Internal distribution code:

(A) [-] Publication in OJ
(B) [-] To Chairmen and Members
(C) [-] To Chairmen
(D) [X] No distribution

Datasheet for the decision of 15 October 2015

Case Number: T 2123/10 - 3.5.04

Application Number: 03814149.5

Publication Number: 1573671

IPC: G06T1/00, G06T5/00

Language of the proceedings: EN

Title of invention:
GRADIENT CALCULATING CAMERA BOARD

Applicant:
Snap-On Technologies, Inc.

Headword:

Relevant legal provisions:
EPC 1973 Art. 56, 111(1)

Keyword:
Inventive step - (no)
Remittal to the department of first instance - (yes)

Decisions cited:

Catchword:

Beschwerdekammern
Boards of Appeal
Chambres de recours

European Patent Office
D-80298 MUNICH
GERMANY
Tel. +49 (0) 89 2399-0
Fax +49 (0) 89 2399-4465

Case Number: T 2123/10 - 3.5.04

D E C I S I O N
of Technical Board of Appeal 3.5.04
of 15 October 2015

Appellant: (Applicant)	Snap-On Technologies, Inc. 420 Barclay Boulevard Lincolnshire, IL 60069 (US)
Representative:	Müller-Boré & Partner Patentanwälte PartG mbB Friedenheimer Brücke 21 80639 München (DE)
Decision under appeal:	**Decision of the Examining Division of the European Patent Office posted on 19 May 2010 refusing European patent application No. 03814149.5 pursuant to Article 97(2) EPC.**

Composition of the Board:

Chairman	B. Müller
Members:	C. Kunzelmann
	M. Paci

Summary of Facts and Submissions

I. The appeal is against the decision of the examining division to refuse European patent application No. 03 814 149.5 under Article 97(2) of the European Patent Convention (EPC).

II. The application was refused on the grounds that the subject-matter of the independent claims then on file did not involve an inventive step in view of documents

D8: US 5 724 743 A and
D24: WO 01/68326 A2.

The features of the dependent claims were held to be known from D8, D24 or

D10: US 2002/0109112 A1.

III. The applicant appealed and requested that the decision be set aside. With the statement of grounds of appeal, the appellant filed claims according to a new main request and first to fourth auxiliary requests. It also indicated that the claims of the main request were identical to those underlying the decision under appeal.

IV. The board issued a communication pursuant to Article 15(1) of the Rules of Procedure of the Boards of Appeal (RPBA), annexed to a summons to oral proceedings. It indicated the board's provisional opinion that the finding as to lack of inventive step in the decision was correct.

V. With a letter of reply dated 15 September 2015, the appellant filed claims of a new main request and first

to eighth auxiliary requests. The appellant also indicated that obvious errors had been corrected and the terminology relating to the pre-processor had been adjusted in the claims of the main and first to fourth auxiliary requests.

VI. Oral proceedings before the board were held on 15 October 2015. During the oral proceedings, the appellant filed the claims of a ninth auxiliary request. The appellant's final requests were that the decision under appeal be set aside and that the case be remitted to the department of first instance with the order to grant a patent on the basis of the Main Request or the First to Eighth Auxiliary Requests, all filed with the letter of 15 September 2015, or on the basis of the claims of the 9th Auxiliary Request filed during the oral proceedings before the board.
At the end of the oral proceedings, the chairman announced the board's decision.

VII. Claim 1 of the main request reads as follows:

"A wheel alignment system, comprising:
at least one imaging module (110, 112), each imaging module comprising:
(a) an image sensor (203), for imaging a field of view encompassing a target (118, 120, 122, 124) attached to a wheel of a subject vehicle and generating representative image data;
(b) a data communication interface (205), and
(c) a processor (221), coupled to receive the image data from the image sensor, for performing at least one of a background subtraction and a gradient calculation on the image data from the image sensor, to form pre-processed image information;

the data communication interface (205) being configured for transmitting said pre-processed image information from the processor (221); and
a computer (111) coupled to receive the pre-processed image information transmitted from each imaging module and configured to act as a host computer of the wheel alignment system for processing the pre-processed image information to determine wheel alignment parameters of the vehicle."

VIII. Claim 1 of the first auxiliary request reads as follows:

"A wheel alignment system, comprising:
at least one imaging module (110, 112), each imaging module (110, 112) comprising:
(a) an image sensor (203), for imaging a field of view encompassing a target (118, 120, 122, 124) attached to a wheel of a subject vehicle and generating representative image data;
(b) a data communication interface (205), and
(c) a pre-processor, coupled to receive the image data from the image sensor (203), and configured to perform at least one of a background subtraction and a gradient calculation on the image data from the image sensor (203), to form pre-processed image information;
the data communication interface (205) being configured for transmitting said pre-processed image information from the pre-processor; and
a computer coupled to receive the pre-processed image information transmitted from each imaging module (110, 112) and configured to act as a host computer (111) of the wheel alignment system for processing the pre-processed image information to determine wheel alignment parameters of the vehicle."

IX. Claim 1 of the second and third auxiliary requests correspond to claim 1 of the first auxiliary request, with feature (c) reading

"a pre-processor, coupled to receive the image data from the image sensor (203), and configured to perform at least a gradient calculation on the image data from the image sensor (203), to form pre-processed image information;"

X. Claim 1 of the fourth auxiliary request corresponds to claim 1 of the second and third auxiliary requests, with the following feature appended at the end:

", wherein the pre-processor is configured to perform a background subtraction, wherein the pre-processor comprises a pipelined image processing circuitry (211), and wherein the pipelined image processing circuitry (211) is configured to perform a background image subtraction, calculate a gradient magnitude for each respective pixel of data from a result of the background image subtraction to produce gradient information, and perform run length encoding on the gradient information to form compressed pre-processed image information for transmission to the host computer (111)."

XI. Claim 1 of the fifth auxiliary request corresponds to claim 1 of the main request, with the last feature reading as follows:

"a computer (111) coupled to receive the pre-processed image information transmitted from each imaging module, to determine the position of the target in space based on the received pre-processed image information, and

configured to act as a host computer of the wheel alignment system for processing the pre-processed image information to determine wheel alignment parameters of the vehicle based on the determined position of the target."

XII. Claim 1 of the sixth auxiliary request corresponds to claim 1 of the fifth auxiliary request, with the function of the processor in feature (c) reading

"for performing at least a gradient calculation on the image data from the image sensor, to form pre-processed image information;".

XIII. Claim 1 of the seventh auxiliary request corresponds to claim 1 of the fifth auxiliary request, with the following feature appended at the end:

", wherein the imaging module is configured to do only the background subtraction and the gradient calculation, and wherein the computer (111) is configured to perform remaining computations."

XIV. Claim 1 of the eighth auxiliary request corresponds to claim 1 of the sixth auxiliary request, with the following feature appended at the end:

", wherein the imaging module is configured to do only a background subtraction and the gradient calculation, and wherein the computer (111) is configured to perform remaining computations."

XV. Claim 1 of the ninth auxiliary request reads as follows:

"A wheel alignment system, comprising:
at least one imaging module (110, 112), each imaging module (110, 112) comprising:
(a) an image sensor (203), for imaging a field of view encompassing a target (118, 120, 122, 124) attached to a wheel of a subject vehicle and generating representative image data;
(b) a data communication interface (205), and
(c) a pre-processor, coupled to receive the image data from the image sensor (203), and configured to perform at least a gradient calculation on the image data from the image sensor (203), to form pre-processed image information;
(d) a control (209) coupled to the image sensor (203), the pre-processor and the data communication interface (205) for controlling operations of the imaging module (110, 112)
(e) an illumination source coupled for selective activation by the control (209), for illuminating the target
the data communication interface (205) being configured for transmitting said pre-processed image information from the pre-processor; and
a computer coupled to receive the pre-processed image information transmitted from each imaging module (110, 112), and configured to act as a host computer (111) of the wheel alignment system for processing the pre-processed image information to determine wheel alignment parameters of the vehicle, wherein the pre-processor is configured to perform a background subtraction, the control (209) selectively activates the image sensor (203) to generate data representing a background image without illumination by the source and to generate data representing a foreground image of the field of view illuminated by the source; and

the pre-processor performs the background subtraction by subtracting the data representing the background image without illumination from the data representing the illuminated foreground image
wherein the pre-processor comprises a pipelined image processing circuitry (211), and wherein the pipelined image processing circuitry (211) is configured to perform the background image subtraction, calculate a gradient magnitude for each respective pixel of data from a result of the background image subtraction to produce gradient information, and perform run length encoding on the gradient information to form compressed pre-processed image information for transmission to the host computer (111)."

XVI. The reasons for the decision under appeal may be summarised as follows:

D24 could be considered as the closest prior art. It disclosed a general placement and alignment system. The subject-matter of claim 1 differed therefrom in that it specified a wheel alignment system in which the target was attached to a wheel of a subject vehicle. The objective problem could be regarded as to find an alternative application of the alignment system of D24. Wheel alignment systems were generally known. In particular, D8 disclosed a wheel alignment system in which the target was attached to a wheel of a subject vehicle. Claim 1 failed to define any feature specific to wheel alignment which went beyond the mere claiming of a wheel alignment system and attaching a target to a wheel of a subject vehicle.

Alternatively, D8 could be considered as the closest prior art. In the wheel alignment system of D8, the cameras were connected directly to the host computer by

an analogue connection. The wheel alignment system of claim 1 differed from the teaching of D8 in that it used an intelligent camera with image processing capabilities in the imaging module, which allowed the transmission of pre-processed image data (typically in digital form) to the host computer. This had the advantage and solved the objective problem of increasing the versatility, processing speed and robustness of the wheel alignment system. D24 disclosed that it was desirable to provide a smart camera capable of carrying out a video monitoring function together with on-board digital signal processing tasks, in particular image pre-processing tasks. Only pre-processed digital images were transmitted to the host computer. The smart camera of D24 provided the advantages for which the person skilled in the art was looking. Thus a person skilled in the art would have had a clear incentive to incorporate the teaching of D24 into the wheel alignment system of D8. As a consequence, the subject-matter of claim 1 lacked an inventive step within the meaning of Article 56 EPC.

XVII. The appellant's arguments may be summarised as follows:

The application described the two most common image processing techniques in the context of wheel alignment systems. A first approach utilised a dedicated video processing board adapted to process the image data. The processed result was then input to the host computer. Such video processing boards often required the use of complex, expensive processors to perform all of the necessary calculations required for the image algorithms. The alternative approach involved the streaming of image data from the cameras to the host computer, which performed all of the processing of the

image data. This imposed a substantial burden on the host computer.

D8 related to the alternative approach. Moreover, it did not use background subtraction or gradient calculation.

D24 concerned a smart camera only. It did not disclose the specific background subtraction of the present application or the gradient calculation.

Hence, no combination of D8 and D24 would result in a wheel alignment system as specified in claim 1 of the main request. The same was true for combinations of documents including D10.

In the technical field of wheel alignment systems, the first and alternative approaches mentioned above were the only ones which a person skilled in the art would have considered. The smart cameras used in the first approach were powerful (see D24, page 12, line 22 to page 13, line 24) and expensive, and hence a person skilled in the art would have fully used their capabilities. With such a smart camera, only specific extracted feature information instead of image data was transmitted to the host computer, as disclosed on page 13, line 15 or in D10, paragraph 19. Thus, the host computer did not require image processing capabilities, as described on page 15, lines 4 to 11 of D24.

In the alternative approach, and in particular in D8, image pre-processing at the camera would not have been envisaged because there was no need for it. Image processing software for host computers was readily available. In practice, the person skilled in the art

might have noticed that the camera output was overwhelming the host computer in the system of D8. But there were many possible solutions to this problem within the framework of the alternative approach, such as using a faster computer or better adapted cameras, reducing the image capturing rate, etc.

The essence of the invention was the distribution of the image processing functionality between the pre-processor at the camera and the host computer in the context of wheel alignment systems. This surprisingly combined the advantages of both above approaches: a simple, cheap pre-processor was sufficient to achieve the reduction in data rate which allowed the use of cameras, connection cables and host computers typically used for wheel alignment systems. Thus, starting from D8, the objective technical problem was "how to provide an enhanced wheel alignment system in which image data processing can be performed in a manner that requires at most a minimal amount of specialized processing hardware".

This idea of an intermediate approach was not disclosed or hinted at in any of the cited documents, which all related to either the first or the alternative approach. Nor was it a question of system design. The argument that a person skilled in the art would have ignored the first or the alternative approach and chosen the specific intermediate approach reflected in the present application was based on an ex-post facto analysis. The person skilled in the art **could** have chosen such an approach but **would not** have done so because the mindset of the person skilled in the art of wheel alignment systems was to use either of the two known approaches.

These arguments related to all the requests. Moreover, claim 1 of the fourth auxiliary request defined this intermediate approach more precisely by specifying the features of the pre-processor. The subject-matter of this claim produced unexpected effects in that background subtraction led to an even intensity distribution in the image except at the targets. Gradient calculation on such an image allowed heavy compression using run length encoding. The combination of these measures synergistically reduced the data amount to be transmitted.

The ninth auxiliary request specified features of the wheel alignment system to better define the technical context in which the intermediate approach took place. The appellant's intermediate approach was specific to wheel alignment systems, not a general distribution of the image processing functionality between a pre-processor at a camera and a host computer. It had been filed when it had become clear to the appellant that the board took into consideration the common general knowledge of a person skilled in the art of image processing in general, as opposed to the image processing techniques used in the specific context of wheel alignment systems.

The appellant would not object to a remittal to the department of first instance on the basis of the claims of the ninth auxiliary request.

Reasons for the Decision

1. The appeal is admissible.

2. Main request: inventive step (Article 56 EPC 1973)

2.1 It is undisputed that document D8 may be considered as the closest prior art for the assessment of inventive step of the subject-matter of claim 1. It discloses, for instance in the context of a two-camera embodiment (see figure 9), a wheel alignment system comprising at least one imaging module (122, 124). Each imaging module comprises an image sensor, such as a CCD device (see column 21, lines 16 to 20), for imaging a field of view encompassing a target (126) attached to a wheel of a subject vehicle (see, for instance, column 20, lines 37 to 67). The imaging module generates image data representative of the target (see column 4, line 51 to column 5, line 14). A computer (32, see figure 2) is coupled to receive the image data transmitted from each imaging module and configured to act as a host computer of the wheel alignment system for processing the image data to determine wheel alignment parameters of the vehicle (see also figure 2a and column 6, line 53 to column 8, line 45).

2.2 D8 does not, however, disclose that each imaging module comprises a data communication interface and a (pre-)processor coupled to receive the image data from the image sensor to form pre-processed image information. In D8, the image data are sent to the host computer without pre-processing at the imaging module. Moreover, D8 does not disclose image processing for performing background subtraction and/or gradient calculation on the image data from the image sensor. Instead, it focuses on the question of how the wheel alignment parameters may be calculated from an analysis of the images using a computer program in the host computer (see column 8, line 47 to column 10, line 62).

2.3 In relation to the problem solved by the vehicle alignment system of claim 1 when compared with the vehicle alignment system of D8, the appellant has referred to the following alleged effects and advantages of the claimed system: reduced requirements for the transmission bandwidth of data to be transmitted to the host computer (as a consequence of the reduction of data amount resulting from the image pre-processing at the imaging module) and a minimal amount of specialised processing hardware needed (as a consequence of the particular image pre-processing functions for which the pre-processor is configured).

2.4 The board has doubts that these advantages exist for all the claimed wheel alignment systems. The first reason is that, in terms of image pre-processing functions, claim 1 refers to "at least one of a background subtraction and a gradient calculation on the image data from the image sensor". Background subtraction and gradient calculation *per se* do not result in a reduction of data amount. The reduction results from the compression of the pre-processed image data, which in turn may be more efficient if background subtraction and/or gradient calculation have been previously performed. The second reason is that in terms of the relevant hardware, claim 1 refers to a processor and a host computer. It does not specify whether the processor has a particularly simple configuration. Moreover, claim 1 is also consistent with the processor being configured for performing further image pre-processing functions, such as truncation or gradient compression/run length encoding as described in paragraphs [0051], [0057], [0058] and [0063] of the application and specified in dependent claim 4.

2.5 However, the board accepts that at least in certain embodiments of the invention the alleged advantages and effects are achieved. Moreover, in the present case the finding as to inventive step is the same, even if the specific formulation of the objective technical problem proposed by the appellant is used (instead of a more general formulation, such as the one considered in the decision under appeal). Thus, in favour of the appellant, the board has accepted the appellant's formulation of the objective technical problem, namely "how to provide an enhanced wheel alignment system in which image data processing can be performed in a manner that requires at most a minimal amount of specialized processing hardware" (see page 10 of the appellant's letter of 15 September 2015).

2.6 A person skilled in the art familiar with the wheel alignment system of document D8 would also be aware, on the basis of their common general knowledge, that a large data rate of the image data from the camera(s) might overload the cabling and/or the host computer. Thus, starting from the wheel alignment system of document D8 and faced with the objective technical problem suggested by the appellant, the person skilled in the art would consider matching the data rate of the data stream from the camera(s) and the capabilities of the rest of the system, in particular the cabling and the host computer.

2.7 A number of options exist for performing this matching, since in principle all of the camera(s), cabling and computer may be adapted as needed.

2.8 One obvious option is to reduce the data rate of the data stream from the camera(s). Since the data represent images, a straightforward solution would be

the application of known image pre-processing techniques which result in a compression of the image data. Such image pre-processing techniques are commonly known.

2.9 A number of such image pre-processing techniques exist, and it is a question of common general knowledge which of these techniques are suitable for the type of images typically occurring in the context of wheel alignment systems utilising machine vision, such as the one of D8.

In particular, the images in the system of D8 represent primarily the targets (126, 130) necessary for the wheel alignment parameter calculations. However, they may also comprise unnecessary background such as portions of the vehicle, portions of the shop floor (125) and/or walls etc. (see figure 9 and column 20, lines 25 to 67). Thus, the images in D8 are in principle suitable for background subtraction and subsequent compression.

Moreover, according to D8 the targets are designed to show sharp-edge transitions between light and dark areas (i. e. sharp-edge dot boundaries, see column 21, lines 57 to 61). The images of these edges are used for the calculations which ultimately yield the wheel alignment parameters of the vehicle (see column 9, line 42 to column 10, line 62). Thus the images in D8 are suitable for applying edge detection techniques such as gradient calculation.

2.10 It is undisputed that background subtraction, gradient calculation and compression are image processing techniques which *per se* are known to the person skilled in the art.

2.11 Thus the person skilled in the art would have implemented some kind of image (pre-)processor in the camera of the wheel alignments system of D8 with the functionalities of at least one of background subtraction and gradient calculation as well as compression to form pre-processed image information in order to reduce the data rate of the data stream from the camera(s) and thereby enhance the wheel alignment system.

2.12 The appellant's argument that a person skilled in the art would not have envisaged an intermediate approach between the two known extremes of performing the image processing operations completely in a pre-processor at the camera or completely in a host computer did not convince the board. These two extremes each have their pros and cons, and it would have been a realistic approach to try to find some kind of compromise between the two. It is clear that such a compromise requires less specialised hardware than the extreme solution in which the entire specialised hardware for the image processing and the wheel alignment parameter determination is implemented in the camera.

Also, the argument that the board's reasoning was based on an ex-post facto analysis, i. e an analysis of the invention, did not convince the board. The board's reasoning is based on an analysis of D8 and an assessment of the common general knowledge relating to wheel alignment systems and image processing techniques. Moreover, the mere fact that other solutions to the objective technical problem would have been known or obvious to the person skilled in the art is not an indication that the claimed invention involves an inventive step.

The argument that the wheel alignment system of claim 1 showed surprising synergistic effects is not convincing. Nor is there any evidence of such effects on file. The effects of the image pre-processing techniques considered in the present application are those that are expected. In particular any synergistic effects between background subtraction, gradient calculation and run length encoding are well known in the art of image processing.

2.13 In view of the above, the board finds that the wheel alignment system of claim 1 of the main request does not involve an inventive step.

First to third auxiliary requests

3. Claim 1 of the first auxiliary request makes it clear that the "processor" in claim 1 of the main request is a pre-processor configured to perform the image processing techniques discussed above. Claim 1 of the second and third auxiliary requests additionally specifies that the pre-processor is configured to perform gradient calculation.

3.1 None of these features change the assessment of inventive step given above in the context of the main request. Also, the appellant did not submit further arguments specific to these three requests during the oral proceedings before the board.

3.2 Thus the board finds that the wheel alignment system of claim 1 of the first to third auxiliary requests do not involve an inventive step for the reasons given in the context of the main request.

Fourth auxiliary request

4. Claim 1 of the fourth auxiliary request additionally specifies that the pre-processor comprises a pipelined image processing circuitry which is configured to perform a background image subtraction, calculate a gradient magnitude for each respective pixel of data from a result of the background image subtraction to produce gradient information, and perform run length encoding on the gradient information to form compressed pre-processed image information for transmission to the host computer.

4.1 As discussed in point 2.9 above, the images produced by the cameras in the wheel alignment system of D8 are in principle suitable for background subtraction, gradient calculation and compression (such as by run length encoding), all of which are well-known image processing techniques. Moreover, these image processing techniques may typically be carried out stepwise, one after the other. Thus a person skilled in the art would have considered using pipelined image processing circuitry in which each element of the circuitry is designed to carry out one of the required image processing techniques and the elements are connected in series in the appropriate order. The appellant did not dispute that pipelined image processing, an example of which can be found in D10 (see pipeline vision processor 26 in figure 1), was well known in the art.

4.2 Thus the board finds that the wheel alignment system of claim 1 of the fourth auxiliary request does not involve an inventive step.

Fifth and sixth auxiliary request

5. Claim 1 of the fifth auxiliary request specifies (in addition to the features of claim 1 of the main request) that the (host) computer has the function of determining the position of the target in space based on the received pre-processed information, and is configured to determine the wheel alignment parameters based on the determined position of the target. Claim 1 of the sixth auxiliary request additionally specifies that the pre-processor is configured to perform gradient calculation.

5.1 None of these features change the assessment of inventive step given above in the context of the main request. Also, the appellant did not submit further arguments specific to these two requests during the oral proceedings before the board.

5.2 Thus the board finds that the wheel alignment system of claim 1 of the fifth and sixth auxiliary requests do not involve an inventive step for the reasons given in the context of the main request.

Seventh and eighth auxiliary requests

6. Claim 1 of the seventh auxiliary request specifies (in addition to the features of claim 1 of the fifth auxiliary request) that the imaging module is configured to do only the background subtraction and the gradient calculation, and the computer is configured to perform the remaining computations. Claim 1 of the eighth auxiliary request additionally specifies that the pre-processor is configured to perform gradient calculation.

6.1 The board notes that the expression "only" in these claims is not meant to have the meaning that the compression (run length encoding) on the gradient information may not be carried out in the pre-processor at the imaging module. Quite the contrary, the pre-processor is explicitly specified to perform run length encoding on the gradient information in dependent claim 4 of both these requests. Moreover, a literal understanding of "only" would be contrary to the original disclosure. The application as filed discloses in paragraphs [0050] and [0051] that, in general, the image processing circuitry provides background subtraction, gradient calculation and gradient compression. Paragraph [0064] states that "the imaging module does only the gradient, and the host performs the remaining computations". The phrase "does only the gradient", in context, encompasses background subtraction (which is performed before gradient calculation, see paragraph [0011]), and both gradient calculation and gradient compression.

6.2 Thus, claim 1 of each of the seventh and eighth auxiliary requests makes it clear that background subtraction and gradient calculation (and gradient compression) are performed in the imaging module. On the other hand, any further image processing tasks and the determination of the position of the target in space are carried out in the host computer.

6.3 This is again the distribution of image processing tasks (between the pre-processor and the host computer) considered in the context of the main request.

6.4 Thus the board finds that the wheel alignment system of claim 1 of the seventh and eighth auxiliary requests

does not involve an inventive step for the reasons given in the context of the main request.

Ninth auxiliary request

7. The board admitted the ninth auxiliary request into the appeal proceedings as a reaction to considerations expressed for the first time in the oral proceedings before it.

7.1 Claim 1 of the ninth auxiliary request comprises further features specifying the illumination source and its relationship with the background subtraction.

7.2 In this respect, the examining division briefly stated in point 31 of the decision that the technical feature of illuminating a target with a strobe comprising an LED array was known from D8, the strobed illumination of the target was also disclosed in D24, and background subtraction was known from D10.

7.3 However, D10 concerns a web inspection system with a camera for monitoring a moving web being continuously produced in a factory, to identify flaws and defects in the web. A running average of the pixels along the length of the web is the reference for a good product and is considered as background (see paragraphs [0054] and [0055]). Thus the technical field of D10 is different from that of the present application, and the background subtraction described in D10 is different from the background subtraction specified in claim 1 of the ninth auxiliary request.

As far as D24 is concerned, the strobe illumination disclosed in D24 has the purpose of providing an exact stop motion image in the context of a machine control

system (see page 16, lines 6 to 8). The smart camera of D24 is used to calculate coordinate feature locations for components and substrates to be registered and aligned with each other, and for the corresponding control of a movable pick-up head carrying the component (see figure 1 and page 12, lines 12 to 16). Thus the context of the strobe illumination is different from the wheel alignment system of D8.

Moreover, even though D8 describes a strobed illumination source comprising an LED array and gives some details of how images are only captured when a target is illuminated (see column 7, lines 46 to 51), it does not describe any background subtraction, and in particular not the type of background subtraction specified in claim 1 of the ninth auxiliary request.

7.4 Thus, the reasons given in the decision under appeal did not convince the board that the wheel alignment system of claim 1 of the ninth auxiliary request does not involve an inventive step.

7.5 Moreover, claim 1 of the ninth auxiliary request also specifies further features concerning the selective activation of the image sensor to generate data representing a background image and a foreground image.

Thus claim 1 of the ninth auxiliary request specifies more specifically than the claims underlying the decision under appeal the relationship between the features of the wheel alignment system and the specific image processing functions which are relevant in the context of this wheel alignment system. The same holds true for the corresponding independent method claim 7 of the ninth auxiliary request.

7.6 In view of the above, it is clear that the examining division has not (yet) taken a position concerning the claims of the ninth auxiliary request. In view of the large number of prior-art documents cited in the first-instance proceedings (but not discussed in the decision) on the one hand and the unknown position of the examining division concerning the amended claims on the other, the board considers it appropriate to remit the case to the department of first instance.

7.7 Thus the board decided to exercise its discretion under Article 111(1) EPC 1973 in remitting the case to the department of first instance for further prosecution.

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 for further prosecution.

The Registrar: The Chairman:

K. Boelicke B. Müller

Decision electronically authenticated