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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DAVID D. CHAMBLISS and NIMROD MEGIDDO

Appeal 2018-008025
Application 14/746,905
Technology Center 2100

Before JEAN R. HOMERE, CAROLYN D. THOMAS, and SCOTT RAEVSKY, *Administrative Patent Judges.*

RAEVSKY, *Administrative Patent Judge.*

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant[1] appeals from the Examiner's decision to reject claims 1–3, 5–11, and 13–21. Appeal Br. 5. Claims 4 and 12 have been canceled. Claims App'x. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

[1] We use the word "Appellant" to refer to "[A]pplicant" as defined in 37 C.F.R. § 1.42(a). Appellant identifies International Business Machines Corporation as the real party in interest. Appeal Br. 3.

CLAIMED SUBJECT MATTER

The claims relate to a storage system organized into a hierarchy of storage tiers. Spec., Abstract. Claim 1, reproduced below, is illustrative of the claimed subject matter:

> 1. A method comprising:
>
> configuring a storage system into a hierarchy of storage tiers, including a first performance storage tier and a second performance storage tier;
>
> determining a resource constraint limiting a number of blocks and number of individual pages for selection and placement into the first performance storage tier, wherein the selection and placement are a combination of individual page and block granularity, and a block comprises at least two pages;
>
> estimating a benefit metric as a value of a given selection of blocks and individual pages for placement in the first performance storage tier, the benefit metric including a sum of block scores of selected blocks, and individual page scores for selected individual pages not contained in the selected blocks;
>
> determining a preferred selection of a first combination of blocks and individual pages according to the benefit metric; and
>
> placing the preferred selection of the first combination of blocks and individual pages in the first storage tier with the selection reflecting the preference as determined by the benefit metric.

REJECTION

Claims 1–3, 5–11, and 13–21 stand rejected under 35 U.S.C. § 101 as being directed to a judicial exception. Final Act. 12.[2]

[2] The Examiner withdrew a rejection of claims 1, 6, 9, 14, 17, and 20 under § 112(b). Advisory Act. 2

We review the appealed rejection for error based upon the issues identified by Appellant and in light of the arguments and evidence produced thereon. *Ex parte Frye*, 94 USPQ2d 1072, 1075 (BPAI 2010) (precedential).

ANALYSIS

I. Principles of Law

An invention is patent-eligible if it claims a "new and useful process, machine, manufacture, or composition of matter." 35 U.S.C. § 101. However, the Supreme Court has long interpreted 35 U.S.C. § 101 to include implicit exceptions: "[l]aws of nature, natural phenomena, and abstract ideas" are not patentable. *E.g.*, *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 216 (2014).

In determining whether a claim falls within an excluded category, we are guided by the Supreme Court's two-step framework, described in *Mayo* and *Alice*. *Id.* at 217–18 (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 75–77 (2012)). In accordance with that framework, we first determine what concept the claim is "directed to." *See id.* at 219 ("On their face, the claims before us are drawn to the concept of intermediated settlement, *i.e.*, the use of a third party to mitigate settlement risk."); *see also Bilski v. Kappos*, 561 U.S. 593, 611 (2010) ("Claims 1 and 4 in petitioners' application explain the basic concept of hedging, or protecting against risk.").

Concepts determined to be abstract ideas, and thus patent ineligible, include certain methods of organizing human activity, such as fundamental economic practices (*Alice*, 573 U.S. at 219–20; *Bilski*, 561 U.S. at 611); mathematical formulas (*Parker v. Flook*, 437 U.S. 584, 594–95 (1978)); and

mental processes (*Gottschalk v. Benson*, 409 U.S. 63, 67–68 (1972)). Concepts determined to be patent eligible include physical and chemical processes, such as "molding rubber products" (*Diamond v. Diehr*, 450 U.S. 175, 191 (1981)); "tanning, dyeing, making water-proof cloth, vulcanizing India rubber, smelting ores" (*id.* at 182 n.7 (quoting *Corning v. Burden*, 56 U.S. 252, 267–68 (1853))); and manufacturing flour (*Benson*, 409 U.S. at 69 (citing *Cochrane v. Deener*, 94 U.S. 780, 785 (1876))).

If the claim is "directed to" an abstract idea, we turn to the second step of the *Alice* and *Mayo* framework, where "we must examine the elements of the claim to determine whether it contains an 'inventive concept' sufficient to 'transform' the claimed abstract idea into a patent-eligible application." *Alice*, 573 U.S. at 221. "A claim that recites an abstract idea must include 'additional features' to ensure 'that the [claim] is more than a drafting effort designed to monopolize the [abstract idea].'" *Id.* (alterations in original) (quoting *Mayo*, 566 U.S. at 77). "[M]erely requir[ing] generic computer implementation[] fail[s] to transform that abstract idea into a patent-eligible invention." *Id.*

The U.S. Patent and Trademark Office ("PTO") recently published revised guidance on the application of § 101. *See* USPTO's *2019 Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. 50 (Jan. 7, 2019); USPTO's *October 2019 Update: Subject Matter Eligibility* (Oct. 17, 2019) (collectively, the "Guidance"). Under the Guidance, we first look to whether the claim recites:

> (1) any judicial exceptions, including certain groupings of abstract ideas (i.e., mathematical concepts, certain methods of

organizing human activities such as a fundamental economic practice, or mental processes); and

(2) additional elements that integrate the judicial exception into a practical application (*see* MPEP §§ 2106.05(a)–(c), (e)–(h) (9th ed. Rev. 08.2017, Jan. 2018)).

Only if a claim (1) recites a judicial exception and (2) does not integrate that exception into a practical application, do we then look to whether the claim:

(3) adds a specific limitation beyond the judicial exception that is not "well-understood, routine, conventional" in the field (*see* MPEP § 2106.05(d)); or

(4) simply appends well-understood, routine, conventional activities previously known to the industry, specified at a high level of generality, to the judicial exception.

See Guidance, 84 Fed. Reg. at 56.

II. Step 2A, Prong One (Judicial Exception)

The Examiner determines that claim 1 is directed to the abstract idea of "calculating values and organizing information through mathematical correlations." Final Act. 12. Appellant disputes that the claims are directed toward an abstract idea. Appeal Br. 11–18.

For reasons set forth in the next section, we agree with Appellant that the claims are not directed toward an abstract idea. However, under Step 2A, Prong One of the Guidance, we determine that claim 1 *recites* at least a mathematical concept because claim 1 broadly recites "estimating a benefit metric as a value . . . the benefit metric including a sum of block scores." As drafted, this limitation, under the broadest reasonable interpretation, and

according to the Guidance, recites a mathematical concept because a "sum of block scores" is a mathematical calculation. *See October 2019 Update: Subject Matter Eligibility*, 4 (Oct. 17, 2019) ("A claim that recites a numerical formula or equation will be considered as falling within the 'mathematical concepts' grouping. In addition, there are instances where a formula or equation is written in text format that should also be considered as falling within this grouping. For example, the phrase 'determining a ratio of A to B' is merely a textual replacement for the particular equation (ratio = A/B)."); *SAP Am., Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1165, 1167 (Fed. Cir. 2018) (A claim reciting "performing a resampled statistical analysis" was directed to a mathematical concept.). Accordingly, we conclude claim 1 recites an abstract idea.

IV. Step 2A, Prong Two (Integration into a Practical Application)

Under the Guidance, we determine if additional elements in the claims integrate the judicial exception into a practical application (*see* MPEP § 2106.05(a)–(c), (e)–(h)).[3]

Appellant contends the claims "are directed toward a specific implementation of a solution to a problem in the computer hardware arts." *Id.* at 15–16. Specifically, Appellant contends,

> Appellant's improvement of storing data in tiered data storage systems through determining a preferred selection of blocks and pages through determination of a specific metric, for example,

[3] We acknowledge that some of the considerations at Step 2A, Prong 2 may be evaluated under Step 2 of *Alice* (Step 2B of the Guidance). For purposes of maintaining consistent treatment within the Office, we evaluate them under Step 1 of *Alice* (Step 2A of the Guidance). *See* Guidance, 84 Fed. Reg. at 55 nn.25, 27–32.

> has a parallel function to that of the self-referential table claimed by *Enfish*, as the improvement for storing and accessing data further improves the efficiency of the overall process of data management.

Id. at 15 (citing *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016). Appellant also contends,

> such improvement for storing data based on the optimal selection of pages through recognizing which pages are already selected in blocks, and the optimal selection of blocks through recognizing that some pages will be selected even when the associated blocks are not selected, implements a real-world solution to issues associated with storing data in tiered data storage systems.

Id. at 14. We agree with Appellant.

Claim 1 recites additional limitations pertinent to solving a problem with computer storage, including at least,

> determining a preferred selection of a first combination of blocks and individual pages according to the benefit metric; and
>
> placing the preferred selection of the first combination of blocks and individual pages in the first storage tier with the selection reflecting the preference as determined by the benefit metric.

These additional limitations address a technical problem arising in the context of a computer storage system, namely the problem that "higher performance tier [storage] is expensive and as such space in the higher tier is limited. . . . To address the limited capacity of the higher tier, a maximum number of blocks and pages for selection and placement in the higher tier must be determined." Spec. ¶ 20. As claimed and explained in the Specification, the solution to this problem is a technical one. For example, the Specification explains,

> [o]nce a page is selected for the high-performance tier as either a selected page or as a page contained in a selected block, there would be no further benefit to selecting it both ways, *e.g.* page and block. Accordingly, the optimal selection of pages must recognize which pages are already selected in blocks, and the optimal selection of blocks must recognize that some pages will be selected even when the associated blocks are not selected.

Id. ¶ 21. Thus, similar to the claims in *Enfish*, "the focus of the claims is on [a] specific asserted improvement in computer capabilities," rather than on an "'abstract idea' for which computers are invoked merely as a tool." *Enfish*, 822 F.3d at 1335–36.

We conclude these limitations integrate the recited judicial exception of a mathematical concept into a practical application. Accordingly, under the Guidance, the claims are eligible because they are not *directed to* the recited judicial exception. Thus, we need not reach step 2B of the *Alice* inquiry. We reverse the Examiner's rejection under § 101.

CONCLUSION

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1–3, 5–11, 13–21	101	Eligibility		1–3, 5–11, 13–21

REVERSED