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EXAMINER

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte DAVID MONROE LEVERMORE, JOHN MARK GARNER,
and JACK MARK BLAYLOCK

Appeal 2018-008926
Application 13/155,076
Technology Center 2800

Before CATHERINE Q. TIMM, LINDA M. GAUDETTE, and
DEBRA L. DENNETT, *Administrative Patent Judges*.

TIMM, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Pursuant to 35 U.S.C. § 134(a), Appellant¹ appeals from the Examiner's decision to reject claims 1–12, 14, 16–19 and 21–29. We have jurisdiction under 35 U.S.C. § 6(b).

We REVERSE.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42(a). Appellant identifies the real party in interest as The Boeing Company. Appeal Br. 1.

CLAIMED SUBJECT MATTER

The subject matter of the claims relates to a design analysis integration (DAI) program for managing data and the non-transitory computer-readable storage media on which it is stored (*see, e.g.*, claim 1), an apparatus system for design and analysis integration (*see, e.g.*, claim 7), and a method for integrating design and analysis features and context metadata into persistent data (*see, e.g.*, claim 11).

The design analysis integration (DAI) program manages and exploits engineering data, such as data associated with the development and lifecycle of an airplane body panel. Spec. ¶¶ 2–4, 77; Fig. 5 (body panel 350). According to the Specification, commercial analysis data management (ADM) systems provide data management, but are not capable of managing and exploiting engineering data at a granular level (i.e., name-value pairs, attributes, and properties), and associated metadata. Spec. ¶¶ 4, 7. According to the Specification, DAI includes several new concepts. Spec. ¶ 49. One new concept is the focus of the analysis on a single part feature object (e.g., bay 1A of aircraft body panel 350 of Figure 5) as opposed to the monolithic part (the entire body panel 350) as is traditionally done. *Id.*; Spec. ¶ 77; Fig. 5.

Appellant's design analysis integration (DAI) program can coexist with ADM systems, but can exploit engineering data at a granular level relative to part features (the contextual level relevant to the engineer). Spec. ¶¶ 46-47. Because engineers ultimately size features of parts and not parts per se, DAI provides object representations of these part features, their necessary descriptive data, and their encompassing analysis, as manageable software business objects. Spec. ¶ 47. Claim 1, reproduced below with the

limitation most at issue highlighted, is illustrative of the claimed subject matter:

1. One or more non-transitory computer-readable storage media having computer-executable instructions embodied thereon, wherein when executed by at least one processor, the computer-executable instructions cause the at least one processor to:

identify a part feature data object having a unique identifier and corresponding to a particular part feature of a monolithic part composed of a plurality of part features having respective unique identifiers, wherein the part feature data object has associated attributes related to the part feature available from a plurality of disparate sources of data related to the design, fabrication and testing of the monolithic part, the associated attributes related to the part feature including geometric properties of the part feature from a geometry model, and load and material properties of the part feature from a finite element model;

define an analysis data object directed to the part feature, the analysis data object including attributes that reference the unique identifier of the part feature data object, and that reference the associated attributes related to the part feature;

define a structural analysis of the part feature to be associated with the analysis data object, wherein the defined structural analysis is configured to receive data inputs and generate data outputs, wherein the data inputs include at least some of the associated attributes related to the part feature, including at least some of the geometric properties, load and material properties;

perform a verification to determine that the associated attributes related to the part feature associated include all the data inputs needed for the defined structural analysis;

in response to the determination, after performing the verification, that not all the data inputs needed are available,

automatically access an additional data source to retrieve additional data to complete the defined structural analysis;

execute the defined structural analysis of the part feature upon receipt of all the data inputs needed for the defined structural analysis, wherein execution of the defined structural analysis populates the analysis data object with the data inputs and the data outputs; and

storing the analysis data object including the data inputs and the data outputs, such that the data inputs and the data outputs are contained within the analysis data object, the analysis data object stored in an application independent format outside of the disparate sources of data.

Appeal Br. 20–21 (Claims Appendix).

REFERENCES

The prior art relied upon by the Examiner is:

Name	Reference	Date
Hensey	US 6,816,762 B2	Nov. 09, 2004
Szabo	US 2003/0135840 A1	July 17, 2003
Ishikawa	US 2007/0233436 A1	Oct. 04, 2007
Malkin	US 2008/0183402 A1	July 31, 2008
Malkowicz	US 2009/0222427 A1	Sept. 03, 2009
Stacklin	US 2011/0060601 A1	Mar. 10, 2011
Wikipedia	Component Object Model, Wikipedia, the free encyclopedia, (accessed using the Wayback Machine internet archive)	Mar. 31, 2011

REJECTIONS

According to the Examiner, the claims are rejected as follows:

- A. Claims 1–12, 14, 16–19, and 21–29 are rejected under 35 U.S.C. § 112(a) or 35 U.S.C. § 112 (pre–AIA), first paragraph, as failing to comply with the written description requirement. Non-Final Act. 2.
- B. Claims 1–12, 14, 16–19, and 21–29 are rejected under 35 U.S.C. § 101 as patent-ineligible. Non-Final Act. 3.
- C. Claims 1–4, 7–9, 11, 14, 16–18, and 21–29 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Malkowicz in view of Ishikawa, Malkin, Szabo, and Stacklin. Non-Final Act. 5.
- D. Claims 5 and 6 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Malkowicz in view of Ishikawa, Malkin, Szabo, Stacklin, and further in view of Wikipedia. Non-Final Act. 31.
- E. Claims 10, 12, and 19 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over Malkowicz in view of Ishikawa, Malkin, Szabo, Stacklin, and further in view of Hensey. Non-Final Act. 32.

OPINION

Written Descriptive Support

We agree with Appellant that the Examiner’s rejection of claims 1–12, 14, 16–19, and 21–29 under 35 U.S.C. § 112(a) or 35 U.S.C. § 112 (pre–AIA), first paragraph, as failing to comply with the written description requirement lacks factual support. Appeal Br. 7–8.

The Examiner’s rejection is based on an erroneous reading of the claims.

Claims 1 and 7 require a processor that is programmed to “identify a part feature data object having a unique identifier and corresponding to *a particular part feature* of a monolithic part composed of a plurality of part features having respective unique identifiers.” Claims 1 and 7 (emphasis added). Claim 11 requires an analogous method step of identifying.

The Examiner emphasizes the words “monolithic part” in the above clause and states that “[t]his recitation is not supported by the originally-filed Specification.” Non-Final Act. 2–3. According to the Examiner, the written description conveys that Appellant’s “analysis does not entail the analysis of a monolithic part, which was the manner of analysis performed by the prior art.” Non-Final Act. 3. The Examiner then quotes paragraph 49 of the Specification as follows: “*The scope of an analysis encompasses a single part feature object as opposed to the monolithic part as is traditionally done.*” Non-Final Act. 3.

Although the Examiner is correct that Appellant’s invention is not directed to analyzing the monolithic part; that is beside the point. This is because the claims are not directed to analyzing the monolithic part. The claims are directed to analyzing “*a particular part feature* of a monolithic part.” Claims 1, 7, 11 (emphasis added). This matches what is described in Appellant’s written description. *See* Spec. ¶ 46 (“the DAI process 20 emphasizes granular data management relative to *part features . . .*”) (emphasis added); Spec. ¶ 47 (“To this end, because engineers ultimately size features of parts and not parts per se, DAI provides object representations of these *part features . . .*”) (emphasis added); Spec. ¶ 49 (“The scope of an analysis encompasses *a single part feature object* as opposed to the monolithic part as is traditionally done.”) (emphasis added);

Spec. ¶ 75 (“DAI creates, groups, serves, and manages related sets of loosely coupled objects . . . that describe *a part feature level analysis* stored in various analysis data objects.”) (emphasis added).

Appellant has identified a reversible error in the Examiner’s rejection. Thus, we do not sustain the rejection of claims 1–12, 14, 16–19, and 21–29 under 35 U.S.C. § 112(a) or 35 U.S.C. § 112 (pre–AIA), first paragraph, as failing to comply with the written description requirement.

Eligibility

We agree with Appellant that the Examiner’s rejection of claims 1–12, 14, 16–19, and 21–29 under 35 U.S.C. § 101 as patent-ineligible is legally erroneous. Appeal Br. 9.

Section 101 of the Patent Act defines the subject matter that is eligible for patent protection. It states that:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the conditions and requirements of this title.

35 U.S.C. § 101.

Although this section of the statute appears expansive at first, the Supreme Court has held that it “contains an important implicit exception: Laws of nature, natural phenomena, and abstract ideas are not patentable.” *Alice Corp. Pty. v. CLS Bank Int’l*, 573 U.S. 208, 216 (2014) (quoting *Ass’n for Molecular Pathology v. Myriad Genetics, Inc.*, 569 U.S. 576, 589 (2013)). As the fundamental building blocks of the universe, laws of nature, natural phenomena, and abstract ideas “are the basic tools of scientific and

technological work that lie beyond the domain of patent protection.”

Myriad, 569 U.S. at 589 (internal quotations omitted).

In order to distinguish patent-ineligible claims to laws of nature, natural phenomena, and abstract ideas from patent-eligible claims to applications of those basic building blocks, the Supreme Court has devised a two-step framework. The first step in that framework involves determining “whether the claims at issue are *directed to* one of those patent-ineligible concepts.” *Alice*, 573 U.S. at 217 (emphasis added).

The Patent Office has promulgated guidance to help answer the “directed to” question. Under the Patent Office’s current guidance, this “directed to” question is termed Step 2A and it is divided into two prongs. *2019 Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. 50 (Jan. 7, 2019) (“Guidance”); October 2019 Patent Eligibility Guidance Update, 84 Fed. Reg. 55942 (Oct. 18, 2019) (available at <https://www.uspto.gov/PatentEligibility>) (“October 2019 Update”). In Prong 1, we determine whether the claim recites one of the abstract ideas discussed in Section I of the Guidance, which lists as abstract ideas, mathematical concepts, certain methods of organizing human activity, such as a fundamental economic practice, and mental processes. Guidance § III.A.1. A claim that includes one of these abstract ideas must be further reviewed in Prong 2 to determine whether the claim integrates the abstract idea into a practical application by imposing a meaningful limit on the judicial exception. Guidance § III.A.2.

The Examiner determines that the claims are “directed to the abstract idea of an algorithm for performing structural modeling of a part (a mathematical algorithm).” Final Act. 3. However, the Examiner does not

point out which limitations are “directed to” this structural modeling or which limitations are part of a mathematical algorithm. *Id.* Nor is there any analysis indicating that the Examiner considered the claims in their entirety to ascertain whether their character as a whole is directed to excluded subject matter, an analysis necessary to support a rejection. *McRO, Inc. v. Bandai Namco Games Am. Inc.*, 837 F.3d 1299, 1312 (Fed. Cir. 2016).

Appellant acknowledges that the claims include an algorithm, but contend that the algorithm is not a mathematical algorithm “any more than the computer-implemented rules at issue in *McRO*” were directed to a mathematical algorithm. Appeal Br. 9–10. The Examiner does not address this argument other than to say that the claims “are directed to the creating of a structural analysis and then the executing of that structural analysis.” Ans. 6. Again, the Examiner does not identify which limitations in the claim recite a mathematical algorithm or include any analysis indicating that the character of any claim as a whole is directed to an ineligible abstract idea.

Abstract ideas are barred from patent eligibility because they are the fundamental building blocks of the universe, i.e. “the basic tools of scientific and technological work that lie beyond the domain of patent protection.” *Myriad*, at 589 (internal quotations omitted). As explained in *Diamond v. Diehr*, “[a] principle, in the abstract, is a fundamental truth; an original cause; a motive; these cannot be patented, as no one can claim in either of them an exclusive right.” *Diamond v. Diehr*, 450 U.S. 175, 185 (1981) (quoting *Le Roy v. Tatham*, 14 How. 156, 175, 14 L.Ed. 367 (1853)). Within the abstract idea construct are mathematical relationships, mathematical formulas or equations, or mathematical calculations that describe natural phenomena. Guidance § I. As pointed out in *Diehr*, for instance, “Einstein

could not patent his celebrated law that $E = mc^2$; nor could Newton have patented the law of gravity. Such discoveries are ‘manifestations of ... nature, free to all men and reserved exclusively to none.’” *Id.* (quoting *Diamond v. Chakrabarty*, 447 U.S. 303, 309 (1980) (alteration in original). When an algorithm is nothing more than a procedure for solving a given type of mathematical problem, it may be patent-ineligible because it is like a law of nature. *Diehr*, 450 U.S. at 186. However, not all algorithms are procedures for solving a given type of mathematical problem and the Examiner has not established that Appellant’s claims recite a mathematical procedure describing a law of nature.

Like the claims of *McRO*, Appellant’s claims define meaningful requirements in the context of a computer program. Here, Appellant’s claims require the processor to identify a part feature data object having a unique identifier (e.g., P.Body.S401.Frame.Frame1A) that corresponds to a particular part feature (e.g., Frame 1A shown in Figure 5) of a monolithic part (e.g., body panel 350). This part feature data object has associated attributes from various sources of data as recited in claim 1 and is used in defining an analysis data object. Appellant’s Specification indicates that this use of part feature data objects is an improvement over the prior art of analyzing the monolithic part as a whole. Spec. ¶ 49.

The Examiner has pointed to no mathematical expressions that describe a scientific truth here. Although Appellant’s computer program and process involve an algorithm, this algorithm is not simply performing a mathematical function. It is specifically limited like the program of *McRO*. Because the Examiner has not established that the claims recite one of the abstract ideas discussed in Section I of the Guidance, our analysis ends at

Step 2A, prong 1 of the Guidance and we determine that the claims are not “directed to” a patent-ineligible concept under the framework of *Alice*.

Appellant has identified a reversible error in the Examiner’s rejection of claims 1–12, 14, 16–19, and 21–29 under 35 U.S.C. § 101 as patent ineligible. We do not sustain the Examiner’s rejection.

Obviousness

The Examiner rejects claims 1–4, 7–9, 11, 14, 16–18, and 21–29 under 35 U.S.C. § 103(a) as being unpatentable over Malkowicz in view of Ishikawa, Malkin, Szabo, and Stacklin and adds Wikipedia to reject claims 5 and 6 and adds Hensey to reject claims 10, 12, and 19. We agree with Appellant that the Examiner reversibly erred in these rejections.

Appellant’s claims require a computer program that identifies a part feature data object having a unique identifier (e.g., P.Body.S401.Bay.Bay1A) that corresponds to a particular part feature (e.g., Bay 1A shown in Figure 5) of a monolithic part (e.g., body panel 350). This part feature data object has associated attributes from various sources of data (claims 1, 7, and 11) and is used in defining an analysis data object. For instance, it is used in sizing body panel 350.

The Examiner finds that Malkowicz discloses programming that identifies the required part feature data object in paragraphs 15, 50, and 64. But those paragraphs describe a parts tracking database that tracks entire parts and components assembled from entire parts. Malkowicz ¶¶ 15, 50, 64. The Examiner does not dispute that this is so. Instead, the Examiner determines that Malkowicz’s *components* assembled from individual parts are “parts” within the meaning of the claims and Malkowicz’s individual

parts are “part features” of the components. Ans. 8. The Examiner then acknowledges that Malkowicz fails to disclose that the part, i.e., Malkowicz’s component, which is an assembly of parts, is monolithic and relies on Ishikawa.

Ishikawa discloses a structural analysis program. Ishikawa ¶ 1. Ishikawa’s structural analysis program zooms in on a part feature where maximum stress occurs and creates a detailed model for the part based on partially modeling (zooming) the evaluation part at the part feature. Ishikawa ¶ 4. Ishikawa divides the model into meshes. Ishikawa ¶ 10.

Malkowicz is directed to the tracking of life-limited parts and components (assemblies of parts). Malkowicz ¶ 1. The Examiner, on the one hand, equates Malkowicz’s components (assemblies of parts) with the monolithic part of the claims, but then, on the other hand, admits that the assembled components of Malkowicz are not monolithic.

Appellant contends that “one skilled in the art would understand that the part of the claimed invention is commensurate with the part of Malkowicz, and not an assembly as in the Examiner’s erroneous construction.” Appeal Br. 13.

Appellant has identified a reversible error.

First, the Examiner has not addressed Appellant’s contention. Ans. 8. The Examiner does not provide any reasoning or cite to any portion of the Specification supporting the interpretation of “part feature of a monolithic part” as reading on the individual parts that comprise Malkowicz’s components.

Second, we find no support for the Examiner’s interpretation. Rather, upon review of the Specification, we determine that Appellant’s

interpretation is the broadest reasonable interpretation of the argued claim language. The Specification discloses an example of feature-level sizing for body panel 350, shown Figure 5. Spec. ¶ 103. Panel sizing is performed for each of six bays of body panel 5. *Id.* The bays are part features identified with part feature data objects. Spec. ¶ 77; Fig. 5. Body panel 350 is an example of a monolithic part and the frames and bays shown in Figure 5 are single part features that are subject to an analysis such as a buckling analysis. Spec. ¶¶ 49, 77, 103.

The ordinary artisan would understand from a reading of Appellant's written description that a part feature, such as a frame or bay of a body panel, is different from a part, i.e., the body panel itself. An assembly of parts (Malkowicz's component) is further different than an individual part. For instance, an assembly would be a group of monolithic parts attached together such as a group of body panels. A monolithic part is of one piece. An assembly is not monolithic, but instead a group of parts attached to one another.

Moreover, although Ishikawa performs a structural analysis on a part feature, the Examiner has not provided a reasonable rationale and evidence to support a finding of a suggestion to identify a part feature data object as required by the claims in the program of Malkowicz, which tracks entire parts and assemblies of parts. The Examiner states that "[i]t would have been obvious to incorporate [Ishikawa's] approach in analyzing the components of Malkowicz so that the lifetime of individual parts within a monolithic component could be independently considered." Non-Final Act. 6. But the Examiner fails to add any reasoning beyond that statement in response to Appellant's arguments. Ans. 9. The Examiner's reference to Ishikawa's

approach does not provide the kind of reasoning sufficient to support the finding of a suggestion to use feature-specific structural analysis in a program that tracks life-limited parts given the different objectives of part tracking programs and engineering structural design programs. Nor does the Examiner’s broad brush finding support a finding of a suggestion to perform the specific identifying step required by the claims.

All the obviousness rejections fall based on the above discussed errors in the Examiner’s obviousness analysis.

CONCLUSION

The Examiner’s rejections are reversed.

DECISION SUMMARY

Claims Rejected	35 U.S.C. §	Basis	Affirmed	Reversed
1–12, 14, 16–19, 21–29	112, first paragraph	Written Description		1–12, 14, 16–19, 21–29
1–12, 14, 16–19, 21–29	101	Eligibility		1–12, 14, 16–19, 21–29
1–4, 7–9, 11, 14, 16–18, 21–29	103(a)	Malkowicz, Ishikawa, Malkin, Szabo, Stacklin		1–4, 7–9, 11, 14, 16–18, 21–29
5, 6	103(a)	Malkowicz, Ishikawa, Malkin, Szabo, Stacklin, Wikipedia		5, 6
10, 12, 19	103(a)	Malkowicz, Ishikawa, Malkin,		10, 12, 19

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Claims Rejected	35 U.S.C. §	Basis	Affirmed	Reversed
		Szabo, Stacklin, Hensey		
Overall Outcome				1-12, 14, 16-19, 21-29

REVERSED