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**D E C I S I O N**  
**of 22 January 2004**

**Case Number:** T 0582/01 - 3.2.7

**Application Number:** 93100292.7

**Publication Number:** 0551854

**IPC:** B25J 9/16

**Language of the proceedings:** EN

**Title of invention:**  
Automatic pickup system and method

**Patentee:**  
G.D. SOCIETA' PER AZIONI

**Opponent:**  
Focke & Co. (GmbH & Co.)

**Headword:**

-

**Relevant legal provisions:**  
EPC Art. 54, 56, 123(2)

**Keyword:**  
"Novelty (yes)"  
"Inventive step (main and second auxiliary request, no)"  
"Added subject-matter (first auxiliary request, yes)"  
"Request at oral proceedings to file a third auxiliary request  
(not allowed)"

**Decisions cited:**

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**Catchword:**

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Case Number: T 0582/01 - 3.2.7

**D E C I S I O N**  
of the Technical Board of Appeal 3.2.7  
of 22 January 2004

**Appellant:** Focke & Co. (GmbH & Co.)  
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**Representative:** Bolte, Erich, Dipl.-Ing.  
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**Respondent:** G.D. SOCIETA' PER AZIONI  
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**Decision under appeal:** Interlocutory decision of the Opposition  
Division of the European Patent Office posted  
21 March 2001 concerning maintenance of  
European patent No. 0551854 in amended form.

**Composition of the Board:**

**Chairman:** A. Burkhart  
**Members:** H. E. Hahn  
E. Lachacinski

## Summary of Facts and Submissions

- I. The opponent lodged an appeal against the interlocutory decision of the Opposition Division to maintain European patent No. 0 551 854 in amended form on the basis of the main request, i.e. the claims 1 to 22 and the amended description pages 2 and 4 as submitted during the oral proceedings held on 20 February 2001.
- II. The opposition had been filed against the patent as a whole and was based on Article 100(a) EPC (lack of novelty and lack of inventive step) and Article 100(b) EPC (that the patent does not disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art).

The Opposition Division held that it had not been proven that document D2 formed part of the prior art and thus could not be considered. Furthermore, the subject-matter claimed was considered to be sufficiently disclosed. The amendments of claims 1 and 12 were considered to be admissible with respect to Article 123(2) and (3) EPC. The subject-matter of the independent claims 1 and 12 was considered to be novel and inventive with respect to the remaining prior art documents submitted.

- III. The most relevant documents of the prior art submitted are considered to be:

D1 = DE-A-3 735 145

D2 = Notarised copy of "Optische Sensorsysteme Videomat and Optomat für industriellen Einsatz", order No. E678/1026

D3 = S.R. Ruocco "Derivation of a computer model for the front end of a robot 3-dimensional vision sensor", IEE Proceedings, Vol. 34, No. 6, December 1987

D6 = EP-A-0 327 069

Enclosure E7 = "Richtlinien zur Erstellung von Betriebsanleitungen", Siemens, March 1986

Enclosure E8 = Siemens Katalog "Bildtechnik MP 18", 1986, pages 4/8 and 4/9

IV. Oral proceedings were held on 22 January 2004.

(a) The appellant/opponent requested that the decision under appeal be set aside and the patent be revoked in its entirety.

(b) The respondent/patentee requested that the appeal be dismissed or alternatively that the decision under appeal be set aside and the patent be maintained in amended form on the basis of either auxiliary requests 1 or 2 (claims 1 to 22 of the first or claims 1 to 22 of the second auxiliary request as filed with the letter of 19 December 2003) or on the basis of a third auxiliary request (claims 1 to 4) as submitted during the oral proceedings before the Board.

V. The independent claims 1 and 12 of the main request submitted on 20 February 2001 under consideration read as follows:

"1. An automatic pickup system comprising a robot (6) having an articulated arm (7) with a gripping member (8) for gripping an object (4), said articulated arm (7) being controlled by a control section (3); characterized by the fact that said gripping member (8) presents a camera (11) for generating a detected image of at least one portion of said object, said detected image consisting of a number of dots; and by the fact that said control section (3) comprises processing means (20) for receiving said detected image and for determining the coordinates of predetermined points of the same."

"12. A method of automatically picking up objects (4) by means of a robot (6) having an articulated arm (7) fitted with a gripping member (8) and controlled by a control section (3); characterized by the fact that it comprises stages wherein a detected image of at least one portion of said object (4) is generated by a camera (11) on said gripping member, said detected image consisting of a number of dots; and wherein the coordinates of predetermined points of said detected image are determined by said control section (3)."

Claims 1 and 12 of the first auxiliary request as submitted with the letter of 19 December 2003 differ from claims 1 and 12 of the main request by replacing the feature "predetermined points" of claim 1 with "predetermined dots" and inserting "and a numerical control unit (16) for receiving said coordinates and

for controlling operation of said articulated arm (7) on the basis of said coordinates, without comparing said detected image with a saved image of a model object, so as to center said gripping member (8) in relation to said object (4)" after the said term "...predetermined dots of the same" while in claim 12 a similar insert "and operation of said articulated arm is controlled by said control section on the basis of said coordinates, without comparing said detected image with a saved image of a model object, so as to center said gripping member in relation to said object." was added.

Claims 1 and 12 of the second auxiliary request differ from claims 1 and 12 of the first auxiliary request in that the feature "without comparing said detected image with a saved image of a model object" has been omitted.

Claims 1 and 3 of the third auxiliary request represent a combination of the subject-matter of claims 1, 3 and 5 to 10 and of claims 12, 14 and 16 to 22 according to the main request, respectively.

VI. The appellant argued essentially as follows:

The coding on the last page of document D2 represents the delivery date (namely month and year) of the prospectus D2 as described by document E7. It would be contrary to any experience of life that document D2 was not made available to the public. Since document D1 comprises the corresponding reference to said document D2, anybody could order and obtain this document after document D1 had been published. Furthermore, it is also

clear that the content of document D2 is incorporated by reference into document D1.

The automatic pick up system of claim 1 lacks novelty with respect to the disclosure of either document D1 or the combination of D1 and D2. The only disputed features of claim 1 of the main request, namely features (a) a robot having an articulated arm, (e) that the detected image consists of a number of dots, and (g) that the control section comprises processing means for determining the co-ordinates of predetermined dots, can be derived from either document D1 or D2. Although document D1 does not mention the term "dot", it is clear to the skilled person that the image detected by the camera consists of a number of dots and is processed using digital image processing means (cf. D1, column 1, lines 62 to 66; column 2, line 32 and lines 44 to 46). The term "co-ordinate" is also not explicitly mentioned in document D1. However, document D1 implicitly discloses the determination of co-ordinates of predetermined points since D1 compares the deviation of the position of the detected image with the reference position and uses the said deviation for controlling the drive of the crane. This drive control implies the use of co-ordinates in order to determine exactly the desired position and thus feature (g) is implicitly disclosed. Furthermore, the skilled person when reading the disclosure of a portal crane - which represents a linear or portal robot having translational degrees of freedom - would automatically read into it the possibility of using another robot having different kinematics such as an articulated arm (implicit disclosure) and thereby obtain feature (a). Finally, feature (g) is also disclosed by document D2

(cf. fifth page, Figures (a) and (b) and sixth page, middle column to right hand column) since each image detected by the camera of the Videomat system is binarised so that each single dot thereof corresponds to a co-ordinate of the detected image. Document D2 explicitly mentions the capability of the Videomat system to determine the co-ordinates of the centre of gravity of objects to be manipulated by industrial robots (cf. D2, sixth page). From this passage the skilled person also immediately derives a robot having an articulated arm since this type is most often used in industry (e.g. automotive industry).

The combination of documents D1 and D2 renders the subject-matter of claim 1 obvious. Document D2 mentions industrial robots and the kinematics for carrying objects from one place to another is not essential. The skilled person would also use robots having rotational movements such as robots having an articulated arm as exemplified by documents D3 or D6. The Videomat system is suitable for all industrial robots without any limitation. The objective problem starting from document D1 (the remaining difference to claim 1 is feature (a)), would be to work in a smaller room and to use the resources more efficiently. The objective problem starting from document D2 (remaining differences to claim 1 are features (a), (b), (c) and (d)) would be to select the robot with those kinematics which are the most suited for the intended purpose. For transporting reels or coils such as described in document D1 the kinematics are interchangeable and are able to carry out the same movements.



The first auxiliary request does not meet the requirements of Article 123(2) EPC since the incorporated feature has no basis in the originally filed application.

The features incorporated into claims 1 and 12 of the second auxiliary request do not add anything inventive since the control unit (7) of document D1 corresponds to the control unit (16) according to the patent. The term "co-ordinates" includes "relative co-ordinates" as well as "absolute co-ordinates" such as the centre of gravity. Claim 1 does not comprise the corresponding limiting features with respect to the patentee's arguments.

The new third auxiliary request was filed late and should therefore not be allowed. According to this request the scope of the claims would be shifted from an object handling process system to an image processing system.

VII. The respondent argued essentially as follows:

The documents E7 to E12 are no longer objected to for being late-filed.

It is contested that document D2 belongs to the state of the art. The digits in the right portion of the code printed on D2 are five in number and not in the usual format indicating a date. Evidence E7 is post-published and refers to instruction handbooks and not to advertising material. Furthermore, the format of the digits and letters of document D2 are inconsistent with those according to document E7. The real availability

to the public of document D2 has not been proven (i.e. that it was delivered to clients).

Moreover, since document D1 describes a very specific way of using the system according to document D2, only this specific disclosure can be incorporated into document D1.

The implicit disclosure in document D1 to the skilled person of an articulated arm is disputed. The control of a crane maintaining the camera parallel to the top surface of the reel as disclosed in document D1 is different from that of an articulated arm which may form an angle so that the detected image is oval shaped. It is not necessary to detect the co-ordinates of the image according to document D1 because it is sufficient to compare the detected image with a reference image for determining the position of the reel. Document D2 is absolutely silent as to how the evaluation of the deviation between the two images is performed. The comparison of two electronic strings of a model object and of the detected image does not represent a determination of the co-ordinates. The passage of document D2 concerning industrial robots in general cannot be incorporated into document D1 which is limited to a crane. Thus claim 1 is novel either with respect to document D1 alone or a combination of documents D1 and D2.

Document D2 does not give any hint as to where the camera should be mounted and, furthermore, represents only a generic disclosure. Document D1 discloses a specific robot (crane) related to a portal robot having the camera in the gripping member. This implies that

the camera is always above the object to be gripped so that the images can always be compared with a reference image. With a robot having an articulated arm the camera can be inclined by an angle with respect to the object. Thus a large number of reference images of model objects would have to be stored in the system, which would nevertheless produce many errors. Thus, the person skilled in the art would not consider using an articulated arm in the system of document D1. The documents D3 and D6 teach different solutions according to which the camera is not mounted on the robot's gripping member but only remotely. Thus, the subject-matter of claims 1 and 12 of the main request involves an inventive step.

The negative feature of claims 1 and 12 of the first auxiliary request is derivable from the general disclosure of the patent and particularly from the example. Therefore the requirements of Article 123(2) EPC are met.

The additional features incorporated into claims 1 and 12 of the second auxiliary request can be found at page 5, lines 4 to 14, of the originally filed application. Thus the requirements of Article 123(2) EPC are met. According to claim 1 of this request the co-ordinates of the image are used for steering the robot. The robot co-ordinates are not the same as those of the detected image. Document D1 does not disclose these features.

A new third auxiliary request based on a combination of claims 1, 3 and 5 to 10 and of claims 12, 14 and 16 to 22 of the main request should be allowed.

## Reasons for the Decision

### *Formal issues*

1. The notarised copy D2 proves that the submitted copy exactly corresponds to the Siemens prospectus having the order number E678/1026 which is cited in document D1 (cf. column 2, lines 34 to 35).
  - 1.1 Although the Siemens guidelines according to E7 (issued 03 1986 - hence post-published with respect to document D2) only concern the writing of operating instructions and not of Siemens prospectuses, they provide a plausible interpretation of a commonly used code. According to this interpretation the document D2 using the format "04833" was issued in 04 83, i.e. in April 1983.

The existing slight differences between the format of the digits and letters according to document D2 and those according to the common format of document E7 are considered to be of minor importance and cannot seriously call into question the issuing date of "April 1983" of the document D2.
  - 1.2 It would not make any sense for a company to print three thousand prospectuses (the last digit of the format "04833" is interpreted as meaning the number of copies in thousands) concerning a new product - which according to experience of life are expected to be distributed to potential customers as soon as possible - and then keep them in the archives and not deliver

them in order to push the sale of the advertised new product. It would be against common sense and all logic for Siemens not to distribute the said prospectus after it was printed.

- 1.3 The Board, taking account of all the circumstances in the present case, is thus convinced that document D2 actually was distributed although this fact has not been proven by a specific piece of evidence by the appellant.

Hence the Board considers that document D2 belongs to the prior art in the meaning of Article 54(2) EPC.

- 1.4 The Board concurs with the respondent that the general passage of document D2 concerning industrial robots cannot be incorporated into document D1 because it does not concern a crane or a portal robot.

Consequently, the Board considers that only the disclosure of the Videomat image evaluation system according to document D2 is incorporated by reference into document D1 (cf. D1, column 2, lines 31 to 35).

*Main request*

2. *Novelty*

- 2.1 The appellant argued that the automatic pickup system of claim 1 lacks novelty with respect to the disclosure of either document D1 or the combination of D1 and D2.

The respondent argued that using the feature analysis of the appellant, three features of claim 1 of the main

request were not disclosed in document D1, namely the features: (a) a robot having an articulated arm, (e) that the detected image consists of a number of dots, and (g) that the control section comprises processing means for determining the co-ordinates of predetermined dots.

2.2 The Board's finding with respect to novelty is as follows:

2.2.1 Although document D1 does not mention the term "dot", it is clear to the skilled person that the image detected by the camera consists of a number of dots and is processed using digital image processing means (cf. D1, column 1, lines 62 to 66; column 2, line 32 and lines 44 to 46). Hence the feature (e) is disclosed in document D1.

2.2.2 Similarly, the term "co-ordinate" is not explicitly mentioned in document D1. However, document D1 implicitly discloses the determination of co-ordinates of predetermined points since D1 compares the deviation of the position of the detected image with the reference position and uses the said deviation for controlling the drive of the crane. This drive control implies the use of co-ordinates in order to determine exactly the desired position and thus feature (g) is implicitly disclosed in document D1.

The respondent's argument that a comparison of two electronic strings of a model object and of the detected image does not represent a determination of the co-ordinates does not plausibly explain how the fine steering of the portal robot according to document

D1 would be carried out without using co-ordinates.  
Hence this argument cannot be accepted.

In any case, feature (g) is explicitly disclosed by document D2 (which is incorporated by reference in D1; cf. point 1.6 above), since each image detected by the camera of the Videomat system is binarised so that each single dot thereof (characterised by an address of the line and column of the binarised black/white transition signal) corresponds to a co-ordinate of the detected image (cf. fifth page, Figures (a) and (b); and sixth page, middle column to right hand column). Additionally, the capability to determine the co-ordinates of the centre of gravity of objects to be manipulated is explicitly mentioned (cf. D2, sixth page).

Thus feature (g) of claim 1 is disclosed by document D1, at least when document D2 is incorporated by reference in D1.

2.2.3 The appellant argued that the skilled person when reading the disclosure of document D1 of a portal crane - which represents a linear or portal robot having translational degrees of freedom - would automatically read into this disclosure the possibility of using another robot having different kinematics such as an articulated arm and thereby arrive at feature (a) of claim 1.

The Board cannot accept this view. There exists no need for a rotational freedom for transferring the metal coils or paper rolls or reels from one place to another.

Similarly, the Board cannot accept the appellant's allegation that the incorporation of document D2 into D1 would imply a robot having an articulated arm. Firstly, document D2 is absolutely silent with respect to the type of robot and there exist more than only two types of robots. Furthermore, the cited passage (D2, page 6) cannot be incorporated into document D1 because it does not concern a crane (cf, point 1.6 above).

Hence feature (a) of claim 1 is neither derivable from document D1 when taken alone nor even if document D2 is incorporated therein by reference.

2.2.4 All other cited documents are less relevant than documents D1 and D2.

2.2.5 Therefore, the subject-matter of claims 1 and 12 of the main request is novel with respect to the submitted documents.

### 3. *Inventive step*

#### 3.1 *Closest prior art*

Document D1 represents the closest prior art. This document discloses an automatic pickup system comprising all the features of claim 1 but the feature "articulated arm" (see point 2 above).

#### 3.2 *Problem to be solved*

The Board concurs with the appellant that the objective problem to be solved starting from document D1 is to



provide a rapid, reliable, fully automatic pickup system for working in a smaller room more efficiently.

3.3 *Solution to the problem*

The problem is solved by a robot system having an articulated arm as defined in claim 1. By replacing the portal robot system of document D1 by a robot having an articulated arm the claimed system can be operated in much smaller rooms in a more efficient manner.

3.4 The Board considers that the subject-matter of the independent claim 1 is obvious for the person skilled in the art for the following reasons:

The installation of the portal robot comprising the Videomat system according to document D1 requires a large hall. The Videomat system of document D2 is suitable for all industrial robots without any limitation. The kinematics for carrying objects from one place to another are not essential. For transporting reels or coils such as described in document D1 the kinematics of a portal robot are interchangeable with those of a robot having an articulated arm, which represents one of the most commonly used type of industrial robots. Both types are able to carry out the same movements. At least in the final stage of the movement of both types of kinematics, the gripping member will be positioned above the hole of the reel or coil. Thus the image of the camera will always be above the object to be gripped for both types of kinematics so that the image can always be compared with the reference image. Consequently, the respondent's argument concerning a technical difficulty

when the said camera is mounted into the articulated arm of a robot cannot be accepted. Furthermore, claim 1 does not comprise any features which would be suitable to solve such problems. Similarly, the respondent's arguments concerning the use of a reference image according to document D1 and/or D2 cannot be accepted since claim 1 of the main request does not exclude such a use.

The Board therefore concurs with the appellant and considers that the skilled person, in order to solve the problem cited under point 3.3 above, would use robots having rotational movements, and particularly the most common type thereof, i.e. a robot having an articulated arm.

- 3.5 Therefore, the subject-matter of claim 1 of the main request does not involve an inventive step within the meaning of Article 56 EPC. The main request is thus not allowable.

*First auxiliary request*

4. *Article 123(2) EPC*

As admitted by the respondent, the originally filed specification does not comprise an explicit basis for the feature "**without comparing said detected image with a saved image of a model object**" which has been incorporated into claims 1 and 12 of the first auxiliary request.

The respondent's argument that this feature is implicitly derivable from the general disclosure of the

application as filed cannot be accepted by the Board, since the general teaching is absolutely silent in this respect. A system not using a saved image of a model object (which object is to be transferred by the robot's articulated arm) for comparison with the image of the object detected by the camera is only derivable from the embodiment according to the example of the application as filed. According to this example, a specific sequence of process steps has to be carried out (cf. description of the processing steps of the apparatus according to Figure 1 in combination with Figures 3 and 4) and only this specific sequence excludes the use of a saved image of a model object. However, since this sequence only represents a specific example of the invention requiring certain process steps in a certain order, a generalisation of this example as intended by the feature "without comparing ... model object" constitutes an extension beyond the content of the application as filed.

Therefore the first auxiliary request does not meet the requirements of Article 123(2) EPC. The first auxiliary request is thus not allowable.

*Second auxiliary request*

5. *Inventive step*

The respondent argued that, according to claim 1 of the second auxiliary request, the co-ordinates of the image are used for steering the robot. The robot co-ordinates are not the same as those of the detected image. Document D1 does not disclose these features.

The Board cannot accept these arguments since the control unit (7) according to document D1 corresponds to the control unit (16) of the patent. Furthermore, the term "co-ordinates" of claim 1 includes "relative co-ordinates" as well as "absolute co-ordinates" such as the centre of gravity. Claim 1 of the second auxiliary request does not comprise the corresponding limiting features with respect to the patentee's arguments.

Therefore the subject-matter of claim 1 of the second auxiliary request does not involve an inventive step within the meaning of Article 56 EPC.

6. *Request of the respondent for allowing a third auxiliary request*

The third auxiliary request which was only submitted at the end of the oral proceedings before the Board is directed to a combination of claims 1, 3 and 5 to 10 and of claims 12, 14 and 16 to 22 of the main request, respectively.

With respect to the allowability of this request, the Board expresses the following opinion:

In the oral proceedings no new matter arose which had not already been addressed in the preceding written appeal proceedings. In the opinion of the Board as set out in the communication accompanying the invitation to oral proceedings, the Board *inter alia* expressed its provisional opinion that the "negative features" incorporated into a proposed auxiliary request had no explicit basis in the originally filed application and

appeared not to meet the requirements of Article 123(2) EPC. The respondent was thus aware well before the proceedings that a claim comprising such "negative features" was likely to be refused. Nevertheless, the respondent insisted on a claim (claim 1 of the first auxiliary request) comprising "negative features".

The third auxiliary request as filed by the respondent in the oral proceedings does not just involve a minor change in the wording of claim 1 but a rather complex modification of the claim which would *prima facie* be difficult for the appellant as well as the Board to deal with properly during the oral proceedings.

It is established jurisprudence of the Boards of Appeal that in such a case late-filed amended claims are not admitted (see Case Law of the Boards of Appeal of the EPO, 4<sup>th</sup> edition 2001, chapter VII.D.14.2).

Therefore the third auxiliary request of the respondent is not admitted.

**Order**

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

1. The decision under appeal is set aside.
2. The patent is revoked.

The Registrar:

The Chairman:

D. Spigarelli

A. Burkhart