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UNITED STATES PATENT AND TRADEMARK OFFICE

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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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Ex parte BEHZAD TORKIAN, ARMAND CASTRO III,
CINDI HANE, and NATHAN BLOMQUIST[1]

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Appeal 2018-004664
Application 14/449,766
Technology Center 3600

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Before CHARLES N. GREENHUT, JAMES P. CALVE, and
BRETT C. MARTIN, *Administrative Patent Judges.*

CALVE, *Administrative Patent Judge.*

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellant appeals under 35 U.S.C. § 134(a) from the Final Office
Action rejecting claims 30–49. Appeal Br. 1. Claims 1–29 are cancelled.
Id. at A-1 (Claims App.). We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM.

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[1] Elemica, Inc. is identified as the real party in interest (Appeal Br. 1) and
also is the applicant pursuant to 37 C.F.R. § 1.46.

CLAIMED SUBJECT MATTER

Claims 30, 38, and 43 are independent. Claim 30 is reproduced below.

30. A method of improving efficiency of a computing system for resource scheduling optimization, the method comprising:

(a) receiving, by the computing system, for a plurality of resources, respective constraints on the plurality of resources, wherein the plurality of constraints includes a plurality of temporal constraints and a plurality of other constraints;

(b) expanding a first other constraint of the plurality of other constraints into an expanded temporal constraint on a first resource of the plurality of resources meeting one or more quality levels associated with the plurality of other constraints;

(c) translating, by the computing system, the plurality of temporal constraints and the expanded temporal constraint into respective sets of binary temporal constraints;

(d) combining, by the computing system, each of the respective sets of the binary temporal constraints into combined respective binary temporal constraints, wherein combining the respective sets of binary temporal constraints into combined respective binary temporal constraints includes applying one or more bit-wise Boolean operations to the respective sets of binary temporal constraints;

(e) combining, by the computing system, the combined respective binary temporal constraints into a single overall binary temporal schedule, wherein combining the combined respective binary temporal constraints includes applying one or more bit-wise Boolean operations to the combined respective binary temporal constraints;

(f) translating, by the computing system, the single overall binary temporal schedule into a non-binary temporal schedule; and

(g) displaying to a user, one or more viable scheduling alternatives from the non-binary temporal schedule.

Appeal Br. A-1 (Claims App.).

REJECTIONS

Claims 30–49 are rejected under 35 U.S.C. § 112(b) as being indefinite.

Claims 30–49 are rejected as directed to patent-ineligible subject matter under a judicial exception to 35 U.S.C. § 101.

ANALYSIS

Claims 30–49 for Indefiniteness

The Examiner finds that the preambles of independent claims 30, 38, and 43 recite "improving efficiency of a computing system for resource scheduling optimization" for their respective methods and apparatus, but the bodies of those claims do not recite limitations that achieve the stated result. Final Act. 5. The Examiner determines that the metes and bounds of these claims are indefinite because it is unclear which limitations (if any) make the systems more efficient and in what manner. *Id.* The Examiner also argues that Appellant should be estopped from asserting that this limitation merely states a purpose while relying on the same language to overcome the § 101 rejection by also asserting that the claims improve efficiency. Ans. 4.

Appellant argues that the phrase is a statement of purpose that does not limit the claims. Appeal Br. 4–6. Appellant argues that features recited in the body of independent claims 30, 38, and 43 would be understood in light of the Specification to improve efficiency of a computing system for resource scheduling optimization by reducing processing times and saving costs in terms of computing hardware and operation. *Id.* at 6–7 (citing Spec. ¶ 92 (the disclosed techniques produce results in seconds in situations where constraint satisfaction problem techniques require hours)); *see* Reply Br. 1 (arguing that clauses (c), (d), and (e) achieve such results).

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"The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the inventor or a joint inventor regards as the invention." 35 U.S.C. § 112(b). For claims in an application that has not issued as a patent, "[a] claim is indefinite when it contains words or phrases whose meaning is unclear." *In re Packard*, 751 F.3d 1307, 1310, 1314 (Fed. Cir. 2014); *see* MPEP § 2173.

We determine that a skilled artisan would understand "improving efficiency of a computing system for resource scheduling optimization" in the preambles of claims 30, 38, and 43 to be a statement of purpose. We appreciate the Examiner's well-reasoned position that Appellant has argued this feature as a basis to overcome a rejection under 35 U.S.C. § 101. Ans. 4–6. We also appreciate that deciding whether a preamble is a limitation of a claim is a fact-specific inquiry. As our reviewing court has explained:

> "Whether to treat a preamble as a limitation is a determination resolved only on review of the entire ... patent to gain an understanding of what the inventors actually invented and intended to encompass by the claim." *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002) (internal quotation marks, brackets, and citation omitted); *see Applied Materials, Inc. v. Advanced Semiconductor Materials Am., Inc.*, 98 F.3d 1563, 1572–73 (Fed. Cir. 1996) (stating that whether the preamble constitutes a limitation "is determined on the facts of each case in light of the overall form of the claim, and the invention as described in the specification and illuminated in the prosecution history"). "[T]here is no simple test" for understanding the import of the preamble, but "we have set forth some general principles to guide th[e] inquiry." *Am. Med. Sys., Inc. v. Biolitec, Inc.*, 618 F.3d 1354, 1358 (Fed. Cir. 2010).

Georgetown Rail Equip. Co. v. Holland L.P., 867 F.3d 1229, 1236 (Fed. Cir. 2017).

Here, the bodies of claims 30 and 38 recite methods and claim 43 an apparatus that are structurally complete and defined by limitations recited in the bodies of those claims. Stated another way, the limitations in the bodies of those claims do not rely on the preambles to breathe life or meaning into the claims, e.g., by reciting essential structure or steps, providing antecedent basis for critical terms that define the invention in the claim body, reciting features that are essential to understand limitations or terms in the claim body, reciting additional structure or steps underscored as important by the specification, or relying on the preamble during prosecution to distinguish the claims from the prior art. *Catalina Mktg. Int'l, Inc. v. Coolsavings.com, Inc.*, 289 F.3d 801, 808 (Fed. Cir. 2002). Thus, "preamble language merely extolling benefits or features of the claimed invention does not limit the claim scope without clear reliance on those benefits or features as patentably significant." *Catalina*, 289 F.3d at 809 (citations omitted) (noting preambles that describe the use of an invention generally do not limit the claims).

The Examiner's concern is well-taken given Appellant's emphasis on improvements in computer functionality of the claimed methods and system as a basis for patent-eligibility. Appeal Br. 8–13. However, the arguments cite steps and features recited in the bodies of the claims as improvements. *Id.* The preamble thus merely states the purpose of the claimed methods and apparatus, namely, to improve efficiency of a computing system, but any improvement is to be found in features recited in the bodies of the claims.

Generally, merely stating the intended purpose of a method such as a treatment does not impose a result limitation on the recited method step. *See Bristol–Myers Squibb Co. v. Ben Venue Laboratories, Inc.*, 246 F.3d 1368, 1375–78 (Fed. Cir. 2001).

However, if the preamble provides a statement of intentional purpose for how a method is to be performed such that it lends meaning and structure to the body of the claim, this statement of purpose may limit the scope of the claim. *E.g., Jansen v. Rexall Sundown, Inc.*, 342 F.3d 1329, 1333 (Fed. Cir. 2003) (holding that "[a] method of increasing survival" was a "statement of intentional purpose for how the method is to be performed"); *Rapoport v. Dement*, 254 F.3d 1053, 1058–61 (Fed. Cir. 2001) (same).

Here, claims 30 and 38 recite "the computing system" in reference to "a computing system" in their preambles, but apparatus claim 43 does not refer back to the preamble's "a computing system." Appeal Br. A-1–A-4. In either case, the bodies of claims 30, 38, and 43 recite complete methods and an apparatus that do not rely on the preamble for additional meaning or structure. Some method steps are performed by the computing system but any improved efficiency of the methods results from the steps recited in the bodies of those claims. The preambles add no limitation or meaning to the methods and apparatus. The Specification describes a need to improve the operation of computer systems that solve supply chain scheduling with constraints and variables (Spec. ¶ 5), but the solution comprises determining constraints and deriving binary temporal constraint masks via steps such as those recited in the claim bodies (*id.* ¶¶ 6, 18, 37, 41–44, 48–56, Fig. 5) with the use of generic computers (*id.* ¶¶ 19, 32, Fig. 1).

As discussed below, Appellant does not rely on the preamble to allege patent-eligibility under § 101; instead, Appellant argues that the steps and features recited in the bodies of the claims provide improved computer system efficiency over conventional systems. *See* Appeal Br. 5–6, 10–12.

Thus, we do not sustain the rejection of claims 30–39 as indefinite.

Claims 30–49
Directed to Judicial Exception to 35 U.S.C. § 101

The Examiner finds that claims 30–42 recite methods, and claims 43–49 recite an apparatus and therefore the claims are directed to recognized statutory categories of subject matter under 35 U.S.C. § 101. Final Act. 6.

The Examiner also determines the claims are directed to the abstract idea of collecting and analyzing information and presenting the results. *Id.* The Examiner illustrates his findings on exemplary claim 30. *Id.* at 6–7. The Examiner finds that step (a) recites collecting information. Steps (b)–(g) recite analyzing information. Step (g) also recites presenting/displaying the results of the analysis. *Id.* The Examiner determines that the additional elements are directed to a generic computing system, an engine, and a display device that simply tie the abstract idea to a particular technological environment without using specialized hardware for performing improved processing volume. *Id.* at 7–8. The Examiner also determines that any improvement that may occur results from capabilities of a general purpose computer rather than the claimed sequence of steps or activities. *Id.*

Appellant argues that the focus of the claims is on an improvement to the functionality of computers as in *Enfish* and *Visual Memory*. Appeal Br. 9–10. Appellant also argues that the claims focus on a specific improvement in the claimed computer system rather than the abstract ideas identified by the Examiner. *Id.* at 10. Appellant argues that, in contrast to prior art algorithms that apply powerful formulas, the claimed invention expands the constraints to develop a greater number of simpler calculations that compile quicker than traditional algorithms to provide results in seconds where traditional constraint satisfaction techniques require hours. *Id.* at 10–12.

The patent laws provide that "[w]hoever 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. However, "this provision contains an important implicit exception: Laws of nature, natural phenomena, and abstract ideas are not patentable." *Alice Corp. Pty. Ltd. v. CLS Bank Int'l*, 573 U.S. 208, 216 (2014) (citation omitted).

Mayo Collaborative Services established a framework to distinguish patents that claim laws of nature, natural phenomena, and abstract ideas from those that claim patent-eligible applications of those concepts. *Alice*, 573 U.S. at 217 (citing *Mayo Collaborative Servs v. Prometheus Labs, Inc.*, 566 U.S. 66, 77 (2012)). First, we determine whether the claims are directed to a patent-ineligible concept. *Id.* If so, we next consider the claim elements individually and as an ordered combination to determine whether additional elements transform the claims into a patent-eligible application. *Id.* This search for an inventive concept seeks an element or combination of elements "sufficient to ensure that the patent in practice amounts to significantly more than a patent upon the [ineligible concept] itself." *Id.* at 217–218.

Recently, the PTO published guidance for evaluating subject matter eligibility. *See 2019 Revised Patent Subject Matter Eligibility Guidance*, 84 Fed. Reg. 50 ("Revised Guidance"). Under Step One, a determination is made whether the claims are in a statutory category of patentable subject matter, i.e., do they recite a process, machine, manufacture, or a composition of matter, identified in 35 U.S.C. § 101. Revised Guidance, 84 Fed. Reg. 50, 53–54; *See Alice*, 573 U.S. at 216; *Mayo*, 566 U.S. at 70.

Next, at Revised Step 2A, Prong One, an evaluation is made whether a claim recites a judicial exception, i.e., an abstract idea set forth in Section I of the Revised Guidance, a law of nature, or a natural phenomenon. *Id.* at 54. To determine if a claim recites an abstract idea, specific limitations that recite an abstract idea must be identified (individually or in combination), and a determination made whether the limitation(s) falls within one or more of the subject matter groupings in Section I of the Revised Guidance. *Id.* (III.*A. Revised Step 2A*). The three groupings are (1) mathematical concepts, relationships, formulas, or calculations, (2) certain methods of organizing human activity, fundamental economic principles and practices, commercial interactions, managing personal behavior, relationships, or interactions and (3) mental processes and concepts formed in the human mind. *Id.* at 52.

If a claim recites a judicial exception, Prong Two of Revised Step 2A requires a determination to be made whether the claim as a whole integrates the judicial exception into a practical application. *Id.* "A claim that integrates a judicial exception into a practical application will apply, rely on, or use the judicial exception in a manner that imposes a meaningful limit on the judicial exception, such that the claim is more than a drafting effort designed to monopolize the judicial exception." *Id.* at 53. If a judicial exception is integrated, the claim is patent eligible. *See id.* at 54–55.

If a claim does not "integrate" a recited judicial exception, the claim is directed to the judicial exception and further analysis is required under Step 2B to determine whether the claim contains additional elements, considered individually or in combination, that provide an inventive concept, such that the additional elements amount to significantly more than the exception itself. *Id.* at 56.

Step One: Does Claim 1 Fall within a Statutory Category of § 101?

We agree with the Examiner that the claims recite methods and an apparatus and thus fall within the statutory categories of 35 U.S.C. § 101. *See* Final Act. 6. Appellant does not dispute this determination.

Step 2A, Prong One: Does Claim 1 Recite a Judicial Exception?

Appellant argues the claims as a group. Appeal Br. 8–16. We select claim 30 as representative. *See* 37 C.F.R. § 41.37(c)(1)(iv).

We agree with the Examiner that claim 30 recites an abstract idea. The Revised Guidance characterizes the abstract ideas recited in claim 30 as (1) mathematical concepts such as mathematical relationships, formulas and calculations, (2) certain methods of organizing human activity by managing interactions between people including by following rules or instructions, and (3) mental processes or concepts performed in the human mind such as an observation, evaluation, and judgment. Revised Guidance, 84 Fed. Reg. 52.

Step (a) recites "receiving, by the computing system, for a plurality of resources, respective constraints on the plurality of resources, wherein the plurality of constraints includes a plurality of temporal constraints and a plurality of other constraints." This limitation organizes human activity by managing interactions between people by following rules or instructions, i.e., by collecting information about the resources to be shared or used by different people and the various constraints on the user of those resources. For example, a loading point for receiving a product may have constraints such as business hours, staff availability, and time for various tasks, storage, operating times, appointments, reservations, volumes, prices, goods, and release times. Spec. ¶¶ 20, 31. "Supplemental resources" (forklifts) may be required for a "top-level resource" (transfer of pallets). *Id.* ¶ 49.

Step (b) involves mathematical concepts, relationships, formulas or equations, or calculations, and/or mental processes performed in the mind of observation, evaluation, and judgment used for "expanding a first other constraint of the first plurality of other constraints into an expanded temporal constraint on a first resource of the plurality of resources meeting one or more quality levels associated with the plurality of other constraints." The exact meaning of this limitation is unclear because we cannot identify the portion of the Specification that describes this process step. The Appeal Brief lists paragraphs 18, 41–44, 51, 61–65, 71, 75–78, 87, and 88 together with Figures 4 and 6–8 as the basis for this limitation. Appeal Br. 2. We find no disclosure of "expanding" or "quality levels" in these disclosures. This limitation seems to mean that the various constraints are processed in a way that lists their constraint in terms of time, i.e., "temporally." Notably, this step is not performed "by the computer system" and therefore readily is performed as a mental process to redraft a constraint in terms of time.

The next step (c) translates, by the computing system, the temporal constraints and the expanded temporal constraint "into respective sets of binary temporal constraints." This step represents temporal constraints in a binary form, i.e., "0" if unavailable and "1" if available at a particular time as illustrated in Figures 6–8. This step involves a conversion from various real-time formats to binary temporal constraint masks. *Id.* ¶ 51. This step also involves mental processes and mathematical formulas to perform.

Combining each binary temporal constraint mask into a composite resource mask by applying a bit-wise Boolean operations, e.g., an "AND" operation in step (d) involves mental processes and mathematical formulas as well. *See id.* ¶¶ 52, 53, Fig. 5 (steps 530, 540).

Similarly, step (e) combines the combined respective binary temporal constraints into "a single overall binary temporal schedule" by applying one or more bit-wise Boolean operations. Again, the step involves mental processes and mathematical formulas of the simplest type as illustrated by Appellants' Figure 6, which is reproduced below.
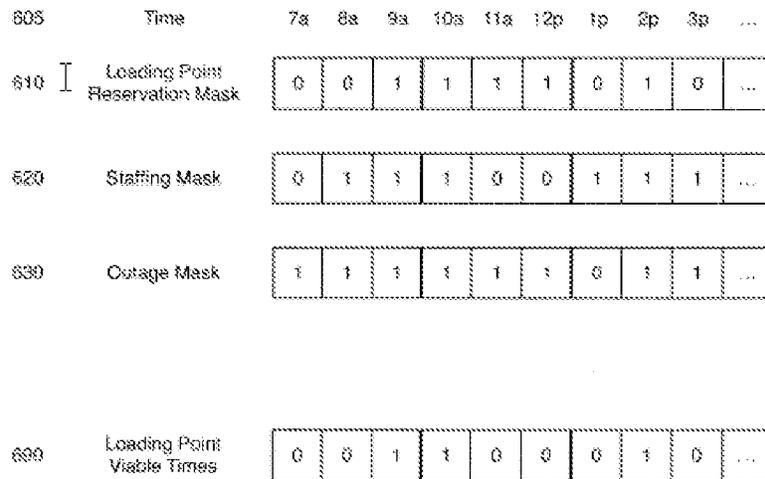

Figure 6 illustrates binary temporal constraint masks 610, 620, 630 combined using logical AND operations to produce an overall availability mask 690 for a loading point. *Id.* ¶ 59. Combined mask 690 indicates all constraints are met for the time slots 9am, 10 am, and 2 pm. *Id.* ¶ 63.

Figures 7 and 8 illustrate similar binary temporal constraint masks. These claimed features can be performed as mental processes in the human mind or using pen and paper. They involve mathematical relationships and rudimentary Boolean calculations/equations to solve for "viability."

Essentially, the claimed method involves the even more abstract idea based on mathematical relationships that in order to combine and manipulate objects/constraints/values, they must be in the same domain. All constraints are converted to the same domain, i.e., *time* in binary form, i.e., "1" when available, "0" when unavailable, so they can be combined. *See* Spec. ¶ 71.

In order to combine the constraints, the claimed method converts all constraints to the same domain (time) so their binary values can be added using a basic Boolean AND formula. *Id.* This process identifies timeslots that are viable (available) for resources, e.g., loading points. *Id.* ¶ 38, Fig. 4.

> A common attribute of each constraint conversion process, however, is to represent the constraint or combination of constraints in a common domain in which a positive value at a particular bit position indicates that the constraints do not prevent an appointment beginning at the time represented by that position, and a negative value indicates that the constraints do prevent an appointment beginning at that time.

Id. ¶ 71.

Final steps (f) and (g) involve translating, by the computing system, the single overall binary temporary schedule into a non-binary temporary schedule for displaying to a user one or more viable scheduling alternatives. These steps involve respectively using mathematical relationships, formulas, equations, and/or calculations to convert a binary schedule into a non-binary schedule that is comprehensible to a user and then displaying the non-binary schedule to a user with results of the calculations from the previous steps.

These steps involve mental processes performed in the human mind to translate a schedule from a binary format to a format displayable to a user using pen and paper. In this regard, Appellant discloses that supply chain management was managed exclusively by manual techniques and recently was partially automated so users can connect to a central server. *Id.* ¶ 4.

Considered together, the steps involve the abstract idea of managing personal relationships/interactions between people via rules or instructions that simply identify those times at which all resources/constraints are viable (e.g., available) to use a top-level resource. *See* Spec. ¶ 76; Appeal Br. 11.

Step 2A, Prong Two: Is There Integration into a Practical Application?

Because each of the limitations of claim 30 recites abstract ideas, we are hard-pressed to identify an additional element(s) sufficient to integrate the abstract ideas into a patent-eligible practical application. Herein lies the rub of the Examiner's rejection under 35 U.S.C. § 112(b). The preamble of claim 30 recites improving computer efficiency but the alleged improvement lies entirely within the body of claim 30, which recites only abstract ideas.

The only improvement argued by the Appellant is the abstract ideas in claim 30. *See* Appeal Br. 10–13. In particular, Appellant argues that,

> the claimed invention "improves the operation of the computer systems" by reducing processing times using the unique solution of expanding other constraints into expanded temporal constraints, translating the temporal constrains and expanded temporal constraints into binary temporal constraints, combining the sets of binary temporal constraints into combined respective binary temporal constraints, combining the combined respective binary temporal constraints into a single overall binary temporal schedule and translating the overall binary temporal schedule into a non-binary temporal schedule . . . . The expansion step is particularly counterintuitive to the prior art systems that use traditional algorithms to apply powerful formulas when developing solutions, in that the claimed invention expands the constraints to develop a greater number but simpler calculations that compile quicker than the traditional algorithms. Through these nonconventional steps that are related to the computer's functionality, the solution provides "not only a vastly improved user experience, but also cost savings in terms of computing hardware and operation."

Id. at 10. The method can "produce results in seconds in situations where constraint satisfaction problem techniques [prior art] require hours." Appeal Br. 10 (citing Spec. ¶ 92). It improves on traditional algorithms, which are impractical for the number and type of constraints. *Id.* (citing Spec. ¶ 4).

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However, claim 30 essentially recites the method with the words "apply it" on a general purpose computer. Thus, steps (a), (c), (d), (e), and (f) are performed "by the computing system." However, claim 30 does not recite any structural or functional features of the computing system, much less any feature that provides improved efficiency as touted in the preamble.

The Specification discloses only that the preferred system utilizes a central database 110 having stored information 112 related to capabilities and constraints of market participants 101, 102, 103 who may communicate with each other through central database 110. Spec. ¶ 19. Central database 110 is implemented using commodity computing hardware with one or more processors, solid state or rotating drives, RAM, and other components as a web server, load balancer, or other components to facilitate access to data. *Id.* ¶ 32. An engine 203 (Fig. 2), which is not recited in claim 30, may be specialized hardware for performing high volumes of computational tasks relevant to the method. *Id.* It may be a message queue, a master data portion, a validation state, a filter, a map and a reduction stage. *Id.* ¶ 24.

Therefore, the claimed computing system is described as generic to perform generic functions of data collection, processing, and analysis as the Examiner determines. Final Act. 6–7. No further details are provided in the Specification about the features or functions of these components. Nor is there any indication that Appellant has improved the functionality of these components. Engine 203 may comprise specialized hardware in the form of "various bitwise algorithms described below" to process high volumes of computational tasks. Spec. ¶ 32. As discussed above, any algorithms recited in claim 30 are recited as abstract ideas at a high level of generality without any particulars as to their implementation or efficacy being claimed.

Thus, even if one or more steps recite specific algorithms to improve efficiency of a computing system, claim 30 recites these steps at a high level of generality without imposing any meaningful limit on their application.

Step (b) recites "expanding" a first other constraint into "an expanded temporal constraint on a first resource." Step (c) recites "translating" temporal constraints into "sets of binary temporal constraints." Step (d) involves "combining" sets of binary temporal constraints into "combined respective binary temporal constraints" using bit-wise Boolean operations that are known (e.g., AND, OR, XOR, NAND). Spec. ¶¶ 53, 54. Step (e) involves further "combining" the "combined respective binary temporal constraints" into "a single overall binary temporal schedule." Then, step (f) recites "translating" this schedule into a non-binary schedule.

The computing system is a mere tool used to apply the abstract ideas recited in claim 30. It provides no meaningful limitation on the abstract ideas or method. It does not require a particular machine used to perform the steps of claim 30. It does not transform the constraints any more than a generic computer translates software and data into binary code to process by the computing system. *See* Ans. 7, 9; MPEP §§ 2106.05(b), 2106.05(f).

The cases cited by Appellants illustrate the absence of any integration in claim 30. *Enfish, LLC v. Microsoft Corp.*, 822 F.3d 1327 (Fed. Cir. 2016) found a patent-eligible application involving an improvement to a computer database through a claimed self-referential table. *Enfish*, 822 F.3d at 1336. The claims recited "a specific improvement to the way computers operate, embodied in the self-referential table." *Id.*; *see id.* at 1337 (finding that the self-referential table functions differently than conventional database structures with increased flexibility, faster search times, and less memory).

Claim 30 does not recite a database *structure*. It recites a generic computing system performing steps that are abstract concepts. The method appears to have automated a process previously performed manually by converting time availability schedules for resources into a binary format that can be processed with a computer. *See* Spec. ¶ 42. The steps in the Figure 5 flowchart may be performed in other orders including in parallel. *Id.* ¶ 48.

Furthermore, the method of Figure 5 (*id.* ¶¶ 48–56) lacks step (b) of expanding constraints into expanded temporal constraints, which Appellant argues to be unconventional and counterintuitive. Appeal Br. 10. Step 520 involves only a "Convert Availabilities to Masks" step. The Specification discloses only that resources and constraints "may each be converted from various real-time formats to binary temporal constraint masks" for step 520. Spec. ¶ 51. "[T]o perform the assessment of viability [availability] of timeslots for the desired tasks, the constraints are processed to create binary temporal constraint masks." *Id.* ¶ 57 ("the temporal constraint mask for each constraint is a binary mask, with each binary digit representing whether or not that constraint makes scheduling a timeslot starting at that time viable or unviable."). The expanding step (b) and translating step (c) of claim 30 are not described. *See id.* ¶ 18 (describing converting constraints to masks). Thus, we find no description of algorithms that improve efficiency.

We find no meaningful integration of the abstract ideas into an improved computer process through the expanding and translating steps of the abstract ideas because the Specification does not describe the steps as an innovation in computer efficiency. Nor do we have an indication that these steps represent significantly more than converting data to a binary format for processing on a computer. *See* Ans. 7, 9; MPEP 2106.05(c).

Appellant argues that the claimed invention improves the operation of the computer systems

> by reducing processing times using the unique solution of expanding other constraints into expanded temporal constraints, translating the temporal constrains and expanded temporal constraints into binary temporal constraints, combining the sets of binary temporal constraints into combined respective binary temporal constraints, combining the combined respective binary temporal constraints into a single overall binary temporal schedule and translating the overall binary temporal schedule into a non-binary temporal schedule.

Appeal Br. 10 (citing Spec. ¶ 5 and claims 30, 38, and 43). Appellant also argues that the expansion step is particularly counterintuitive to the prior art systems that use traditional algorithms to apply powerful formulas when developing solutions because the claimed invention expands the constraints to develop a greater number but simpler calculations that compile quicker than the traditional algorithms to provide a vastly improved user experience and cost savings in computing hardware and operation. *Id.*; Reply Br. 3–4.

Apart from Appellant's attorney arguments, the sole evidence of the alleged improvement is found in Appellant's Specification as follows:

> In practice, the above techniques have been shown to produce results in seconds in situations where constraint satisfaction problem techniques require hours. Thus, the described methods provide not only a vastly improved user experience, but also cost savings in terms of computing hardware and operation.

Spec. ¶ 92 cited at Appeal Br. 10, 12, 13. As the Examiner points out, however, the Specification lacks any discussion of prior art techniques or comparison of the claimed technique to prior art techniques. Ans. 7. Nor does the Specification describe improved accuracy or results. *Id.* at 8.

Appellant has not provided any other evidence or technical reasoning to support its contentions of improved computer processing times. Reply Br. 4–7 (arguing that the Examiner bears the burden of providing a factual basis for a rejection and Federal Circuit cases accept as evidence allegations by an applicant or patent holder).

On the record before us, we are not persuaded that the method as recited in claim 30 integrates the abstract ideas into a practical application. As discussed above, we reach this result because the claims do not integrate the abstract ideas into a particular machine that operates in a particular way to integrate the ideas. *See* MPEP § 2016.05(b). Instead, the claims recite a generic computer, which Appellant does not dispute. *See* Appeal Br. 13.

Second, Appellant recognizes that some of the claimed steps require *more* processing steps. Those steps are the steps of expanding constraints and translating temporal constraints in steps (b) and (c). Appellant refers to the steps as "counterintuitive" because they require a greater number of calculations. *Id.* at 10. Appellant asserts that the calculations are "simpler calculations" that are easier to compile than traditional algorithms. *Id.* Not only is this feature not claimed but the fact remains that the claimed method requires more calculations than prior art methods to convert constraints to a common domain, i.e., time. Thus, they involve more computer processing.

More importantly, the alleged improvement in processing time is the result of an unclaimed feature: *parallel processing.* Appellants explain that "[t]he claimed system accomplishes this result not by analyzing each step in sequence, but by analyzing the availability of each top-level resource, such as a loading point, temporally independently from the analysis of each other top-level resource." *Id.* at 11 (citing Spec. ¶ 41).

The Specification alludes to this aspect of the invention by disclosing that the process steps of the methods illustrated in Figures 4 and 5 can be performed in other orders or *in parallel* by a larger number of processors for a larger number of loading points and constraints. Spec. ¶¶ 48, 56. Using more processors to improve processing speed is not a technical innovation. Nor is it sufficient to integrate the abstract ideas into a practical application.

Even if parallel processing of some or all of the steps of claim 30 was an innovation in computer operability or function, claim 30 does not require parallel processing of any of the recited steps. Claim 30 does not require the use of a large number of processors or any processors. Claim 30 does not recite a particular computer arrangement needed to run the claimed method steps (a)–(g) optimally or faster than prior art systems. MPEP § 2106.05(b).

Although methods are not necessarily interpreted to require a certain order of steps, here, the steps of claim 30 largely are recited in reliance on previous steps. Thus, step (b) recites expanding of "the plurality of other constraints" and "the plurality of resources" recited in step (a). Likewise, step (c) recites translating "the plurality of temporal constraints" and "the expanded temporal constraint" of step (b). Step (d) combines the "binary temporal constraints" of step (c). Thus, the claimed method largely operates *sequentially*. *Cf.* Appeal Br. 3 (distinguishing claimed method from prior art and its alleged sequential method of operation).

Although the improved computer processing apparently results from parallel processing (as contrasted with the sequential processing of the prior art discussed at Appeal Br. 3, 10, 11 and Spec. ¶¶ 4, 91) of one or more steps (*see* Spec. §§ 48, 56), claim 30 does not recite this feature either. Therefore, this feature cannot provide a basis for integration into a practical application.

In contrast to claim 30, the claims in dispute in *Enfish*, recited a very specific configuration of the logical table that did not require preconfiguring a database structure to which a user must adapt entry as in the prior art due to the self-referential nature of the object identification number recited in the claims. *Enfish*, 822 F.3d at 1336–37. As discussed above, claim 30 does not recite a particular database structure for its method of abstract ideas.

In contrast to claim 30, the claims in dispute in *Visual Memory* were directed to an improvement to cache memory by providing programmable operational characteristics defined by the processor connected to a memory system so different processors can be installed in a memory system without significant compromise to their individual performance. *Visual Memory LLC v. NVIDIA Corp.*, 867 F.3d 1253, 1259, 1261 (Fed. Cir. 2017). We find no similar reliance on processors or memory, or allocation of tasks across different elements of a computer or CPU to improve a speed of the process.

In contrast to claim 30, *Thales* recited a unique configuration of inertial sensors and the use of a mathematical equation for calculating the location and orientation of an object relative to a moving platform. *Thales Visionix Inc. v. United States*, 850 F.3d 1343, 1347 (Fed. Cir. 2017). Again, claim 30's method does not rely on a particular equation in conjunction with a unique configuration of processors, memory, sensors, or other elements.

The database structure of *Enfish* and programmable cache memory of *Visual Memory* were innovative structures that improve computer operation. Claim 30 simply collects data, changes it to a temporal domain in a binary format (used in computers), adds the "1s" and "0s" together, and reports the result in a visual format. A computer's ability to process these steps faster depends on its processor configuration and the use of parallel processing.

We agree with the Examiner that the subject matter defined by claim 30 does not improve computer functions or produce greater accuracy or improved memory. *See* Ans. 7–9. What Appellant has established is, like the gentleman making soup out of stones, the method runs faster on a generic computer than unidentified "conventional" programs as long as the computer uses extra processors to handle the added processing required to expand and translate constraints, and the processing of one or more of the claimed steps occurs in parallel rather than sequentially like some prior art allegedly does calculations. Appellant does not purport to have invented parallel processing or used it in an innovative way in resource scheduling optimization. Nor does claim 30 recite a particular processor configuration, in parallel or otherwise, that processes data using the claimed method in an optimal way. Thus, the method has not been integrated into a meaningful practical application in a particular machine, computer, or structure (or even a software "structure") to ensure that it recites more than abstract ideas in a particular environment. The fact that steps may be performed faster on a computer than manually or as a mental process does not integrate the abstract ideas recited claim 30 into a practical application. Final Act. 8.

Step 2B: Does Claim 30 Recite an Inventive Concept?

We next consider whether claim 30 recites any elements, individually or as an ordered combination, that transforms the abstract ideas into a patent-eligible application, e.g., by providing an inventive concept. *Alice*, 573 U.S. at 217–18. As discussed above, Appellant asserts that the claimed method improves the processing speed of computers and has been shown to produce results in seconds in situations where prior art constraint satisfaction problem techniques require hours. Spec. ¶ 92; Appeal Br. 10, 12.

Appellant argues that the claims have an inventive concept as follows.

The claims specifically include the unconventional steps of
expanding the other constraints into expanded temporal
constraints, translating the temporal constraints into binary
temporal constraints, combining the binary temporal constraints
into combined respective binary temporary constraints,
combining the combined respective binary temporal constraints
into a single overall binary temporal schedule and translating
the overall binary temporal schedule into a non-binary temporal
schedule. As described above, the expansion step is
particularly inventive in that expanding the constraints is
counterintuitive to the traditional algorithm solution that applies
more powerful formulas to develop solutions, as opposed to
expanding the constraints to develop more but simpler
calculations that compile quicker than traditional algorithms.
These unconventional and counterintuitive steps are
significantly more than the abstract idea of collecting and
analyzing information, and presenting the results and are also
significantly more than know prior art systems, some of which
the Examiner has identified.

Appeal Br. 14. Appellant also argues that the Examiner's withdrawal of all
prior art rejections "evidences the inventive step of claims 30–49." *Id.* In
addition, Appellant argues that the detailed limitations of the claims mean
the claims are narrowly drawn to withstand preemption concerns. *Id.* at 15.

As discussed in Step 2A, Prong One, the limitations of claim 38 are
directed to a variety of abstract ideas. However, merely claiming different
abstract ideas, without more, does not provide an inventive concept to make
a claim patent-eligible. *RecogniCorp, LLC v. Nintendo Co.*, 855 F.3d 1322,
1327 (Fed. Cir. 2017) ("Adding one abstract idea . . . to another abstract idea
. . . does not render the claim non-abstract."); *FairWarning IP, LLC v. Iatric
Sys., Inc.*, 839 F.3d 1089, 1093–94 (Fed. Cir. 2016) (patent-ineligible claims
were directed to a combination of abstract ideas).

Even if claim 38 recites a combination of abstract ideas that is novel and non-obvious in the prior art, "[t]he 'novelty' of any element or steps in a process, or even of the process itself, is of no relevance in determining whether the subject matter of a claim falls within the § 101 categories of possibly patentable subject matter." *Diamond v. Diehr*, 450 U.S. 175, 188– 89 (1981). *See also Mayo Collaborative Servs. v. Prometheus Labs., Inc.*, 566 U.S. 66, 88–90 (2012) (the patent eligibility of an abstract idea does not depend on its alleged novelty or non-obviousness); *SAP America, Inc. v. InvestPic, LLC*, 898 F.3d 1161, 1163 (Fed. Cir. 2018) ("No matter how much of an advance in the finance field the claims recite, the advance lies entirely in the realm of abstract ideas, with no plausibly alleged innovation in the non-abstract application realm. An advance of that nature is ineligible for patenting."); *Two-Way Media, Ltd. v. Comcast Cable Commc'ns, LLC*, 874 F.3d 1329, 1340 (Fed. Cir. 2017) ("Eligibility and novelty are separate inquiries."); *Synopsys, Inc. v. Mentor Graphics Corp.*, 839 F.3d 1138, 1151 (Fed. Cir. 2016) ("But, a claim for a *new* abstract idea is still an abstract idea."); *Versata Develop. Grp., Inc. v. SAP Am., Inc.*, 793 F.3d 1306, 1335 (Fed. Cir. 2015) (affirming unpatentability of claims that improved an abstract idea, but not a computer's performance).

As discussed in Step 2A, Prong Two, nothing in claim 38 represents an advance in computer processing or resource planning and optimization. Any improvement in computer systems requires using more processors and some parallel processing. *See* Spec. ¶¶ 48, 56; Appeal Br. 11. Even if these features represent an inventive step, neither feature is claimed. Any advance thus involves abstract steps of organizing the constraints in the same time domain in binary form for generic computer processing. Spec. ¶¶ 64, 71.

The Specification also discloses that processing may be more efficient if an initial filtering is performed using methods that operate directly in the domain. *Id.* ¶ 40. This feature is not recited in claim 30. Furthermore, the Specification provides no working examples of the method to illustrate its improvement over prior art methods that use more complicated algorithms.

Aatrix Software is illustrative. That case held that a data processing system for importing data into a viewable form "contained an inventive concept directed to improved importation of data and interoperability with third-party software." *Aatrix Software, Inc. v. Green Shades Software, Inc.*, 882 F.3d 1121, 1129 (Fed. Cir. 2018).

Unlike *Aatrix Software*, claim 30 here does not improve processing of data in an innovative way or promote interoperability. Instead, the computer requires *unclaimed* extra processors and parallel processing to achieve the improved results that Appellant touts. However, claim 30 recites a generic computing system without tying the method to any innovative features that are required to provide the improved, allegedly innovative results.

Arguments about preemption (Appeal Br. 14–15) are resolved by our § 101 analysis. *Ariosa Diagnostics, Inc. v. Sequenom, Inc.*, 788 F.3d 1371, 1379 (Fed. Cir. 2015); *see also Two-Way Media Ltd. v. Comcast Cable Commc'ns, LLC*, 874 F.3d 1329, 1339 (Fed. Cir. 2017) (where patent claims are deemed patent ineligible, "preemption concerns are fully addressed and made moot").

For the foregoing reasons, we sustain the rejection of claims 1–20.

DECISION

We reverse the rejection of claims 30–49 for indefiniteness.

We affirm the rejection of claims 30–49 as directed to patent-ineligible subject matter.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

AFFIRMED