

Ex parte Bar-Tal et al.

Appeal Number 2026-000860

App. No: 16/952,943

Technology Center 3700

June 18, 2026

Grounds of Rejection to be Reviewed on Appeal

- **[A]** Claims 1-20 and 22-24 stand rejected under 35 U.S.C. § 101 because the Office Action alleged that the claimed invention is directed to a judicial exception (i.e., a law of nature, a natural phenomenon, or an abstract idea) without significantly more.

Claim 1

- 1. A method for improving accuracy in detecting a cardiac arrhythmia in a patient, the method comprising:
- inserting a catheter into a heart of the patient; (Application, ¶0016–¶0018)
- receiving unipolar pattern intra-cardiac (IC) electrogram (EGM) signals for an area of the heart, from a plurality of activity channels corresponding to a plurality of electrodes of the catheter; (Application, ¶0004, ¶0017–¶0018)
- selecting a window of interest (WOI) of the IC EGM signals, the WOI representing an entire cycle length for a single heartbeat; (Application, ¶0034, ¶0052)
- calculating an activity signal based on a median filter and reference annotations; (Application, ¶0034, ¶0036)
- calculating an activity threshold of the WOI using the activity signal; (Application, ¶0034, ¶0036–¶0038)
- calculating, using the activity threshold, a pattern of interest (POI), the POI encompassing at least a portion of the WOI, and corresponding to a specific portion of the WOI where an arrhythmia activation is exhibited; (Application, ¶0030–¶0034)
- storing a template POI representative of the arrhythmia activation, the template POI formed of a plurality of template channels and based upon the IC EGM signals within the WOI; (Application, ¶0030–¶0031, ¶0034)
- receiving subsequent electrical activity comprising IC EGM signals from the plurality of activity channels; (Application, ¶0014, ¶0052)
- calculating signal correlations based on the template POI and the subsequent electrical activity; (Application, ¶0007, ¶0011, ¶0052, ¶0054–¶0057)
- calculating weights based on a maximum slope of the plurality of template channels, (Application, ¶0042)
- generating a correlation score by applying the weights to the signal correlations; and (Application, ¶0042, ¶0052, ¶0064)
- detecting the cardiac arrhythmia when the correlation score is above a threshold correlation score. (Application, ¶0060, ¶0063)

Claim 13

- 13. An apparatus for improving accuracy in detecting a cardiac arrhythmia in a patient, the apparatus comprising:
- one or more catheters with respective one or more electrodes arranged for insertion into a heart of the patient for acquiring unipolar pattern intra-cardiac (IC) electrogram (EGM) signals from an area of the heart, from a plurality of activity channels corresponding to the one or more electrodes; (Application, ¶¶0016–¶0018)
- a memory; and, (Application, ¶0019, ¶0023–¶0024)
- one or more processors that are communicatively coupled to the one or more catheters and the memory, wherein the one or more processors are collectively configured to: (Application, ¶0018–¶0020, ¶0023–¶0025)
- receive the IC EGM signals from the one or more catheters, (Application, ¶0020)
- select a window of interest (WOI) of the IC EGM signals, the WOI representing an entire cycle length for a single heartbeat, (Application, ¶0034, ¶0052)
- calculate an activity signal based on a median filter and reference annotations, (Application, ¶0034, ¶0036)
- calculate an activity threshold of the WOI using the activity signal, (Application, ¶0034, ¶0036–¶0038)
- calculate, using the activity threshold, a pattern of interest (POI) of the IC EGM signals, the POI encompassing at least a portion of the WOI, and corresponding to a specific portion of the WOI where an arrhythmia activation is exhibited, (Application, ¶0030–¶0034)
- store a template POI representative of the cardiac arrhythmia in the memory, the template POI comprising a plurality of template channels based on the IC EGM signals within the WOI, (Application, ¶0030–¶0031, ¶0034)
- receive subsequent electrical activity comprising IC EGM signals from the plurality of activity channels, (Application, ¶0014, ¶0052)
- calculate signal correlations based on the template POI and the subsequent electrical activity, (Application, ¶0007, ¶0011, ¶0052, ¶0054–¶0057)
- calculate weights based on a maximum slope of the plurality of template channels, channel; (Application, ¶0042) (note: claim text has a stray “channel;” after this phrase; consider deleting in the appendix)
- generate a correlation score by applying the weights to the signal correlations; and (Application, ¶0042, ¶0052, ¶0064)
- detect the cardiac arrhythmia when the correlation score is above a threshold correlation score. (Application, ¶0060, ¶0063)

Claims 15 & 16

- 15. The apparatus of claim 14, additionally comprising a display screen arranged for displaying the subsequent electrical activity when the cardiac arrhythmia is detected. (Application, ¶0025, ¶0060)
- 16. The apparatus of claim 15, wherein the subsequent electrical activity having the correlation score exceeding the threshold is incorporated into a map of the heart appearing on the display screen, wherein areas of the heart exhibiting the cardiac arrhythmia are emphasized. (Application, ¶0025, ¶0060)

Examiner's Error: Treating the Claimed Solution as the Abstract Idea

Core dispute: the Answer labels catheter acquisition as pre-solution, the claimed processing as the abstract idea, and map/display limitations as post-solution.

Examiner's framing

Catheter acquisition = pre-solution data gathering

The Answer treats the catheter/electrode front end as generic antecedent data collection.

Record: Ans. 3-4

Post-acquisition processing = abstract idea itself

The Answer declares the claimed sequence after acquisition to be the judicial exception.

Record: Ans. 4, 7, 10

Display/map = post-solution activity

The Answer treats mapping and display as merely presenting the result of the alleged abstraction.

Record: Ans. 4, 12

Appellant's framing

Catheter channels = front end of the EP workflow

The activity channels supply the template channels, channel correlations, and slope-based weights.

Record: Reply Br. 13-15; Claim 1

The ordered pipeline is the claimed technical mechanism

WOI -> activity signal -> threshold -> POI -> template -> slope-weighted correlations -> detection.

Record: Reply Br. 3-7, 14-15

Claim 16 constrains EP map incorporation

Threshold-exceeding activity is incorporated into a heart map and arrhythmia regions are emphasized.

Record: Claim 16; Reply Br. 9-10, 16-17

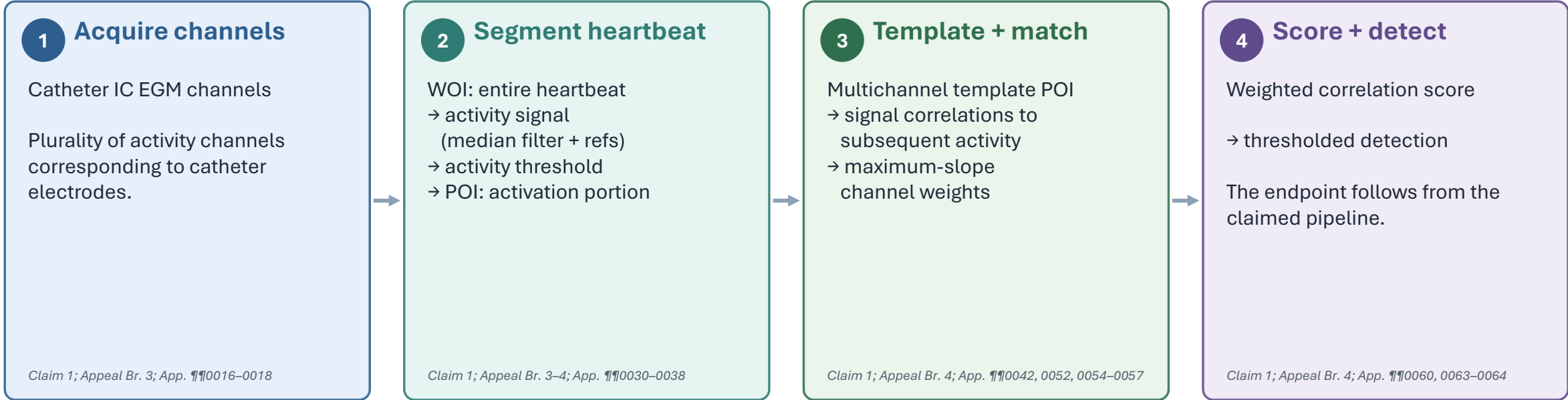
The claimed EP pipeline is the practical application - not the exception.

Record: Reply Br. 3-7, 11-18; Ans. 3-4, 12

Claim 1 Recites a Specific Processing Pipeline, Not a Result

Representative claim architecture: the recited “how” converts catheter-acquired IC EGMs into thresholded detection.

Record: Claim 1 reproduced at Appeal Br. 3–4; pipeline characterized at Appeal Br. 11–12 and Reply Br. 6–7.



Speaker point: Claim 1 is not the command “detect arrhythmia”; it is the constrained pipeline for how arrhythmia activation is identified from multichannel intracardiac electrograms.

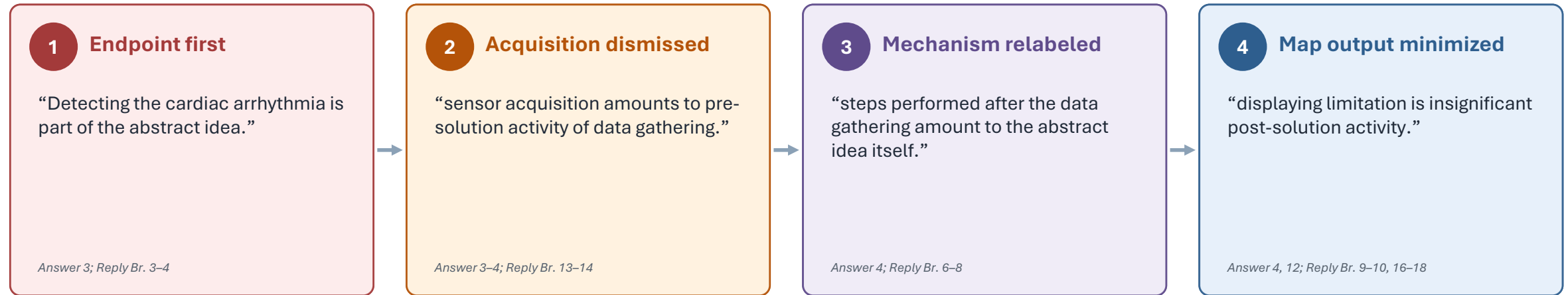
Record: Appeal Br. 11–12; Reply Br. 6–7 (claims directed to a concrete, rule-bound intracardiac EGM processing pipeline, not an abstract objective).

Claim chain: IC EGM channels → WOI → activity signal → threshold → POI → template → correlations → slope weights → weighted score → detection

The Answer Collapses Step 2A into a Tautology

Examiner defines the endpoint at a high level, then labels the claimed mechanism as the abstract idea.

Record: Examiner's Answer 3–4, 10, 12; Reply Br. 3–8, 11–18; Claim 16 discussed at Reply Br. 9–10, 16–18.



Result-first framing: endpoint = abstract → claimed “how” = abstract → practical application never analyzed

Record: Reply Br. 6–7 explains that this approach “collapses Step 2A into a tautology.”

Correct framing: evaluate the claim as a whole — the recited WOI → activity signal → threshold → POI → template → correlations → slope weights → weighted score pipeline.

Record: Reply Br. 7–8; 14–15; 18–19 (claimed operations are tied to catheter-acquired IC EGMs and physiologically bounded, morphology-weighted correlation).

The Claims Are Directed to the “How,” Not the Desired Result

Step 2A, Prong One: the claim focus is the recited technical mechanism — not the clinical endpoint in isolation.

Record: Claim 1 reproduced at Appeal Br. 3–4; claim-as-a-whole / “how” framing at Appeal Br. 11–12, 45–46 and Reply Br. 6–8; Examiner result-level framing at Ans. 3–4.

NOT

“detect arrhythmia”

as the claim focus

Examiner’s result-level label

Record: Ans. 3–4 (“Detecting the cardiac arrhythmia is part of the abstract idea”; post-acquisition steps are “the abstract idea itself”).

INSTEAD

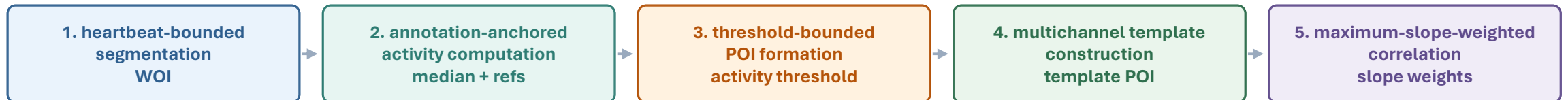
**a concrete, rule-bound intracardiac EGM processing pipeline
embedded in an EP device context**

Record: Reply Br. 7–8 (claim focus is the constrained technique, not the abstract concept of detecting arrhythmia); Appeal Br. 11–12 (prescribed pipeline).



The claimed “how” limitations

These are implementation constraints, not a desired result.



Record: Claim 1; Appeal Br. 3–4, 45–46; Reply Br. 7–8, 14–15.

Step 2A should ask what the claims are directed to as a whole — the recited “how” is the technological solution, not the exception.

The Catheter Channels Define the Processing Architecture

The catheter acquisition is not a generic preface; the electrode channels supply the structure carried through the claimed workflow.

Record: Ans. 3–4 (“pre-solution” acquisition / post-acquisition steps “abstract idea itself”); Claim 1 at Appeal Br. 3–4; Reply Br. 8, 13–15.

Examiner label

“catheter” = pre-solution data gathering

Record: Ans. 3–4



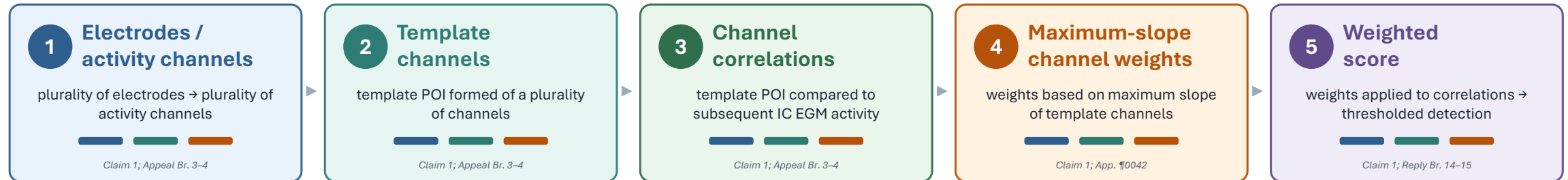
Claim reality

the same activity channels are carried through template, correlation, weighting, and score

Record: Reply Br. 8, 13–15; Appeal Br. 11–12

Channels carried through the claim

The channel structure is not discarded after acquisition; it becomes the architecture for the template, correlations, channel weights, and final score.



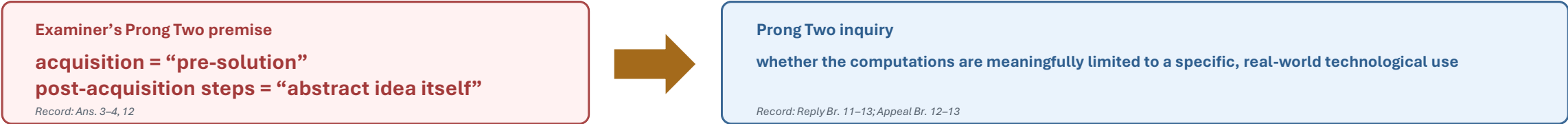
The acquisition is not a generic preface — the electrode channels supply the structure that the rest of the claim uses.

Record: Reply Br. 8 (acquisition is the “front end of an integrated workflow”); Reply Br. 13–15 (closed device-embedded workflow from multi-electrode acquisition through segmentation, template formation, weighted scoring); Appeal Br. 11–12.

Even If Mathematical, the Operations Are Integrated into EP Device Operation

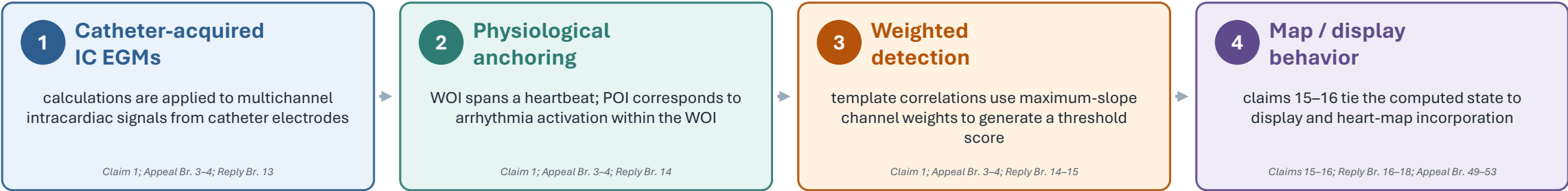
Step 2A, Prong Two: the claimed calculations are not free-floating math; they operate within a catheter-based electrophysiology workflow.

Record: Ans. 3–4, 12 (pre-/post-solution labels); Claim 1 at Appeal Br. 3–4; Appeal Br. 11–13, 41–43; Reply Br. 11–18; Claim 16 at Appeal Br. 9–10 / Claims App.



Four integration anchors in the record

The operations are constrained by signal source, physiological segmentation, detection mechanism, and system output.



The record's Prong Two answer is not "math improves math." The claimed computations are applied to catheter-acquired IC EGMs in a concrete EP workflow, and claims 15–16 further connect the computed threshold state to map/display operation.

Record: Reply Br. 12–18 (Prong Two integration and map incorporation); Appeal Br. 11–13, 41–43; Ans. 3–4, 12.

CardioNet: Do Not Oversimplify Cardiac Signal Processing

The Examiner repeats the same overgeneralization CardioNet rejected: reducing a specific cardiac-signal technique to data analysis or arrhythmia detection.

Record: Appeal Br. 18-24 (CardioNet comparison and rule-bound technique); Ans. 5-7 (Examiner response); Reply Br. 23-28 (CardioNet response).

CardioNet rule

Federal Circuit warning

- Do not generalize cardiac-signal claims as merely collecting, analyzing, and reporting data.
- Ask whether the claim focuses on a specific means that improves cardiac monitoring technology.

CardioNet, 955 F.3d at 1370-72; Appeal Br. 18-24; Reply Br. 24-25

Same error here

Examiner framing

- The Answer says the processing sequence is the abstract idea itself.
- It distinguishes CardioNet because arrhythmia-detection processes existed before.

Ans. 5-7; Reply Br. 23-26

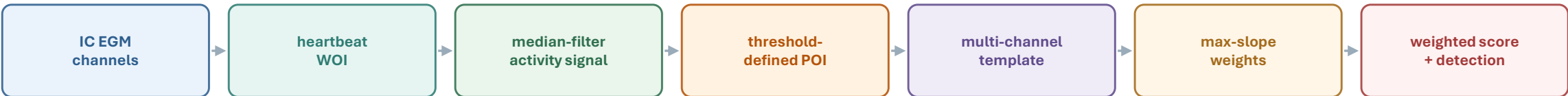
Correct focus

Claim-as-a-whole inquiry

- Not whether arrhythmia detection existed.
- Whether the claims recite a specific technological mechanism for EP signal processing.

Reply Br. 25-28; Appeal Br. 46-48

Here, the claimed mechanism is not a generic diagnosis step:



Record: Claim 1 at Appeal Br. 3-4 / Claims App.; Appeal Br. 11-13, 46-48; Reply Br. 24-28.

CardioNet vs Current Claims

Eligible Subject Matter in CardioNet	Amended Claim 13	Notes
1. A device, comprising: a beat detector to identify a <u>beat-to-beat timing of cardiac activity</u> ;	An <u>apparatus</u> for improving accuracy in <u>detecting a cardiac arrhythmia</u> in a patient, the apparatus comprising: one or more catheters with respective one or more electrodes arranged for insertion into a heart of the patient for <u>acquiring unipolar pattern intra-cardiac (IC) electrogram (EGM) signals from an area of the heart</u> , from a plurality of activity channels corresponding to the one or more electrodes; a memory; and,	Both claims recite a device/apparatus that detects cardiac signals.
a <u>ventricular beat detector</u> to <u>identify ventricular beats</u> in the cardiac activity;	<u>one or more processors</u> that are communicatively coupled to the one or more catheters and the memory, wherein the one or more processors are collectively configured to: <u>receive the IC EGM signals</u> from the one or more catheters, <u>select a window of interest (WOI) of the IC EGM signals, the WOI representing an entire cycle length for a single heartbeat,</u>	Both claims recite identification/selection of one or more aspects of the detected cardiac signals.

CardioNet vs Current Claims

Eligible Subject Matter in CardioNet	Amended Claim 13	Notes
<u>relevance determination logic to identify a relevance of the variability in the beat-to-beat timing to at least one of atrial fibrillation and atrial flutter; and</u>	calculate an activity signal based on a median filter and reference annotations, calculate an activity threshold of the WOI using the activity signal, calculate, using the activity threshold, a pattern of interest (POI) of the IC EGM signals, the POI encompassing at least a portion of the WOI, and corresponding to <u>a specific portion of the WOI where an arrhythmia activation is exhibited</u> , store <u>a template POI representative of the cardiac arrhythmia in the memory</u> , the template POI comprising a plurality of template channels based on the IC EGM signals within the WOI, receive subsequent electrical activity comprising IC EGM signals from the plurality of activity channels, calculate signal correlations based on the template POI and the subsequent electrical activity, calculate weights based on a maximum slope of the plurality of template channels, channel; <u>generate a correlation score by applying the weights to the signal correlations;</u>	Both claims recite analysis of the detected signals to make a "determination" or render a "score" associated with abnormal cardiac activity.

CardioNet vs Current Claims

Eligible Subject Matter in CardioNet	Amended Claim 13	Notes
an event generator to generate an event <u>when the variability in the beat-to-beat timing is identified as relevant to the at least one of atrial fibrillation and atrial flutter in light of the variability in the beat-to-beat timing caused by ventricular beats identified by the ventricular beat detector.</u>	<u>detect the cardiac arrhythmia when the correlation score is above a threshold correlation score.</u>	Both claims recite "event generation" / detection of abnormal cardiac activity based on the previous "determination" or "score."

Fautz / Thales: Medical-Device Math Can Be Eligible

The point is integration into device operation: mathematical processing tied to sensor acquisition and improved system output.

Record: Appeal Br. 25-34 (Thales/Fautz analogies); Ans. 7-8 (Examiner distinctions); Reply Br. 29-33 (Fautz response).

Fautz rule

Medical-device math

- Equations eligible when embedded in a device workflow and improving output.
- Acquisition was not token data gathering around math.

Appeal Br. 29-34; Reply Br. 29-31

Thales rule

Sensor data used in a specific way

- Eligibility turns on how raw sensor data improve a system determination.
- Novel sensor hardware is not the point.

Appeal Br. 25-28, 32-34; Reply Br. 31-33

Here

Claimed EP pipeline

- Catheter channels feed WOI/POI, template, max-slope weights, and correlation.
- The pipeline produces a refined EP detection output.

Claim 1 at Appeal Br. 3-4; Appeal Br. 41-43; Reply Br. 30-33

The Answer asks the wrong question:

Not required

Novel end goal | nonconventional electrodes | express sensor criticality

Ans. 7-8; Reply Br. 31-33

Required inquiry

Math embedded in a specific medical-device workflow that yields an improved output

Fautz pp. 9-11 as cited at Reply Br. 29-33; Appeal Br. 29-34



Record: Claim 1 at Appeal Br. 3-4 / Claims App.; Appeal Br. 11-13, 29-34, 41-43; Reply Br. 30-33.

Thales vs Current Claims

Eligible Subject Matter in Thales	Amended Claim 13
A system <u>for tracking the motion of an object relative to a moving reference frame</u>, comprising:	An apparatus <u>for improving accuracy in detecting a cardiac arrhythmia in a patient</u>, the apparatus comprising:
<u>a first inertial sensor mounted on the tracked object;</u> <u>a second inertial sensor mounted on the moving reference frame;</u> and	<u>one or more catheters with respective one or more electrodes arranged for insertion into a heart of the patient for acquiring unipolar pattern intra-cardiac (IC) electrogram (EGM) signals from an area of the heart, from a plurality of activity channels corresponding to the one or more electrodes;;</u>
<u>an element adapted to receive signals from said first and second inertial sensors</u>	<u>receive the IC EGM signals from the one or more catheters,</u> ... <u>receive subsequent electrical activity comprising IC EGM signals from the plurality of activity channels,</u>

Thales vs Current Claims

Eligible Subject Matter in Thales	Amended Claim 13
and configured to <u>determine an orientation of the object relative to the moving reference frame based on the signals received from the first and second inertial sensors.</u>	calculate an activity signal based on a median filter and reference annotations, calculate an activity threshold of the WOI using the activity signal, calculate, using the activity threshold, a pattern of interest (POI) of the IC EGM signals, the POI encompassing at least a portion of the WOI, and corresponding to a specific portion of the WOI where an arrhythmia activation is exhibited, store a template POI representative of the cardiac arrhythmia in the memory, the template POI comprising a plurality of template channels based on the IC EGM signals within the WOI, ... calculate signal correlations based on the template POI and the subsequent electrical activity, calculate weights based on a maximum slope of the plurality of template channels, channel; generate a correlation score by applying the weights to the signal correlations; and <u>detect the cardiac arrhythmia when the correlation score is above a threshold correlation score.</u>

This Is Not “Do It Faster on a Computer”

Intellectual Ventures does not control where the claims themselves recite the operative technical mechanism.

Record: Ans. 3-4, 7-8, 11 (Examiner’s *Intellectual Ventures* framing); Appeal Br. 16-17, 48; Reply Br. 19-23.

Examiner’s shortcut

Relies on “new abstract idea is still abstract.”

Treats the claimed processing sequence as the exception itself.

Ans. 3-4, 7-8, 11

Appeal response

Not generic information processing made faster.

The claims recite a different medical-device signal-processing method in kind.

Appeal Br. 16-17, 48

Desjardins frame

The eligibility question asks whether the claim language operationalizes the asserted improvement.

Reply Br. 19-23

What the claims actually recite:

the operative mechanism is in the claim limitations, not merely in the specification



Record: Claim 1 at Appeal Br. 3-4 / Claims App.; Appeal Br. 16-17, 48; Reply Br. 21-23.

Bottom line

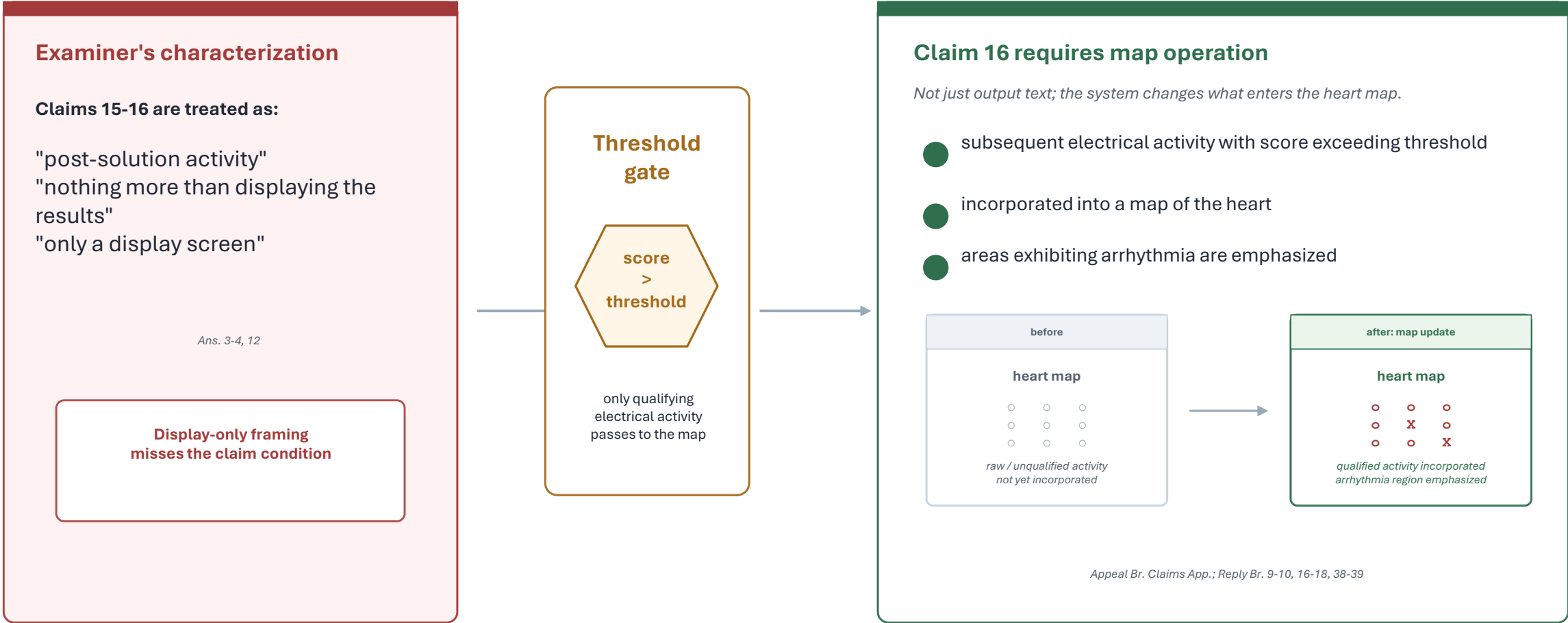
The claims do not simply invoke a generic computer to perform an abstract idea faster. They specify how an EP system processes catheter-acquired IC EGMs through a claimed sequence that operationalizes the asserted improvement.

Record: Appeal Br. 16-17, 48; Reply Br. 19-23.

Claim 16 Is Not Merely "Display the Result"

It conditions map incorporation and anatomical emphasis on the computed correlation state.

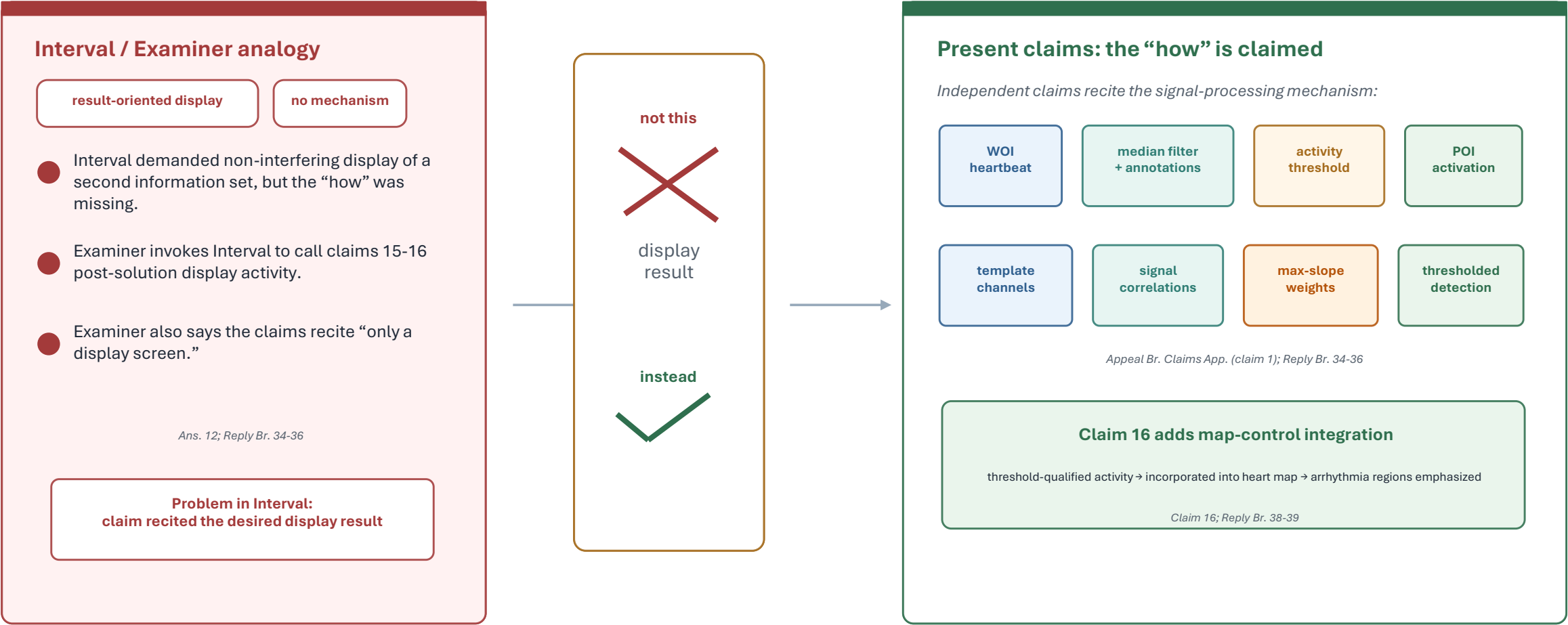
Record: Claim 16 at Appeal Br. Claims App.; Ans. 3-4, 12; Reply Br. 9-10, 16-18, 38-39.



Interval Was Missing the “How”; These Claims Recite the “How”

The Examiner’s display-case analogy does not fit claims with a detailed EP signal-processing mechanism.

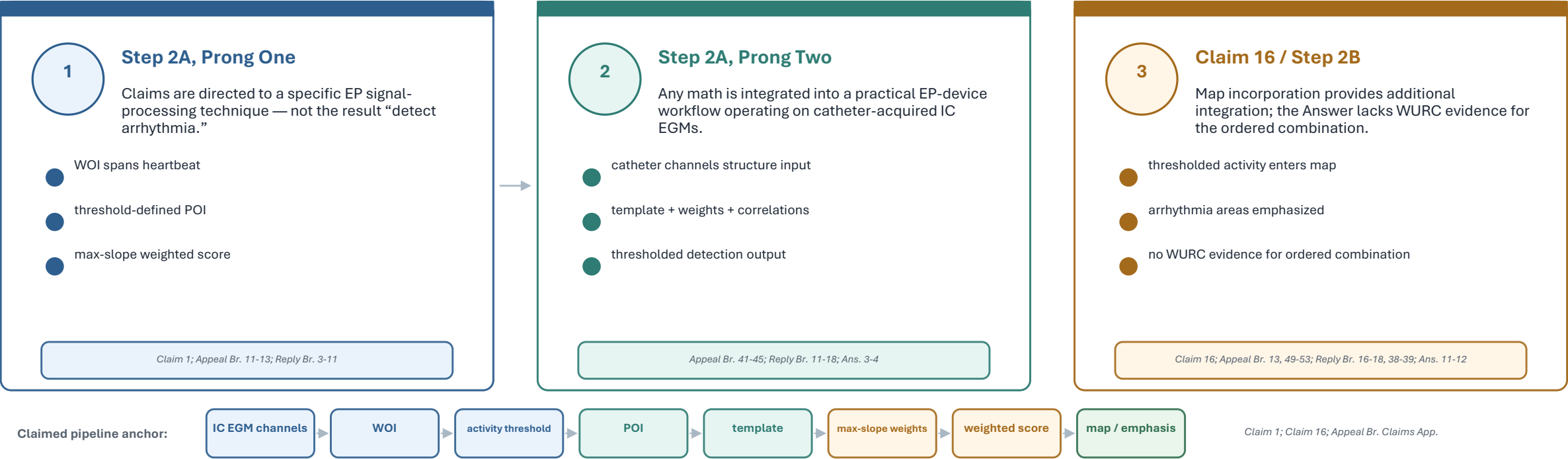
Record: Ans. 12 (Interval / “only a display screen”); Reply Br. 34-39 (Interval distinction); Appeal Br. Claims App. (claims 1, 16).



Three Independent Reasons to Reverse

The panel need not reach every issue: reversal follows once the claimed pipeline is treated as the technological application rather than the abstract idea itself.

Record: Reply Br. 3-18, 24-34, 38-39; Appeal Br. 11-13, 45-49, 49-53; Ans. 3-4, 11-12.



Requested Holding

Reverse the Section 101 rejection because the claims recite the EP-system technique, not a disembodied abstract idea.

Record: Appeal Br. 11-13, 45-53, 53-54; Reply Br. 3-18, 39-40; Ans. 3-4, 7, 12; Claims App. claim 1 & claim 16.

Requested order:

REVERSE

the Section 101 rejection of claims 1-20, 22-24

Appeal Br. 53-54; Reply Br. 39-40

Why: the Examiner’s Answer never analyzes the claimed pipeline as a whole.

1

Answer failed to analyze the claims as a whole

It labels acquisition “pre-solution” and the remaining ordered processing steps “the abstract idea itself.”

Ans. 3-4, 7; Reply Br. 3-11

2

Claimed EP pipeline is the technical solution

Claim 1 specifies heartbeat-bounded windowing, activity-threshold POI formation, multichannel template construction, maximum-slope weighting, and weighted correlation scoring.

Claim 1; Appeal Br. 11-13, 45-49; Reply Br. 11-18

3

No preemption of arrhythmia detection or correlation generally

The claims are limited to a particular way an EP system processes catheter-acquired IC EGMs to identify arrhythmia activation.

Appeal Br. 53-54; Reply Br. 39-40