliary request 1 is not obvious to a person skilled in the art and it thus involves an inventive step in the sense of Article 56 EPC.

2.2.4 Therefore, the patent can be maintained in amended form on the basis of claim 1 of auxiliary request 1 since it satisfies the requirements of the Convention (Article 102(3) EPC).

2.3 Thus, it is not necessary to take into account the further auxiliary requests of the respondent.

Order**For these reasons it is decided that:**

1. The decision under appeal is set aside.
2. The case is remitted to the Opposition Division with the order to maintain the patent in amended form as follows:

claim 1 of auxiliary request 1 presented at the oral proceedings;

claims 2 to 9 filed with respondents's letter dated 19 December 1997 as first auxiliary request;

with the description to be adapted and the drawings as in the patent specification.

The Registrar:



P. Martorana

The Chairman:



E. Turrini

