

NOTE: This disposition is nonprecedential.

**United States Court of Appeals
for the Federal Circuit**

IN RE: JENNIFER SCHWEICKERT,
Appellant

2016-1266

Appeal from the United States Patent and Trademark
Office, Patent Trial and Appeal Board in No. 90/012,284.

Decided: January 26, 2017

ROBERT W. BERGSTROM, Olympic Patent Works, Seat-
tle, WA, argued for appellant. Also represented by
RICHARD L. BELL.

BRIAN RACILLA, Office of the Solicitor, United States
Patent and Trademark Office, Alexandria, VA, argued for
appellee Michelle K. Lee. Also represented by THOMAS W.
KRAUSE, MICHAEL SUMNER FORMAN, SCOTT
WEIDENFELLER.

Before NEWMAN, CHEN, and STOLL, *Circuit Judges*.
CHEN, *Circuit Judge*.

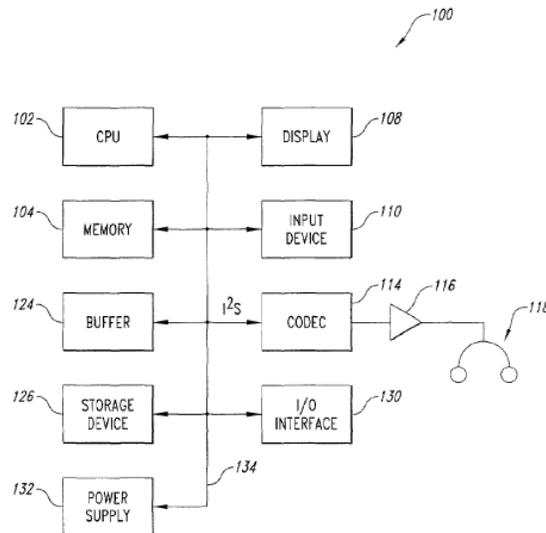
This appeal arises from a decision of the Patent Trial
and Appeal Board in an ex parte reexamination, which

concluded that all of the claims in U.S. Patent No. 7,574,272 were unpatentable as obvious over two prior art references. Because the Board’s obviousness conclusion is based on findings not supported by substantial evidence, we *vacate* the Board’s decision.

BACKGROUND

A. The Invention

The ’272 Patent is directed at a portable media player that minimizes power consumption during the transfer of data from a spinning storage medium (such as a CD-ROM) to other memory in the player. The portable media player generally consists of off-the-shelf components as seen in figure 1.



’272 Patent fig. 1. Notably, “storage device 126 has a motor that is only enabled when the system 100 requires a data transfer from the [spinning] storage media” in storage device 126 to buffer 124. *Id.* col. 3 l. 58–col. 4 l. 3; *see also id.* col. 6 ll. 3–5. “[T]he motor . . . consumes a significant amount of power when active”—it is “the main source of power consumption in system 100.” *Id.* col. 6 ll. 5–8.

Data transfer generally occurs when central processing unit 102 executes instructions from memory 104 to transfer compressed digital data from storage device 126 to buffer 124, which can consist of random access memory (RAM). *See id.* col. 5 ll. 11–19; *see also id.* col. 3 ll. 58–59. Once the compressed digital data is received by buffer 124, that data is then sent through a high-speed serial bus to CODEC 114, where it can be converted to decompressed analog data, *id.* col. 3 ll. 14–22; *id.* col. 3 ll. 48–49, and ultimately sent to “an audio output device 118, such as a pair of headphones,” *id.* col. 3 ll. 48–54.

The optimization of the data transfer process from storage device 126 to CODEC 114 relies on the structure and organization of buffer 124. *See generally id.* col. 7 l. 21–col. 10 l. 56. In particular, “buffer 124 may be readily broken down into a number of individual buffers.” *Id.* col. 7 ll. 44–45. And each individual buffer is entirely “lockable”—that is, at any given time, a buffer storing compressed digital data is temporarily locked such that the data cannot be overwritten, even while neighboring buffers are receiving new compressed digital data from storage device 126. *See id.* col. 10 l. ll. 42–45. The “lockable” feature of the buffers is the touchstone of the claimed invention because it limits how much compressed digital data can be reloaded into buffer 124 at any given time, thereby reducing the frequency in which storage device 126 has to be activated and the motor therein enabled. *See id.* col. 10 ll. 42–51. Claim 1 is representative of the claimed invention:

1. A portable media player comprising:
 - a processor that executes commands;
 - a random-access-memory component that stores compressed data in more than two different random-access-memory buffer areas, each random-access-memory buffer lockable and unlockable by the processor;

a codec component, controlled by the processor, that reads compressed data from a locked random-access-memory buffer, the locked random-access-memory buffer selected from among the more than two different random-access-memory buffer areas and locked by the processor to prevent writing of the locked random-access-memory buffer by another component, and that generates a decompressed signal from the read compressed data that is rendered by a data-rendering component;

a non-volatile, mass-storage component that stores compressed data and that writes compressed data, under control of the processor, to unlocked random-access-memory buffers; and

a battery power supply to provide electrical power to the processor, random-access memory component, codec component, data-rendering component, and non-volatile, mass-storage component.

Id. col. 12 ll. 32–55.

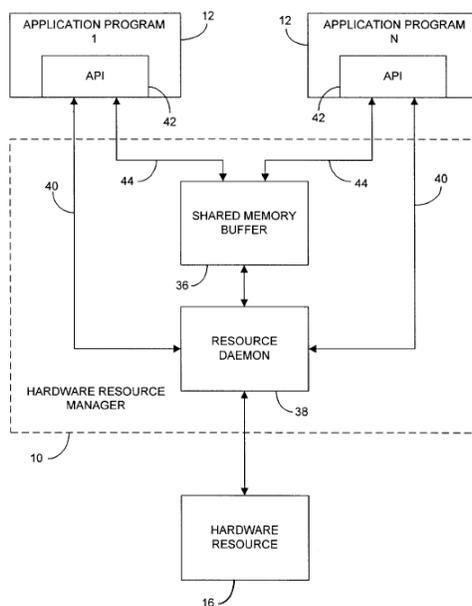
B. The Prior Art

U.S. Patent No. 6,332,175 (Birrell) is generally directed at a portable audio player that stores compressed audio data on an internal storage unit such as a hard disk drive, and loads that data into an internal RAM, from where the data can be played. Birrell col. 3 ll. 39–47. In addition to storing compressed data, other portions of the RAM are designated for the storage of information related to the data, such as a list of audio tracks to be played. *See, e.g., id.* figs. 2A, 2B, 2C.

To play the compressed data from Birrell's RAM, a converter changes the data into decompressed audio data,

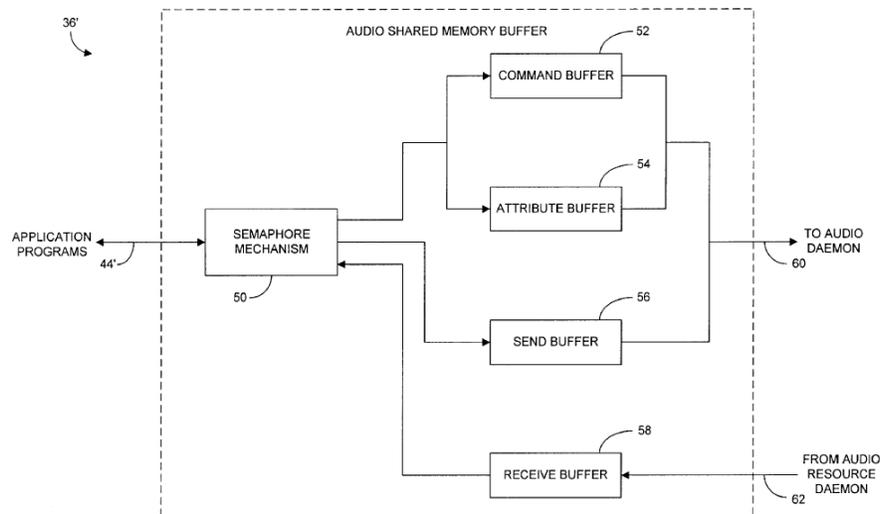
and the decompressed data is ultimately sent to an output jack. *Id.* col. 4 ll. 30–37. The audio player’s play control logic monitors the amount of unplayed compressed data that remains in the RAM as that data is being played from the RAM. *Id.* col. 5 ll. 9–12; *see also id.* col. 6 ll. 5–28. Once the play control logic recognizes that the amount of unplayed, compressed data in the RAM falls below a threshold, the play control logic copies additional compressed data from the storage unit into the RAM. *See id.* col. 6 ll. 5–28. Keeping the RAM continually filled with an adequate amount of compressed data ensures that there is no break in audio output. *See id.*

U.S. Patent No. 5,842,015 (Cunniff) generally discloses a hardware resource manager, or a software program, for use in a computer system that controls access to a hardware resource by several application programs. Figure 2 in Cunniff is a block diagram that illustrates the architecture of an embodiment of the hardware resource manager.



Cunniff fig. 2.

Inside hardware resource manager 10 is a shared memory buffer 36. *See id.* Importantly, shared memory buffer 36 has a semaphore (a type of lock) that controls how many application programs can access hardware resource 16 at any given point in time. *Id.* col. 6 ll. 20–23. The semaphore “protects the hardware resource manager from having more than one application program write to the shared memory buffer 36 at a time,” which “preserves the integrity of the shared resources of the shared memory buffer 36.” *Id.* col. 6 ll. 41–46. In other words, the semaphore “ensures that the application programs do not overwrite each other[s] commands or data stored in the audio shared memory buffer.” *Id.* col. 8 ll. 5–12. The semaphore’s role in shared memory buffer 36 is illustrated in the block diagram below.



Id. fig. 4.

C. The Ex Parte Reexamination

The Patent and Trademark Office instituted an ex parte reexamination of all of the claims of the '272 Patent. During the reexamination, a PTO examiner concluded that the patent claims were obvious in light of several, two-reference combinations. The Board affirmed

the examiner's conclusion of obviousness, relying on only one combination: Birrell and Cunniff. J.A. at 4–7. In doing so, it explained that there was

no reason why Birrell would not have benefitted from the advantages of including Cunniff's semaphore mechanism. Cunniff's semaphore mechanism is readily applicable to Birrell because Birrell plays data stored in [the] RAM and also copies data from the disk drive to the RAM. As such, modifying Birrell to include Cunniff's semaphore mechanism would have been a predictable use of prior art elements according to their established functions—an obvious improvement.

Id. at 5–6. And the Board also noted that

the fact that a lockless implementation may be used in Birrell [did] not persuade [it] that an implementation using locks would not have been obvious because although the use of locks adds additional complexity and computations, . . . an implementation using locks is within the knowledge of a skilled artisan.

Id. at 6.

The patent owner sought reconsideration of this decision, but the Board stood by its decision. *See id.* at 10–14. The patent owner has timely appealed the Board's obviousness determination to this court. We have jurisdiction pursuant to 28 U.S.C. § 1295(a)(4)(A) (2012) and 35 U.S.C. § 141 (2012).

DISCUSSION

We review the Board's factual findings for substantial evidence and its legal conclusions without deference. *Flo Healthcare Solutions, LLC v. Kappos*, 697 F.3d 1367, 1375–76 (Fed. Cir. 2012) (citing cases). Substantial evidence “means such relevant evidence as a reasonable

mind might accept as adequate to support a conclusion.” *Blue Calypso, LLC v. Groupon, Inc.*, 815 F.3d 1331, 1337 (Fed. Cir. 2016) (quoting *Consol. Edison Co. of N.Y. v. NLRB*, 305 U.S. 197, 217 (1938)). A claim is unpatentable as obvious if the differences between the claimed subject matter and the prior art are such that the subject matter as a whole would have been obvious at the time of invention to a person having ordinary skill in the art. 35 U.S.C. § 103(a).¹ Obviousness is a question of law premised on underlying issues of fact, including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the pertinent art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence, such as commercial success, long-felt need, and the failure of others. *E.g.*, *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 427 (2007). Similarly, the determinations of what a prior art reference teaches and the existence of a reason to combine references are questions of fact. *E.g.*, *In re Hyon*, 679 F.3d 1363, 1365–66 (Fed. Cir. 2012).

Here, the Board never sufficiently justifies why Cunniff’s semaphore would provide an “obvious improvement” to Birrell. J.A. at 5. At oral argument, the PTO argued that it would have been obvious to substitute Birrell’s play control logic with Cunniff’s semaphore. *See Oral Argument at 16:00–17:00*, <http://oralarguments.cafc.uscourts.gov/default.aspx?fl=2016-1266.mp3>. But this substitution is illogical as it would leave Birrell void of the mechanism it relies on to monitor when the com-

¹ In passing the Leahy-Smith America Invents Act (AIA), Congress amended 35 U.S.C. § 103(a). *See Pub. L. No. 112-29, § 3(c), 125 Stat. 284, 287–88 (2011)*. However, because the application that led to the ’272 Patent was filed before March 16, 2013, the pre-AIA § 103(a) applies. *See id.* § 3(n)(1), 125 Stat. at 293.

pressed data in the RAM has fallen below a level such that additional data from the storage unit needs to be copied over into the RAM. Loss of this mechanism would thus strip Birrell of the ability to timely copy additional data into the RAM to ensure continuous playing of an audio file. In other words, removing the play control logic defeats the purpose of Birrell's system. Nothing in Cunniff's semaphore serves this critical function supplied by Birrell's play control logic.²

Alternatively, the PTO contends that Birrell's RAM is similarly situated to Cunniff's limited shared resource, and thus Birrell would have benefited from the addition of the access control provided by Cunniff's semaphore. Appellee Br. at 24. This contention is also not supported by substantial evidence. Cunniff describes at least two application programs competing for access to a limited hardware resource. *See* Cunniff col. 5 ll. 52–57 (“[T]he hardware resource manager of the present invention along with its associated methodology can be employed in connection with more than one application program 12 for controlling and managing the use of an associated hardware resource 16 within a computer system . . .”). But there is no similar competition for access to Birrell's RAM,

² Relatedly, the PTO argues that Birrell, like Cunniff, seeks to avoid unintended overwriting of data, and that Cunniff's semaphore would be a suitable mechanism to address that concern. *See* Appellee Br. at 20–21. Birrell's concern with unintended overwriting, however, is limited to the circumstance in which users may wish to rewind the most recently played data to replay it. And Birrell's play control logic already addresses this concern through its timing of copying new data in a way that precludes immediately overwriting the most recently played data. Birrell col. 6 l. 64–col. 7 l. 5.

let alone competition to use the compressed data stored in the RAM. This record describes no problem in Birrell that would be resolved by the semaphore in Cunniff.

The Board's decision is deficient in another respect. Even if the semaphore in Cunniff were readily applicable to the RAM in Birrell, the Board has not explained why or how a skilled artisan would further configure or manipulate Birrell's RAM such that there would be multiple lockable buffers as claimed in the '272 Patent. *See* '272 Patent col. 10 ll. 42–56³; *see also* *KSR*, 550 U.S. at 418 (stressing that it is “important to identify a *reason* that would have prompted [a skilled artisan] to combine the elements *in the way* the claimed new invention does” (emphasis added)).

The PTO attempted to address this deficiency at oral argument. It directed us to certain disclosures in Birrell and Cunniff: (1) figures 2A, 2B, and 2C in Birrell; and (2) figure 4 in Cunniff. *See* Oral Argument at 20:08–21:44, 23:48–24:18, <http://oralarguments.cafc.uscourts.gov/default.aspx?fl=2016-1266.mp3>. As a preliminary matter, the Board's decision neither addressed how Birrell or Cunniff disclosed multiple, lockable buffers nor relied upon these figures.

Moreover, Figures 2A, 2B, and 2C in Birrell disclose RAM that can be partitioned into separate storage areas for different types of data or information, such as an area

³ We briefly pause to note that the '272 Patent specification seemingly acknowledges that the claimed invention is only an advance over the prior art because it uses more than two lockable buffers whereas it was already known to use one buffer that is allocated into two portions, where one portion is lockable and the other portion is not. *See* '272 Patent col. 10 ll. 42–56.

for storing a list of audio tracks to be played. But Birrell's partitioned RAM does not suggest the use of multiple RAM buffers for the compressed data. Birrell discloses RAM with a single buffer for such data. *See* Birrell col. 5 ll. 40–42 (“A *portion* of [the] RAM . . . is devoted to storing a predetermined amount of [compressed data].” (emphasis added)). And figure 4 in Cunniff fares no better. There is no indication that the buffers there are individually lockable.

We note one more shortcoming in the Board's decision. The Board found that a “lockless” Birrell worked without trouble and that the application of Cunniff's semaphore to Birrell's RAM would “add[] additional complexity and computations” to Birrell. J.A. at 6. Given these findings, the Board needed to explain why a skilled artisan would still have a reason to combine Birrell and Cunniff to achieve the claimed invention. *See, e.g., Intelligent Bio-Sys., Inc. v. Illumina Cambridge Ltd.*, 821 F.3d 1359, 1368 (Fed. Cir. 2016). Although it asserts that Birrell would have “benefitted from the advantages of . . . Cunniff's semaphore mechanism,” the Board did not explain why this is so. Birrell's play control logic already knows when the storage unit should (and should not) transfer more data to the RAM. The gating function of Cunniff's semaphore, which is designed to prevent unwanted overwriting, is unnecessary to Birrell's system, and it would do little more than add unwanted cost and complexity to the system.

The PTO suggests that a skilled artisan would have been motivated to combine Cunniff and Birrell despite the difficulties of doing so because Birrell's system would be more cost-effective to manufacture with Cunniff's semaphore. *See* Appellee Br. at 24 (first citing J.A. at 536; and then citing Cunniff col. 1 ll. 34–38). But the Board never made this finding. And even if the Board did, the record does not appear to substantiate it. At most, Cunniff states that there are advanced hardware resources in the

prior art that can juggle multiple program applications, but that these hardware resources are expensive to manufacture and repair. Cunniff col. 1 ll. 34–38. That stated comparison to expensive hardware resource alternatives has no bearing on how Cunniff’s semaphore would have lowered manufacturing expenses associated with Birrell’s system. Thus, the record lacks support for this supposed motivation to introduce Cunniff’s semaphore into Birrell’s RAM.

The Board, at best, merely posits that a skilled artisan could combine Birrell and Cunniff, notwithstanding any difficulties, and would do so because these references were within the knowledge of a skilled artisan. But in view of the foregoing, this broadly-stated conclusion suffers from hindsight bias. *See, e.g., In re Giannelli*, 739 F.3d 1375, 1380 (Fed. Cir. 2014) (reversing affirmance of examiner’s obviousness determination where the Board’s analysis “contained no explanation why or how [a skilled artisan] would modify” the prior art to arrive at the claimed invention); *In re Rouffet*, 149 F.3d 1350, 1358 (Fed. Cir. 1998).

In short, the Board has proffered no sufficient basis for why a skilled artisan would have readily applied Cunniff to Birrell. On this record, Cunniff is an ill fit for Birrell.

CONCLUSION

For the foregoing reasons, we vacate the Board’s decision and remand for further proceedings consistent with this opinion.

VACATED AND REMANDED

COSTS

No costs.