



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

Table with 5 columns: APPLICATION NO., FILING DATE, FIRST NAMED INVENTOR, ATTORNEY DOCKET NO., CONFIRMATION NO. Includes details for application 12/639,740 filed 12/16/2009 by Joseph Z. Lu, examiner GILLS, KURTIS, art unit 3623, notification date 05/08/2018, and delivery mode ELECTRONIC.

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

patentservices-us@honeywell.com
patents@munckwilson.com

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JOSEPH Z. LU

Appeal 2017-001932
Application 12/639,740¹
Technology Center 3600

Before DEBRA K. STEPHENS, DANIEL J. GALLIGAN, and
DAVID J. CUTITTA II, *Administrative Patent Judges*.

CUTITTA II, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant appeals under 35 U.S.C. § 134(a) from a final rejection of claims 1–4, 6–12, 14–18, and 20–25, which are all of the claims pending in the application.² We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

¹ Appellant identifies Honeywell International Inc. as the real party in interest. *See* App. Br. 3.

² Claims 5, 13, and 19 have been cancelled.

STATEMENT OF THE CASE

According to Appellant, the claims are directed to determining an optimal production schedule for an industrial process by performing an iterative computation of an intermediate product's contribution to a final product. Spec. ¶ 38, Abstract.³ Claim 1, reproduced below, is representative of the claimed subject matter:

1. A method comprising:

receiving first input data from one or more first process control system components;

receiving second input data from one or more second process control system components;

performing an iterative process using at least one processing device, the iterative process comprising:

identifying one or more adjustments to at least one target quantity using the first input data and one or more initial estimated product yields, each target quantity identifying a production target for at least one intermediate or final product to be produced;

identifying one or more contribution values using the one or more adjustments, each contribution value based on an intermediate product's contribution to each of multiple final products, wherein each contribution value comprises a sum of multiple values, each of the multiple values representing a multiplication product of the intermediate product's contribution percentage to a different one of the final products and that final product's price;

³ This Decision refers to: (1) Appellant's Specification filed December 16, 2009 (Spec.); (2) the Final Office Action (Final Act.) mailed October 2, 2015; (3) the Appeal Brief (App. Br.) filed March 4, 2016; (4) the Examiner's Answer (Ans.) mailed September 23, 2016; and (5) the Reply Brief (Reply Br.) filed November 16, 2016.

identifying one or more updated estimated product yields using the one or more contribution values and the second input data, each updated estimated product yield identifying an expected quantity of one of the intermediate or final products to be produced; and

repeating the identifying steps using the one or more updated estimated product yields as the one or more initial estimated product yields; and

in response to identifying that the at least one target quantity meets a desired goal based on the one or more updated estimated product yields, providing the one or more contribution values to the one or more second process control system components to modify an industrial process.

REFERENCE AND REJECTIONS

Claims 1–4, 6–12, 14–18, and 20–25 stand rejected under 35 U.S.C. § 101 as being directed to patent-ineligible subject matter. Final Act. 3–4.

Claims 1–4, 6–12, 14–18, and 20–25 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Esposito (US 2008/0243310 A1; published Oct. 2, 2008) and Official Notice. *Id.* at 5–12.

Our review in this appeal is limited only to the above rejections and the issues raised by Appellant. Arguments not made are waived. *See* MPEP § 1205.02; 37 C.F.R. §§ 41.37(c)(1)(iv) and 41.39(a)(1).

ANALYSIS

35 U.S.C. § 101

The Examiner concluded claims 1–4, 6–12, 14–18, and 20–25 are directed to patent-ineligible subject matter. Final Act. 4. We agree with the Examiner.

In *Alice*, the Supreme Court set forth an analytical “framework for distinguishing patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts.” *Alice Corp. Pty. Ltd. v. CLS Bank Int’l*, 134 S. Ct. 2347, 2355 (2014) (citing *Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 75–79 (2012)). The first step in the analysis is to “determine whether the claims at issue are directed to one of those patent-ineligible concepts.” *Id.* If so, the second step is to consider the elements of the claims “individually and ‘as an ordered combination’ to determine whether the additional elements ‘transform the nature of the claim’ into a patent-eligible application.” *Id.* (quoting *Mayo*, 566 U.S. at 79, 78). In other words, the second step is to “search for an ‘inventive concept’ — *i.e.*, an element or combination of elements that is ‘sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself.’” *Id.* (brackets in original) (quoting *Mayo*, 566 U.S. at 73).

Independent Claims

Initially, independent claims 1, 10, and 17, recite a method, an apparatus, and a non-transitory computer readable medium, respectively. As such, the claims are directed to a statutory class of invention within 35 U.S.C. § 101. Turning to the first step of the *Alice* analysis, we agree with the Examiner that the present claims are directed to a patent-ineligible concept: “enterprise optimization” provided by a “process of organizing information through mathematical correlations.” Final Act. 3–4; Ans. 2–3. Appellant argues the claims do not recite “just an organization of

information[,] but rather the use of several identifications to decide when and how to modify an industrial process.” App. Br. 18; Reply Br. 4–5. In particular, Appellant points out the claims recite “a specific process that involves the receipt of input data from various process control system components, performance of an iterative process using the data, and providing identified contribution values identified in the iterative process to the process control system components to modify an industrial process.” App. Br. 17; Reply Br. 3–4.

Appellant’s arguments highlight the claimed operations of “receiving” inputs, “identifying” data using those inputs, “repeating” those operations, and “providing” the identified data to modify an industrial process, i.e., collecting data, analyzing data, and outputting that data. App. Br. 17; Reply Br. 3–4. However, our reviewing court has determined that, when the “focus of the asserted claims . . . is on collecting information, analyzing it, and displaying certain results of the collection and analysis,” those claims are “a familiar class of claims ‘directed to’ a patent-ineligible concept.” *Elec. Power Grp., LLC v. Alstom S.A.*, 830 F.3d 1350, 1353 (Fed. Cir. 2016); *TDE Petroleum Data Sols., Inc. v. AKM Enter., Inc.*, 657 F. App’x 991, 993 (Fed. Cir. 2016), cert. denied, 137 S. Ct. 1230 (2017) (citing *OIP Techs., Inc. v. Amazon.com, Inc.*, 788 F.3d 1359, 1363 (Fed. Cir. 2015)). Here, similar to *TDE Petroleum*, the claims evaluate an industrial process by gathering and analyzing data; the claims are “the sort of data gathering and processing claim[s] that [are] directed to an abstract idea under step one of the *Alice* analysis.” 657 F. App’x at 993. Accordingly, we conclude that the process of gathering, analyzing, and providing data to modify, i.e., optimize,

an industrial process is directed to an abstract idea. *See OIP Techs.*, 788 F.3d at 1363 (“the abstract idea of offer-based price optimization”).

Turning to the second step of the *Alice* analysis, we agree with the Examiner that the claims fail to transform the abstract idea into a patent-eligible invention. Final Act. 4; Ans. 3–4. Appellant argues the claims are “significantly more” than the abstract idea itself because the claimed “operations recited . . . combine to create an ordered combination that is not well-understood, routine, or conventional and that is not previously known to the industry.” Reply Br. 9; App. Br. 19–20. However, as discussed *supra*, those claimed operations merely recite gathering, analyzing, and outputting data. Even considering the claimed subject matter as an ordered combination, Appellant’s arguments do not persuade us the claimed limitations are anything more than “the most ordinary of steps in data analysis and are recited in the ordinary order,” i.e., data is gathered, that data is analyzed using an calculation with the data as input, and resultant data is output. *TDE Petroleum*, 657 F. App’x at 993. Even further, the claims “do not include any requirement for performing the claimed functions of gathering, analyzing,” and outputting data “by use of anything but entirely conventional, generic technology.” *Elec. Power Grp.*, 830 F.3d at 1356. Indeed, the Specification teaches that the operations recited by the claims may be performed by any generic computing system. Spec. ¶¶ 36 (“integration unit 154 could be implemented on [application or system (DCS),] any server, real-time workstation, . . . execution platform, distributed control (DCS), real-time controller, or other suitable device or system”), 85 (“the method 500 could be performed by any other device or system”), 93 (“‘controller’ means any device, system, or part thereof that

controls at least one operation”). As such, the claimed operations for optimizing an industrial process, using routine computing operations that may be performed by any generic computing system, do not transform the abstract idea into a patent-eligible invention. *See OIP Techs.*, 788 F.3d at 1363–1364.

Additionally, Appellant argues “the claim also provides improvement to another technical field. Specifically . . . the technical field of industrial process control.” App. Br. 20; Reply Br. 9. However, the claims do not purport to improve any particular system—rather, the purported improvement is directed to the abstract idea itself, discussed *supra*. The claims arguably “modify” an industrial process but do not recite any technical advance for any particular system. Instead, the claims merely recite contribution values are provided “to modify an industrial process,” without detailing how that industrial process is modified, what that industrial process is, or what components of that industrial process are modified. Thus, the improvement offered by Appellant’s claims is not rooted in any novel computer technology, as further evidenced by claim 10’s recitation of a generic “processing device.” *See DDR Holdings, LLC v. Hotels.com, L.P.*, 773 F.3d 1245, 1257 (Fed. Cir. 2014) (finding an inventive concept in the modification of the conventional mechanics behind website display to produce a dual-source integrated hybrid display). Rather, Appellant’s Specification identifies as a problem that “it [is] difficult to perform plant-wide or enterprise-wide optimization in real time.” Spec. ¶ 4. Appellant’s claimed invention seeks to solve the identified problem by “integrating planning, scheduling, and control for enterprise optimization.” Spec. ¶ 5.

Appellant’s identified problem is, therefore, a business problem, not a technical problem. Claim 1 recites a specific way and specific context for collecting data, analyzing data, and outputting that data — namely, “a specific process that involves the receipt of input data from various process control system components, performance of an iterative process using the data, and providing identified contribution values identified in the iterative process to the process control system components to modify an industrial process.” App. Br. 17. Claims 10 and 17 recite similar limitations. While these steps limit the scope of the abstract idea, the limitations are not sufficient to transform Appellant’s otherwise patent-ineligible abstract idea into patent-eligible subject matter.

Accordingly, Appellant has not persuaded us claims 1, 10, and 17 are directed to patent-eligible subject matter. Therefore, we sustain the rejection of claims 1, 10, and 17 under 35 U.S.C. § 101 as being directed to patent-ineligible subject matter.

Dependent Claims

Appellant argues dependent claims 2, 4, 8, 11, 12, 15, 18, and 23–25 recite significantly more than the abstract idea itself. App. Br. 22–26; Reply Br. 10–14. Specifically, Appellant argues claims 2, 11, and 18 “recite[] a specific technique for the receipt of the data inputs from different sources including at least one process controller controlling at least a portion of the industrial process to be modified.” App. Br. 22; Reply Br. 10. Further, Appellant argues claims 4, 8, 12, 15, and 25 recite “additional elements, [that,] when taken in combination with the other elements recited . . . add to the ordered combination of elements recited and further demonstrate that the

claim amounts to significantly more than an attempt to patent the alleged abstract idea.” App. Br. 23–24, 26; Reply Br. 11–14. Additionally, Appellant argues claim 24 “recites a specific technique for the identification of a plurality of final products that the intermediate product is planned to be used to produce and percentages for each as well as the multiplying with price and summation to identif[y] the contribution value in the iterative process.” App. Br. 25; Reply Br. 12–13.

We are not persuaded. The dependent claims do not transform the abstract idea into significantly more than the abstract idea itself because the dependent claims only further define the data gathering or data analysis operations recited in their respective independent claims, which, as discussed *supra*, are generic and routine operations. *TDE Petroleum*, 657 F. App’x 993. Like their respective independent claims, the operations further defined by the dependent claims may be performed by any generic computing system and do not transform the abstract idea into a patent-eligible invention. *See OIP Techs.*, 788 F.3d 1363.

Appellant has not proffered sufficient evidence or argument to persuade us that any of the limitations in the remaining dependent claims, i.e., dependent claims 3, 6, 7, 9, 14, 16, and 20–22, provide a meaningful limitation that transforms the claims into a patent-eligible application. *See* App. Br. 14–26. Accordingly, Appellant has not persuaded us claims 2–4, 6–9, 11, 12, 14–16, 18, and 20–25 are directed to patent-eligible subject matter. Therefore, we sustain the rejection of claims 2–4, 6–9, 11, 12, 14–16, 18, and 20–25 under 35 U.S.C. § 101 as being directed to patent-ineligible subject matter.

35 U.S.C. § 103

Claims 1–4, 6–12, 14–18, 20–23, and 25

Appellant contends the Examiner erred in finding the combination of Esposito and Official Notice teaches “each contribution value comprises a sum of multiple values, each of the multiple values representing a multiplication product of the intermediate product’s contribution percentage to a different one of the final products and that final product’s price,” as recited in claim 1 and similarly recited in claims 10 and 17. App. Br. 28–32; Reply Br. 14–19. Specifically, Appellant argues “*Esposito* never considers any multiplication product of an *intermediate product’s* contribution percentage and a *final product’s price*” because the “multiplication in *Esposito* is only disclosed to involve (i) a ‘flow of a raw material with associated cost’ and (ii) a ‘flow of a given product with associated price.’” App. Br. 29; Reply Br. 16. Further, Appellant argues “*Esposito* mentions summations of certain values” and “performs global calculations of the cost of raw materials or the revenue from the sale of products,” but “*Esposito* never considers a contribution value for an intermediate product or any intermediate product’s contribution percentage to a different one of multiple final products.” App. Br. 29; Reply Br. 16.

We are not persuaded. The Examiner finds, and we agree, Esposito’s variable margin teaches a “contribution value” that is based on “a multiplicative product of raw product[’]s contribution [F_i],” i.e., an “intermediate product,” and the “final product[’]s price [p_i].” Ans. 7–8 (citing Esposito ¶ 63). Further, the Examiner finds Esposito’s variable margin is the “difference between TS [(Total Sales)] and TC [(Total Cost)]” (Ans. 7–8), where “Total Cost = $\sum F_i * C_i$,” “Total Sales = $\sum P_i * p_i$,” “ F_i is the

flow of a raw material with associated cost C_i [,] and P_i is the flow of a given product with associated price p_i ” (Esposito ¶ 63).

Appellant’s argument that “*Esposito* never considers any multiplication product of an *intermediate product’s* contribution” (App. Br. 29; Reply Br. 16) is not persuasive because we agree with the Examiner’s finding that Esposito’s raw material teaches an intermediate product (*see* Ans. 8). The Specification describes that “an intermediate product . . . is used to produce one or more final products.” Spec. ¶ 38; *see id.* ¶¶ 62, 81. Consistent with the Specification’s description of an intermediate product, Esposito discloses that final “products are produced through consumption of raw materials.” Esposito Abstract; *see id.* ¶ 14. For example, the “raw materials of [a] hydrogen plant are the feed water stream **12**, the natural gas stream **10**, the natural gas fuel stream **60**, [and] electricity”; those raw materials are used to produce final products, e.g., “the hydrogen product stream **60** and the export steam stream **38**.” *Id.* ¶ 38; *see id.* ¶ 63. Furthermore, even following Appellant’s description that “intermediate products require processing to be formed” (App. Br. 31; Reply Br. 17), Esposito’s raw materials teach intermediate products because Esposito’s raw materials are processed before being used to produce the final products. For example, to produce Esposito’s final hydrogen and export steam products, in “hydrogen plant **1**, a natural gas stream **10** is preheated” and then “natural gas stream **10** would be pretreated by addition of some of the hydrogen product to a hydrotreater to convert the sulfur species present in the natural gas to hydrogen sulfide that would be removed by an adsorbent bed containing zinc oxide”; additionally, “feed water stream **12** is also preheated . . . [and] then divided into first and second subsidiary feed

water streams.” Esposito ¶ 29. Accordingly, Esposito’s raw material, e.g., natural gas or feed water, teaches an “intermediate product.”

Furthermore, Appellant’s argument that neither of Esposito’s “flow of a raw material with associated cost,” i.e., F_i , and “flow of a given product with associated price,” i.e., P_i , teach “a *final product’s price*” (App. Br. 29; Reply Br. 16), does not address the Examiner’s finding that p_i teaches the final product’s price (Ans. 8). Specifically, Esposito’s “Total Sales” calculation for final products, i.e., “saleable products . . . hydrogen and the export steam,” accounts for “a given product with associated price p_i ,” i.e., the “final product’s price.” Esposito ¶ 63.

Further, Appellant’s argument that “*Esposito* never considers a contribution value for an intermediate product or any intermediate product’s contribution percentage to a different one of multiple final products” (App. Br. 29; Reply Br. 16) is not persuasive because that argument merely summarizes Esposito and italicizes certain claim limitations and, as such, does not provide any persuasive explanation or elaboration as to why Esposito does not teach the disputed claim limitation. Moreover, Esposito teaches that its different final products, e.g., “saleable products . . . hydrogen and the export steam,” are created from an intermediate product, e.g., natural gas or feed water (Esposito ¶ 63; *see* Esposito ¶¶ 15, 29–32, 38). Further, the Examiner finds that Esposito’s variable margin, i.e., contribution value, is determined based on the Total Cost of an intermediate product and the summation of Total Sales of multiple different final products (Ans. 7–8 (citing Esposito ¶ 63)). Because Esposito produces different saleable products from a raw material, and Esposito’s variable margin calculation considers those different saleable products and the raw material producing

those saleable products, Esposito's contribution value considers the intermediate product's contribution to "a different one of multiple final products."

Additionally, we agree with the Examiner's finding that Esposito's raw material teaches an "intermediate product," as discussed *supra*; therefore we need not address the Examiner's reliance on Official Notice that "it was well known in the art at the time of the invention to substitute the raw products of Esposito for the claimed intermediate products" (Final Act. 7–8; *see* Ans. 9–10), to reach our decision. As such, we decline to address Appellant's arguments that the Examiner's reliance on such Official Notice was improper. *See* App. Br. 30–32; *see also* Reply Br. 18–19.

Accordingly, we are not persuaded the Examiner erred in finding the combination of Esposito and Official Notice teaches "each contribution value comprises a sum of multiple values, each of the multiple values representing a multiplication product of the intermediate product's contribution percentage to a different one of the final products and that final product's price," as recited in claim 1 and similarly recited in claims 10 and 17. Dependent claims 2–4, 6–9, 11, 12, 14–16, 18, 20–23, and 25 are not separately argued. *See* App. Br. 27, 30, 32. Therefore, we sustain the rejection of claims 1–4, 6–12, 14–18, 20–23, and 25 under 35 U.S.C. § 103(a) as being unpatentable over Esposito and Official Notice.

Claim 24

Appellant contends the Examiner erred in finding the combination of Esposito and Official Notice teaches "identifying a percentage of the intermediate product planned to be used to produce each of the final

products to identify multiple percentages; multiplying a respective one of the multiple percentages and a price of a respective one of the final products to identify multiple multiplication products,” as recited in claim 24. App. Br. 33–34; Reply Br. 19–21. Specifically, Appellant argues “all of the formulas and variables in paragraph [0063] of *Esposito* (to which the Examiner refers) only consider flow and cost of ‘a raw material’ and flow and price of ‘a given product’ as the formula variables,” (Reply Br. 20) but the claim “recites identification of *a percentage* of the intermediate product planned to be used to produce *each of the final products to identify multiple percentages* and multiplication of a respective one of the multiple percentages and a price of a respective one of the final products *to identify multiple multiplication products*” (App. Br. 33–34).

We are not persuaded. As discussed *supra*, the Examiner finds, and we agree, *Esposito*’s raw material teaches an “intermediate product.” Ans. 7–8. The Examiner further finds (*id.*), and we agree, *Esposito*’s process calculates variable margin by considering the “flow of a raw material” (*Esposito* ¶ 63), e.g., “flow rates of the feed water stream **12** [or] the natural gas stream **10**” (*Esposito* ¶¶ 39, 61).

Appellant’s arguments, that *Esposito* discloses flows, but the claims recite percentages (App. Br. 33–34; Reply Br. 20) does not address the Examiner’s conclusion that it would have been obvious to “substitute” “values” of raw material flows “as percentages” (Final Act. 12). *Esposito*’s raw material flow, or flow rate, is a measure of the consumption of that raw material in producing a final product (*Esposito* ¶ 14), e.g., “[i]ncreasing the flow rate of the natural gas stream **10** will increase the production of hydrogen” (*Esposito* ¶ 37). The Examiner takes official notice that

representing the raw material consumption as a percentage, rather than a rate, is obvious because both rates and percentages are comparative measurements. Final Act. 8. Because Appellant does not traverse the Examiner's assertion of official notice we determine Appellant's accepts the noticed statement as admitted prior art.

Further, Appellant's argument that "*Esposito* never considers a contribution value for an intermediate product or any plurality of final products that the intermediate product is planned to be used to produce" (App. Br. 34) is not persuasive because that argument merely summarizes *Esposito* and recites claim limitations without any persuasive explanation or elaboration as to why *Esposito* does not teach those disputed claim limitations. In any event, as discussed *supra*, the raw materials of *Esposito*, e.g., natural gas or feed water, produce multiple final products, e.g., "saleable products . . . hydrogen and the export steam." *Esposito* ¶ 63; *see* *Esposito* ¶¶ 15, 29–32, 38.

Accordingly, we are not persuaded the Examiner erred in finding the combination of *Esposito* and Official Notice teaches "identifying a percentage of the intermediate product planned to be used to produce each of the final products to identify multiple percentages; multiplying a respective one of the multiple percentages and a price of a respective one of the final products to identify multiple multiplication products," as recited in claim 24. Therefore, we sustain the rejection of claim 24 under 35 U.S.C. § 103(a) as being unpatentable over *Esposito* and Official Notice.

Appeal 2017-001932
Application 12/639,740

DECISION

For the reasons above, we affirm the Examiner's decision rejecting claims 1–4, 6–12, 14–18, and 20–25.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a). *See* 37 C.F.R. § 41.50(f).

AFFIRMED