

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 29

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte MARK M. TOWFIQ

Appeal No. 1999-2720
Application No. 08/580,965

ON BRIEF

Before FLEMING, LALL and BARRY, ***Administrative Patent Judges.***

FLEMING, ***Administrative Patent Judge.***

DECISION ON APPEAL

This is a decision on appeal from the final rejection of claims 1-9, all of the claims pending in the present

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application.

The invention relates to a method and apparatus for maintaining source control for new successive versions of

software where modifications have been made to a first version S1 are not included in the new version S3 (specification, page 1, and figure 1). The invention allows changes in a new version S3 of the software to be incorporated into the modified initial version of the software S2 (specification, page 3, lines 3-5). The difference between the new version S3 and the initial version S1 is integrated into a copy of the initial version S1', and the integrated copy is then integrated with a copy of the modified initial version S2 to yield a modified new version S4 (figures 4(a) through 4(d), and specification, page 7, lines 9-30 through page 9, lines 1-14).

Independent claim 1 is reproduced as follows:

1. A method of maintaining version control for an initial S1 of software stored in a memory, where the initial version has been modified to yield a modified initial version S2 of the software that is also stored in the memory, the method comprising the steps, performed by a data processing system, of:

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creating, in memory, a source tree containing the initial version S2 and the modified initial version S2 of the software;

receiving a new version S3 of the software;

determining a difference between the new version S3 and the initial version S1;

Integrating the difference between the new version and the initial version (S3-S1) into a copy of the initial version S1' to yield an integrated copy; and

incorporating the integrated copy into a copy of the modified initial version S2 to yield a modified new version S4, while still retaining the initial version S1 and its modified initial version S2.

The Examiner relies on the following references:

Leblang et al. (Leblang) 5,574,898 Nov.
12, 1996

Ambriola, V., Bendix L. and Ciancarini, P., "The Evolution of Configuration Management and Version Control," Software Engineering Journal, (November, 1990), pp. 303-310.

Tichy, W. "RCS-A System for Version control," 4.4BSD Programmer's Supplementary Documents (PSD), O'Reilly & Associates, Inc., (April, 1994), pp. 13-1 to 13-14.

Allman, E. "An Introduction to the Source Code Control System," 4.4BSD Programmer's Supplementary Documents (PSD), O'Reilly & Associates, Inc., (April, 1994), pp. 14-1 to 14-14.

SunSoft, SPARCworks/TeamWare ProWorks/TeamWare Users Guide, (1995), pp. 1-292.

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Claims 1-4 and 7 stand rejected under 35 U.S.C. § 103 as being unpatentable over Tichy in view of Ambriola.

Claim 5 stands rejected under 35 U.S.C. § 103 as being unpatentable over Tichy in view of Ambriola and further in view of Leblang.

Claim 6 stands rejected under 35 U.S.C. § 103 as being unpatentable over Tichy in view of Ambriola and further in view of Allman.

Claims 8-9 stands rejected under 35 U.S.C. § 103 as being unpatentable over Tichy in view of Ambriola and further in view of Allman and SunSoft.

Rather than reiterate the arguments of Appellant and the Examiner, reference is made to the Brief¹ and the Examiner's Answer for the respective details thereof.

¹The Brief was received October 26, 1998, and the Examiner's Answer was mailed January 4, 1999. A Reply Brief was received March 8, 1999. A response by the Examiner to Appellant's Reply Brief was mailed May 11, 1999, and stated that the reply brief had been entered and considered but no further response by the Examiner was necessary.

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OPINION

We will not sustain the rejections of claims 1-9 under 35 U.S.C. § 103.

We first consider the rejection of claims 1-4 and 7.

The Examiner has failed to set forth a **prima facie** case. It is the burden of the Examiner to establish why one having ordinary skill in the art would have been led to the claimed invention by the express teachings or suggestions found in the prior art, or by implications contained in such teachings or suggestions. *In re Sernaker*, 702 F.2d 989, 995, 217 USPQ 1, 6 (Fed. Cir. 1983). "Additionally, when determining obviousness,

the claimed invention should be considered as a whole; there is no legally recognizable 'heart' of the invention." *Par Ordnance Mfg. v. SGS Importers Int'l, Inc.*, 73 F.3d 1085, 1087, 37 USPQ2d 1237, 1239 (Fed. Cir. 1995), *cert. denied*, 117 S.Ct. 80 (1996) *citing W. L. Gore & Assocs., Inc. v. Garlock, Inc.*, 721 F.2d

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1540, 1548, 220 USPQ 303, 309 (Fed. Cir. 1983), *cert. denied*,
469 U.S. 851 (1984).

On page 3 the brief, Appellant argues that the cited references do not disclose or suggest all of the explicit limitations set forth in the claims. In particular, Appellant avers² that neither reference includes the step of copying an initial version S1 to yield a copy S1' of the initial version.

Appellant also asserts³ that no one of ordinary skill in the art would have been motivated to combine Tichy and Ambriola at the time the invention was made, as the references are contradictory and teach away from each other. Appellant notes Tichy's teaching of a Revision Control System (RCS) which, in performing version control, stores revisions in the form of

reverse deltas. He then points to Tichy's specific statement⁴

²Brief, page 6

³Brief, pages 4-6, and Reply Brief, pages 2-3

⁴Page PSD:13-5, Section 3.2, paragraph 3

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that "Using deltas is a classical space-time tradeoff: deltas reduce the space consumed but increase access time. However, **a version control tool should impose as little delay as possible on programmers** To gain reasonably fast access time for both editing and compiling, RCS arranges deltas in the following way. **The most recent revisions on the trunk is stored intact. All other revisions on the trunk are stored as reverse deltas.**" (Appellant's emphasis).

Appellant also points to Tichy's disclosure⁵ stating "**The naive solution would be to store complete copies for the tips of all branches.** Clearly, this approach would cost too much space." (Appellant's emphasis). Hence, Appellant concludes that not only does Tichy neither teach nor hint of a version control system that uses revision complete revision copies, Tichy teaches away from such a system.

In addition, Appellant asserts that in view of Tichy's application of this methodology, Tichy indicates that adding a new revision to the trunk is fast, because all that is needed is

⁵Page PSD:13-5, Section 3.2, paragraph 4

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to add the new revision intact, and replace the previous revision with a reverse delta, and maintain the rest of the old deltas.

Therefore, Tichy teaches a version methodology that limits space usage with deltas, and limits processing time with the use of reverse deltas.

This disclosure is then contrasted by Appellant⁶ with the disclosure of Ambriola. He notes that Ambriola discloses employing complete revision copies. This reference discloses a version control system named Cedar, which includes a "bringover command" and a "storeback command." The bringover command takes the description files and copies all the referenced files onto the user's personal computer. When the user completes changes, the changed files are copied back. Ambriola states⁷ that the Cedar mechanisms for VC are not very advanced and that no attempts are made to apply space-saving mechanisms.

Consequently, Appellant asserts that since Tichy has no need for, nor suggests a version control system that uses

⁶Brief, page 5

⁷Page 308, column 1, line 34 et seq.

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complete copies of versions, one of ordinary skill in this art would not have been motivated to combine Tichy and Ambriola.

In response to the Examiner's statement that "whether the versions . . . are stored in the form of deltas or complete/intact copies is not claimed, and thus does not preclude the application of the Ambriola reference."

Appellant asserts⁸ that technical distinctions between references that would preclude a suggestion or motivation for combining references do not need to be recited in the claims.

Appellant also argues that the Examiner has not considered Ambriola as a whole in conformance with the requirements of 35 U.S.C. § 103 and MPEP § 2141.01. Specifically, Appellant points to the Examiner's alleged attempt to separate this reference's bringover and storeback commands from its delta version control method.

At page 5 of his Reply Brief, Appellant asserts that the Examiner's finding that a version/revision of Tichy can be represented in a delta or a complete form, applies hindsight

⁸Reply brief, page 3

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reasoning to the progression of Tichy's discussion of the RCS version control system. Appellant asserts that the Examiner's analysis fails to take into account the natural progression of the academic paper where initial sections provide a foundation

for the reader's understanding of RCS, and do not include the concept of deltas, and represent each revision in figure 5 as a rectangle. Later sections of the paper introduce the concept of deltas and represent each delta in figure 5 with a triangle.

In reply to the Examiner's statement that "Considering the space-time tradeoff, one of ordinary skill in the art would have been motivated to employ more **up to all revisions** in complete/intact form to address the need for fast retrieval/checkout" (emphasis added), Appellant asserts⁹ that since Tichy indicates that there is a space-time tradeoff, there would be no motivation to entirely discount the importance of conserving space by employing revisions in

⁹Reply Brief, page 6

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complete copies.

Appellant then contends that the Examiner is in error in stating that the combination of Tichy and Ambriola would work because RCS as disclosed by Tichy, and Cedar as disclosed by Ambriola are different stages of development of an integrated version/configuration management system. Appellant asserts that RCS and Cedar are entirely two different technical generations. As evidence thereof, he points to the Ambriola statement¹⁰ "As we

will show, **these generations corresponding to the use of different basic methods and technologies** for the support of the activities of configuration management and version control." (emphasis added).

Finally, Appellant argues¹¹ that contrary to the Examiner's conclusion, the "storeback command" does not integrate file modifications, but for each modified file it copies the complete file back to its original location. He

¹⁰Page 303, column 2

¹¹Reply brief, page 8

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points to Ambriolas' statement¹² that "[V]ersions are in fact immutable . . ." to show that the Examiner's use of Ambriola functions of "bringover" and "storeback" to integrate and incorporate into a copy of the initial version is not possible.

The Examiner finds¹³ that Tichy teaches all the limitations of claim 1, excepting explicit teaching of:

- a. Memory and data processing system; and
- b. That the difference determined is between S3 and S1; and
- c. That the integrated copy is integrated from a copy of the initial version S1'; and
- d. That the modified new version is incorporated from a copy of the modified initial version.

As to item (a) above, the Examiner asserts that memory and a data processing system would have been inherent components of the system of Tichy for performing version management.

As to item (b) above, the Examiner points to Tichy's teaching of determining the difference between any one version

¹²Page 308, column 1

¹³Examiner's Answer, page 4

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and its successor/predecessor, and finds that it would have been obvious to apply the teaching to version S3 and S1 so that memory taken is minimized by storing the difference instead of another full version.

As to items (c) and (d) above, the Examiner points to the Ambriola teaching of the Cedar version management system, including the bringover command for making a copy of the original version, for modifying a copy, and for integrating the modification by the storeback command. Examiner notes that Ambriola teaches that the description files and all the referenced files form an initial version/revision subjected to modification/change.

In conclusion to the rejection, the Examiner finds that since Tichy and Ambriola address version management, it would have been obvious to combine the teachings of Ambriola to integrate/incorporate into a copy of the initial version the modified initial version of the system of Tichy, so that the system is provided with the ability to extend to a distributed system with multiple machines.

In response to Appellant's argument that since Tichy

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stores revisions in the form of reverse deltas, while Ambriola does not employ deltas, one would not have been motivated to combine these references, the Examiner asserts¹⁴ that since the claims do not specify whether the versions are stored as deltas or complete/intact copies, the application of Ambriola is not precluded.

Next, the Examiner argues that since Tichy uses a triangle to represent a revision stored in delta form and a rectangle for a revision stored in complete/intact form, all the version/revisions in figures 2-4 of Tichy can be represented in complete intact form as evidenced by the respective rectangles.

The Examiner then contends¹⁵ that considering the space-time tradeoff in storing revisions in deltas to save memory space, and the need for fast retrieval/check-out of any revision, one of ordinary skill in the art would have been motivated to employ

¹⁴Examiner's Answer, page 9

¹⁵Examiner's answer, page 10

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more up to all revisions in complete/intact form to address the need for fast retrieval/checkout.

Finally, the Examiner asserts that the combination of these references would work because RCS as disclosed by Tichy, and Cedar as disclosed by Ambriola are different stages of development of an integrated version/configuration management system.

As pointed out by our reviewing court, we must first determine the scope of the claim. "[T]he name of the game is the claim." *In re Hiniker Co.*, 150 F.3d 1362, 1369, 47 USPQ2d 1523, 1529 (Fed. Cir. 1998).

Turning first to Appellant's claim 1, we note that the Examiner has admitted that Tichy does not provide an explicit teaching of the following claim limitations:

- a. Memory and data processing system (recited in the preamble of the claim); and
- b. That the difference determined is between S3 and S1 (recited in the third subparagraph of the claim); and
- c. That the integrated copy is integrated from a copy of the initial version S1' (recited in the fourth subparagraph of the claim); and
- d. That the modified new version is incorporated from a copy of the modified initial version (recited in the final subparagraph of the claim).

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As to item (a) above, we agree with the Examiner that the memory and a data processing system would have been inherent components of the system of Tichy for performing version management. The Tichy article is directed to computer science software development and the use of version control systems for programs. The storage of data is explicitly¹⁶ and implicitly disclosed by Tichy.

Furthermore, Appellant has not argued contrary to the Examiner's finding.

Therefore, as the extrinsic evidence makes it clear that the missing descriptive matter is necessarily present in the reference of Tichy and that it would be so recognized by one skilled in this art, we find memory and a data processing system to be disclosed by Tichy.

As to item (b) above, we agree with the Examiner that since Tichy teaches determining the difference between any one version and its successor/predicessor, it would have been obvious to apply the teaching to version S3 and S1 so that

¹⁶Page PSD:13-1

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memory taken is minimized by storing the difference instead of another full version.

However, as to items (c) and (d) above, we find that it would not have been obvious to apply the Ambriola reference to teach these claim limitations.

The Federal Circuit states that "[t]he mere fact that the prior art may be modified in the manner suggested by the Examiner does not make the modification obvious unless the prior art suggested the desirability of the modification." *In re Fritch*, 972 F.2d 1260, 1266 n.14, 23 USPQ2d 1780, 1783-84 n.14 (Fed. Cir. 1992), *citing In re Gordon*, 733 F.2d 900, 902, 221 USPQ 1125, 1127 (Fed. Cir. 1984). "Obviousness may not be established using hindsight or in view of the teachings or suggestions of the inventor." *Para-Ordnance*, 73 F.3d at 1087, 37 USPQ2d at 1239, *citing W. L. Gore & Assocs.*, 721 F.2d at 1551, 1553, 220 USPQ at 311, 312-13. In addition, our reviewing court requires the PTO to make specific findings on a suggestion to combine prior art references. *In re Dembiczak*, 175 F.3d 994, 1000-01, 50 USPQ2d 1614, 1617-19

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(Fed. Cir. 1999).

We agree with Appellant's assertion¹⁷ that no one of ordinary skill in the art would not have been motivated to combine Tichy and Ambriola at the time the invention was

made, as the references are contradictory and teach away from each other.

One important indicium of non-obviousness is "teaching away"

from the claimed invention by the prior art. *In re Dow Chemical Co.*, 837 F.2d 469, 473, 5 USPQ2d 1529, 1532 (Fed. Cir. 1988),

In re Bell, 991 F.2d 781, 784, 26 USPQ2d 1529, 1531 (Fed. Cir. 1993). The present references are replete with evidence teaching away from the combination for the claimed invention.

First, Tichy states¹⁸ "*The naive solution would be to store complete copies for the tips of all branches. Clearly,*

¹⁷Brief, pages 4-6, and Reply Brief, pages 2-3

¹⁸Page PSD:13-5, Section 3.2, paragraph 4

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this approach would cost too much space." (Emphasis added).

Thus, Tichy teaches away from such a system.

Furthermore, Tichy discloses an RCS which, in performing version control, stores revisions in the form of reverse deltas. Tichy specifically states¹⁹ that ". . . deltas reduce the space consumed but increase access time. However, a *version control tool should impose as little delay as possible on programmers* . . ." (Emphasis added).

In addition, Tichy teaches²⁰ that adding a new revision to the trunk is fast, because all that is needed is to add the new revision intact and replace the previous revision with a reverse delta, and maintain the rest of the old deltas. Therefore, Tichy teaches a version methodology that limits space usage with deltas, and limits processing time with the use of

¹⁹Page PSD:13-5, Section 3.2, paragraph 3

²⁰Page PSD:13-5, Section 3.2

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reverse deltas.

On the other hand, Ambriola discloses²¹ employing complete revision copies, and the Cedar system, which includes a bringover command and a storeback command. The bringover command takes the description files and copies all the referenced files onto the user's personal computer. Ambriola explicitly states²² that the Cedar mechanisms for VC are not very advanced and that no attempts are made to apply space-saving mechanisms.

Therefore, we find that since Tichy has no need for, nor provides any suggestion of a version control system that uses complete copies of versions, one of ordinary skill in this art would not have been motivated to combine Tichy and Ambriola.

The Examiner's argument that "whether the versions . . . are stored in the form of deltas or complete/intact copies is not claimed, and thus does not preclude the application of the Ambriola reference" is not well taken. The Examiner has not provided any support for this statement. We agree with the

²¹Pages 307-308

²²Page 308, column 1, line 34 et seq.

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Appellant that distinctions between references that would preclude a suggestion or motivation for combining references does not need to be recited in the claims to be considered as evidence of unobviousness.

We also agree with Appellant that the Examiner's finding that a version/revision of Tichy can be represented in a delta or a complete form, applies hindsight reasoning to the progression of Tichy's discussion of the RCS version control system. Tichy's academic paper first provides a foundation for the reader's understanding of RCS, and does not include the concept of deltas, and therefore represents each revision in figure 5 as a rectangle. Later sections of the paper then introduce the concept of deltas and represent each delta in figure 5 with a triangle.

We disagree with the Examiner's contention that due to the space-time tradeoff one of ordinary skill in the art would have been motivated to employ more up to all revisions in

complete/intact form to address the need for fast

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retrieval/checkouts. As Tichy teaches²³ that there is a space time tradeoff, there would be no motivation to entirely discount the importance of conserving space by employing revisions in complete copies.

In addition, we note that although RCS as disclosed by Tichy, and Cedar as disclosed by Ambriola, are different stages of development of an integrated version/configuration management system, they are of entirely two different technical generations and use different methods and technologies. Ambriola explicitly states²⁴ "these generations correspond to the use of different basic methods and technologies for the support of the activities of configuration management and version control." (Emphasis added).

We are not inclined to dispense with proof by evidence when the proposition at issue is not supported by a teaching in a prior art reference or shown to be common knowledge of unquestionable demonstration. Our reviewing court requires

²³Page PSD:13-5, section 3.2

²⁴Page 303, column 2

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this evidence in order to establish a *prima facie* case. *In re*

Piasecki, 745 F.2d 1468, 1471-72, 223 USPQ 785, 787-88 (Fed. Cir.

1984); *In re Knapp-Monarch Co.*, 296 F.2d 230, 232, 132 USPQ 6, 8 (CCPA 1961); *In re Cofer*, 354 F.2d 664, 668, 148 USPQ 268, 271-72 (CCPA 1966). Furthermore, our reviewing court states in *In re Piasecki*, 745 F.2d at 1472, 223 USPQ at 788 (Fed. Cir. 1984) the following:

The Supreme Court in *Graham v. John Deere Co.*, 383 U.S. 1 (1966), focused on the procedural and evidentiary processes in reaching a conclusion under Section 103. As adapted to *ex parte* procedure, *Graham* is interpreted as continuing to place the "burden of proof on the Patent Office which requires it to produce the factual basis for its rejection of an application under section 102 and 103." *Citing In re Warner*, 379 F.2d 1011, 1020, 154 USPQ 173, 177 (CCPA 1967).

Therefore, we will not sustain the rejections of claims 1-4, and 7 under 35 U.S.C. § 103 as being unpatentable over Tichy in view of Ambriola.

In addition, as the three remaining rejections include the combination of Tichy and Ambriola as applied to claim 1, and the Examiner has only applied the additional references to

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the specific limitations added by those claims, we will not sustain those rejections.

We have not sustained the following rejections:

1. The rejection of claims 1-4 and 7 under 35 U.S.C. § 103 over Tichy in view of Ambriola;

2. The rejection of claim 5 under 35 U.S.C. § 103 over Tichy in view of Ambriola and further in view of Leblang;

3. The rejection of claim 6 under 35 U.S.C. § 103 over Tichy in view of Ambriola and further in view of Allman;

4. The rejection of claims 8-9 under 35 U.S.C. § 103 over Tichy in view of Ambriola and further in view of Allman and SunSoft.

Accordingly, the Examiner's decision is reversed.

REVERSED

MICHAEL R. FLEMING)	
Administrative Patent Judge)	
)	
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)	BOARD OF PATENT
PARSHOTAM S. LALL)	APPEALS AND
Administrative Patent Judge)	INTERFERENCES

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)
LANCE LEONARD BARRY)
Administrative Patent Judge)

MRF:lbg

LAURA A. MAJERUS
GRAHAM & JAMES LLP
600 HANSEN WAY,
PALO ALTO, CA 94304-1043

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