

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

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Paper No. 12

UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES

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Ex parte JOHN CLARENCE ENDICOTT,  
STEVEN LESTER HALTER,  
STEVEN JAY MUNROE,  
ERIK EDWARD VOLDAL,  
and XIN XU

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Appeal No. 2000-1973  
Application 08/890,906<sup>1</sup>

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ON BRIEF

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Before HAIRSTON, BARRETT, and RUGGIERO, Administrative Patent Judges.

BARRETT, Administrative Patent Judge.

DECISION ON APPEAL

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<sup>1</sup> Application for patent filed July 10, 1997, entitled "Object Encapsulation Protection Apparatus," which is a division of Application 08/336,581, filed November 9, 1994, now U.S Patent 5,742,826, issued April 21, 1998.

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This is a decision on appeal under 35 U.S.C. § 134 from the rejection of claims 2-6 and 12-22.<sup>2</sup> Claims 7-11 are objected to as depending from a rejected claim.

We reverse.

#### BACKGROUND

The invention relates to an apparatus and method for enforcing encapsulation of an object having object data and at least one object method program, by restricting access to the object data to only authorized method programs including the at least one object method program.

Claim 2 is reproduced below.

2. A data protection apparatus, said data protection apparatus comprising:

a first object, said first object being stored on a computer system;

first object data and a first at least one method program associated with said first object; and

a storage protection mechanism which enforces encapsulation of said first object, said storage protection mechanism enforcing encapsulation by restricting access to said first object data to only first authorized method programs, said first authorized method programs being a set of method programs which includes at least one method program, said first method program being included in said first authorized method programs.

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<sup>2</sup> These claims in their present form were finally rejected in parent Application 08/336,581 (Paper No. 5) and were rejected in this application (Paper No. 5). Thus, the claims have been twice rejected and the appeal is proper under 35 U.S.C. § 134.

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The examiner relies on the following references:

Kelly, Jr. et al. (Kelly)	5,129,084	July 7, 1992
Endicott et al. (Endicott)	5,404,525	April 4, 1995
Tanaka et al. (Tanaka)	5,539,909	July 23, 1996
Yoshihiro Watabe et al. (Yoshihiro) (Japanese Kokai)	JP 2-165223	June 26, 1990

Claims 2-6, 21, and 22 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kelly and Endicott.

Claims 12-16 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kelly, Endicott, and Tanaka.

Claims 17-20 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Kelly, Endicott, Tanaka, and Yoshihiro.

We refer to the rejection (Paper No. 5) (pages referred to as "R\_\_") and the examiner's answer (Paper No. 11) (pages referred to as "EA\_\_") for a statement of the examiner's rejection, and to the brief (Paper No. 9) (pages referred to as "Br\_\_") for a statement of appellants' arguments thereagainst.

#### OPINION

The examiner finds that Kelly teaches "first object data and a first at least one method program associated with said first object" in the abstract (EA3). The examiner finds (EA3-4) that the access control list and access mask (at col. 23, Table 2) constitute "a storage protection mechanism which enforces encapsulation of said first object . . . by restricting access to said first object data to only first authorized method programs

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. . . said first method program being included in said first authorized method programs." The examiner finds that Kelly does not explicitly disclose implementation of "authorized method programs, but that this would have been obvious over Endicott.

Appellants argue that the principal disagreement regarding the patentability of the claimed subject matter involves the proper interpretation of the term encapsulation (Br5). It is argued that the well known meaning of the term is "tight coupling of an object's data with an object's methods" (Br5), while the examiner has defined encapsulation as "Grouping the functions that operate on a data structure with its representation . . ." (R2). Nevertheless, appellants state that the examiner's definition is in keeping with the disclosed invention (Br6).

We find no discrepancy between the Object Oriented Programming (OOP) definition employed by the examiner and the statement in the specification that "[m]ethods and object data are said to be 'encapsulated' in the object" (spec. at 2). That is, "encapsulation" in the OOP context is related to the concept of "modularity" and encapsulation is broadly the creation of self-sufficient modules (objects) that contain the data and the processing (data structure and functions that manipulate that data). "Encapsulation" can also refer to "data hiding," where the object has an interface part and an implementation part, and the interface part is the only visible part of the object; e.g.,

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in C++ a program developer can define objects in which all or some of the data variables and all or some of the related functions are considered "private" or made available for use only by the object itself. The claim recitation of "enforcing encapsulation by restricting access to said first object data to only first authorized method programs" brings in the meaning of data hiding. It is not clear how appellants' definition of "tight coupling of an object's data with an object's methods" (Br5) relates to the concepts of modularity or data hiding.

Appellants argue that Kelly does not teach, disclose, or suggest the enforcement of encapsulation (Br6). It is argued that the access control information in Kelly involves only the relationship between a program and an object, not between an object method and object data, and, thus, Kelly only controls access at the user/object level, not at the method/data level (Br6). It is noted that the secondary reference to Endicott is not offered to provide encapsulation and does not do so (Br6).

The examiner states that access controlled at the user/object level does not preclude encapsulation at the method/data level (EA9):

For example, a user could access a public method in the objects taught by Kelly whereupon the public method interface provided by the object then accesses and modifies the object's private data. There is no disclosure by Kelly that shows where a user may access an object's private data directly, i.e., without going through a public method interface.

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We see several problems with the examiner's reasoning. First, the "objects" in Kelly are "data structures which store information about the user processes running in the system" (col. 2, lines 1-3) and are not objects in the OOP sense of a self-sufficient module that contains both data and functions (methods). Not all objects in computer science are objects in the OOP sense. The examiner relies on an OOP definition of "encapsulation," but while the object may be considered to contain "first object data," the examiner has not shown where Kelly discloses "a first at least one method program associated with said first object," so that Kelly encapsulates both data and a method. Thus, the rejection is based on an erroneous assumption about the nature of the objects. Second, there is no teaching of the objects in Kelly having "public" methods and "private" data, undoubtably because the objects are not OOP objects having data and methods. Therefore, the rejection is based on improper speculation about a user accessing a public method which accesses private data. It is improper to resort to speculation or unfounded assumptions to supply deficiencies in the factual basis for a rejection. See In re Warner, 379 F.2d 1011, 1017, 154 USPQ 173, 178 (CCPA 1967). Third, the fact that Kelly does not disclose a user accessing an object's private data directly does not mean that user methods access data through a "public" method interface; no method interface in the

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object has been shown to be present in Kelly. Thus, Kelly does not encapsulate an object comprising data and a method. We agree with appellants that Kelly only controls access at the user/object level, i.e., access by users to objects (where "objects" are only data structures) by methods external to the object, and does not deal with enforcing encapsulation by restricting access to object data to only authorized method programs including a method program associated with the object.

Appellants argue that there is no teaching in Kelly that describes how Kelly ensures that only the object's methods are allowed to access the object's data (Br6).

The examiner states (EA10):

In response, the Examiner notes that Kelly defines objects as follows: "*Objects* are data structures used to hold information that is used by the operating system and which must be protected from unauthorized access by users of the system" [col. 4, lines 58-61]. Hence, calling object methods according to access privileges does provide protection to the data that the object methods operate upon.

In addition, Kelly explicitly disclose: "*User of object instances of a particular type do not need to know anything about the routines 430-438 pointed to by the OTD (Object Type Descriptor)*" [col. 14, lines 9-11]. Kelly further discloses: "... thus the details of the object's structure do not concern the users of these objects" [col. 14, lines 18-20]. These disclosures by Kelly are entirely consistent with standard accepted definitions of encapsulation.

The examiner's reasoning is not persuasive. Again, Kelly does not disclose encapsulating object data and methods. Thus, the examiner's statement about "calling object methods according

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to access privileges" (EA10) is erroneous. The examiner's statement that the "disclosures by Kelly are entirely consistent with the standard definitions of encapsulation" (EA10) fails to prove that Kelly discloses encapsulation as claimed. Endicott does not cure the deficiencies of Kelly. Accordingly, we conclude that the examiner has failed to establish a prima facie case of obviousness as to independent claims 2 and 21. The rejection of claims 2-6, 21, and 22 is reversed.

Claim 12 contains limitations similar to claims 2 and 21 except that it refers to "server" and "client" objects. The examiner applies Tanaka as disclosing enforcing encapsulation using client and server objects (EA5-6).

The combination of Kelly and Endicott does not teach or suggest enforcing encapsulation of an object containing data and a method program for the reasons discussed in connection with claims 2 and 21. We find nothing in Tanaka that cures the deficiencies of Kelly and Endicott. We conclude that the examiner has failed to establish a prima facie case of obviousness as to independent claim 12. The reference to Yoshihiro does not cure the deficiencies of Kelly, Endicott, and Tanaka. The rejections of claims 12-20 are reversed.

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CONCLUSION

The rejections of claims 2-6 and 12-22 are reversed.

REVERSED

KENNETH W. HAIRSTON	)	
Administrative Patent Judge	)	
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	)	
	)	BOARD OF PATENT
LEE E. BARRETT	)	APPEALS
Administrative Patent Judge	)	AND
	)	INTERFERENCES
	)	
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JOSEPH F. RUGGIERO	)	
Administrative Patent Judge	)	

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