

**United States Court of Appeals for the Federal Circuit**

01-1198

CARDIAC PACEMAKERS, INC., GUIDANT SALES CORPORATION,  
and ELI LILLY AND COMPANY,

Plaintiffs-Appellants,

v.

ST. JUDE MEDICAL, INC., PACESETTER, INC., and VENTRITEX, INC.,

Defendants-Appellees.

Lawrence M. Jarvis, McAndrews, Held & Malloy, Ltd., of Chicago, Illinois, argued for plaintiffs-appellants. With him on the brief were Timothy J. Malloy, Stephen F. Sherry and Sharon A. Hwang.

Denis R. Salmon, Gibson, Dunn & Crutcher LLP, of Palo Alto, California, argued for defendants-appellees. With him on the brief were Mark A. Perry and H. Mark Lyon. Of counsel on the brief were Jeffrey M. Olson, Lyon & Lyon LLP, of Los Angeles, California; and Michael I. Rackman, Gottlieb, Rackman & Reisman, P.C., of New York, New York.

Appealed from: United States District Court for the Southern District of Indiana

Judge David F. Hamilton

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DECIDED: July 11, 2002

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Before NEWMAN, GAJARSA, and PROST, Circuit Judges.

GAJARSA, Circuit Judge.

The Plaintiffs-Appellants, Cardiac Pacemakers, Inc., Guidant Sales Corp., and Eli Lilly and Co. (together "Cardiac Pacemakers"), appeal an Order of Partial Final Judgment by the United States District Court for the Southern District of Indiana that claims 1-14 of United States Patent No. 4,572,191 (the "'191 patent") are invalid for indefiniteness under 35 U.S.C. § 112, ¶ 2. Because the district court properly determined that the specification of the '191 Patent fails to disclose structure corresponding to the "third monitoring means" limitation, we affirm.

## I. BACKGROUND

### A. The '191 Patent

Cardiac Pacemakers owns the '191 patent, which pertains to implantable defibrillators. A

defibrillator (or cardioverting device) is a device used to stimulate an ailing heart. Contractions in the heart muscle cause the heart to pump blood. These contractions are caused by electrical stimulation. Disturbances in the heart's natural electrical conduction mechanism can cause deviations from the heart's normal rhythm. Defibrillators deliver a pulse of energy to stimulate the heart, restoring normal cardiac rhythm. The implantable defibrillator claimed in the '191 patent is designed for people who experience recurring episodes of abnormal cardiac rhythm.

The sole independent claim at issue, claim 1, reads as follows:

1. A cardioverting device comprising:

detecting means for issuing an electrical signal representing the actual ECG activity of the heart of a wearer of the device;

storage means for storing energy to convert an abnormal cardiac rhythm to normal sinus rhythm;

delivery electrode means for discharging the stored energy into the heart of the wearer;

switch means for controlling the discharge of the stored energy into the heart of the wearer;

charging means for delivering to said storage means said energy to convert the abnormal cardiac rhythm;

first monitoring means for monitoring the operation of said storage means and issuing a first signal when said storage means has stored a predetermined amount of energy;

second monitoring means for monitoring the ECG signal produced by said detecting means and for detecting a preselected repeatable characteristic of the ECG signal, said monitoring means further including means for issuing a second signal each time said second monitoring means detects said preselected repeatable characteristic of the ECG signal;

third monitoring means for monitoring the ECG signal produced by said detecting means for activating said charging means in the presence of abnormal cardiac rhythm in need of correction; and

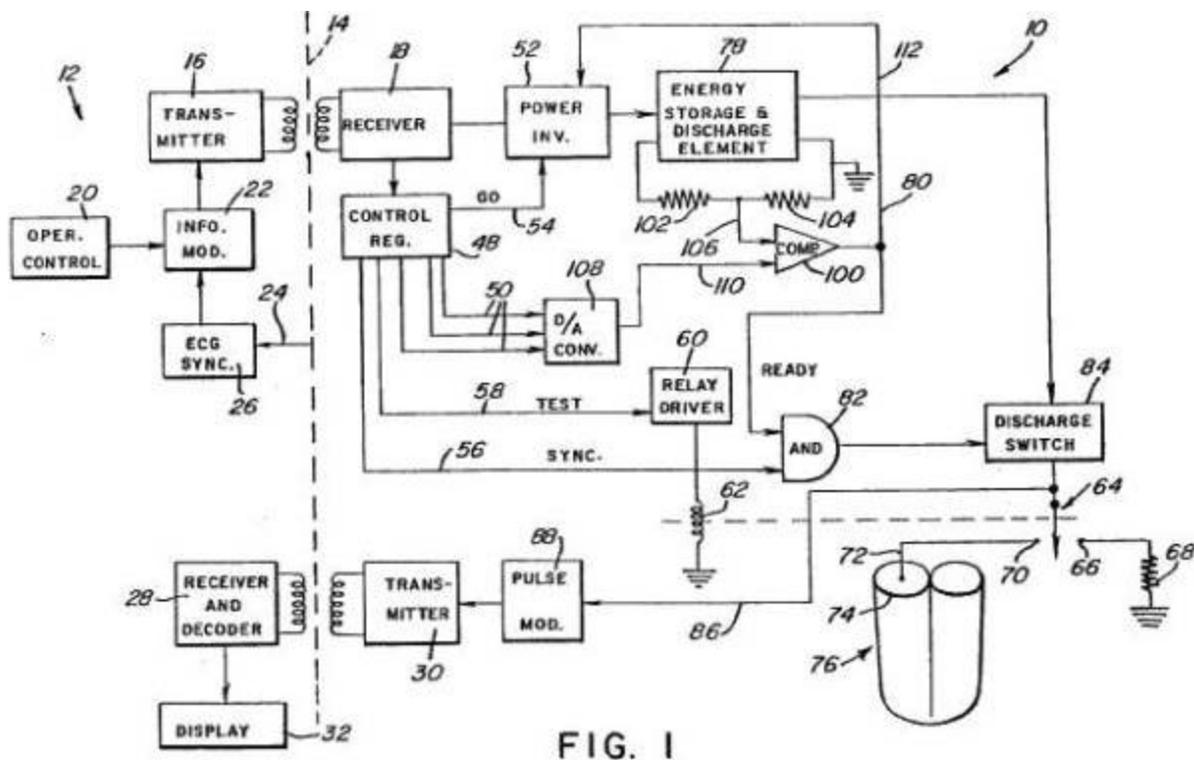
actuating means connected to said first and second monitoring means and requiring the simultaneous presence of said first and second signals at the time the stored energy is to be delivered to the heart of the wearer, said actuating means for actuating said switching means.

'191 Patent, col. 8, l. 56 to col. 9, l. 22 (emphasis added). The underscored claim language is

the “third monitoring means” limitation for which the district court found no corresponding structure.

The specification discloses two embodiments. In each embodiment, the defibrillator is implanted under the patient's skin. *Id.* at col. 1, ll. 47-48. The first embodiment is designed for operation by a doctor (the “physician embodiment”). *Id.* at col. 1, ll. 61-65. The second embodiment is designed for operation by the patient (the “patient embodiment”). *Id.* at col. 2, l. 23.

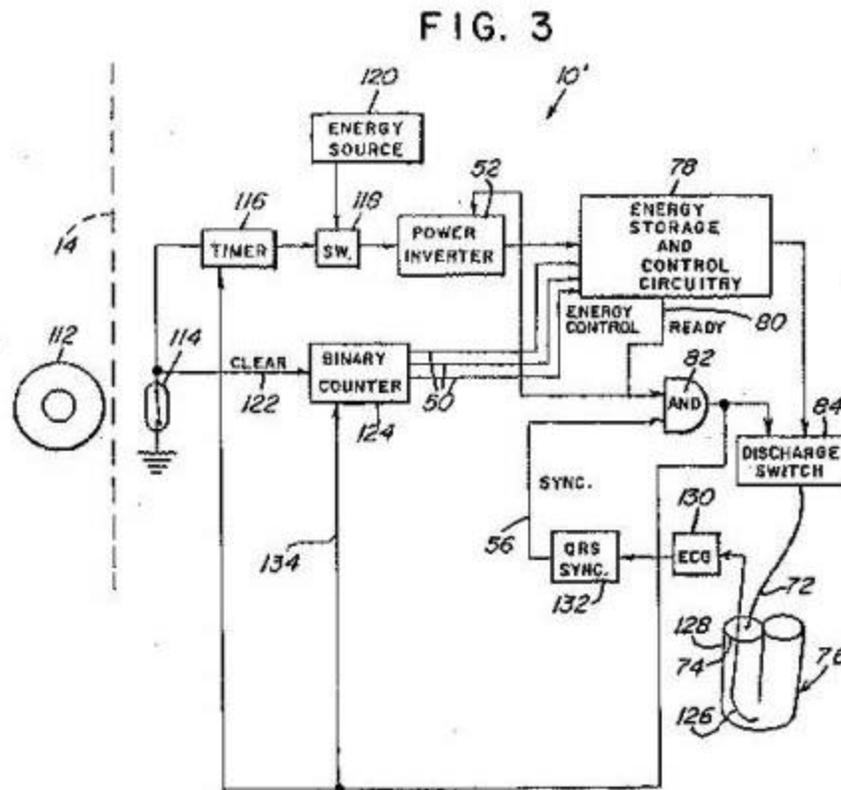
Figures 1 and 2 of the '191 patent, which appear below, pertain to the physician embodiment. *Id.* at col. 3, ll. 22–27, 35–36. Figure 1 is a block diagram of the physician embodiment. *Id.* at col. 3, ll. 22–24. Figure 2 depicts the physician's console, which is represented by the general area 12 in Figure 1. *Id.* at col. 3, ll. 25–27. These Figures appear as follows:





appropriate energy level, sets switch 38 to test load, and turns the on/off switch 34 to the on position. At this point the physician can observe the ECG signals representative of the QRS complex 44 on the display. The physician then presses the load data button 41. Pressing the load data button 41 transmits instructions regarding the energy level the physician has selected for discharge into the ailing heart to the control register 48. The power inverter 52 receives these instructions and charges the storage capacitor 78 to the selected energy level. Next, the physician depresses the discharge button 40 and the test load is shocked at the appropriate time during the QRS complex. The test load allows verification that the device is operating at the proper discharge level before actually shocking the heart. After this verification, the physician flips switch 38 from the test load to the catheter discharge position, and then presses the load data button 41 and then the discharge button 40 to deliver a pulse to the heart. The physician then observes the display screen 42, where the signal 46 representative of the delivery of an electrical shock appears. The physician observes the information on the display and determines whether cardioversion has been successful. If it has been unsuccessful, the physician repeats the attempt, perhaps after selecting a higher energy level.

In the second embodiment, the patient operates the defibrillator without the aid of a physician. Figure 3, which depicts the patient embodiment, appears below.



In the patient embodiment the entire device is implanted with the exception of a command magnet 112. When a patient in whom the device has been implanted recognizes that he or she is experiencing an arrhythmia the patient positions the command magnet 112 over the implanted reed switch 114. The magnet causes the reed switch 114 to close. Closing reed switch 114 delivers operating power to the timer 116, which is set with a preset delay. Upon expiration of the preset delay, the timer 116 commands switch 118 to close, allowing it to conduct energy, and energy is delivered from the implanted battery 120 to the power inverter 52. Closing reed switch 114 also causes a "clear" signal to reset binary counter 124. Once cleared, the binary counter 124 commands the power inverter 52 to charge the discharge capacitor 78 to its lowest predetermined energy level. When discharge capacitor 78 reaches that energy level, a "ready" signal is passed to AND gate 82. AND gate 82 also receives QRS synchronization pulses that are generated by circuit 132 from the ventricular catheter 126, which senses the heart function. When AND gate 82 receives both the "ready signal" and a QRS synchronization pulse, it switches discharge switch 84 to its conductive state, causing the discharge capacitor 78 to discharge through the patient's heart. The discharge sets binary

counter 124 to its second state, which represents a higher level of energy. The discharge also reinitiates the delay period of timer 116. This delay allows the patient to determine whether cardioversion was successful. If it was unsuccessful, the patient keeps the magnet 112 over the reed switch 114 and, once the preset delay elapses, switch 118 returns to its conductive state and binary counter 124 commands power inverter 52 to charge energy storage and discharge capacitor 78 to the higher energy level. When it reaches this energy level, capacitor 78 is once again discharged through the patient's heart in synchronization with the QRS complex.

On October 26, 1998, a non-party-competitor of Cardiac Pacemakers requested reexamination of the claims of the '191 Patent. The competitor argued that claims 1-14 of the '191 Patent were unpatentable due to double patenting. On April 6, 2000, the examiner confirmed the patentability of the claims without amendment, and deemed patentable new dependent claim 15. Claim 15 recites: "[t]he cardioverting device of claim 1, wherein said third monitoring means includes a display." '191 Patent, col. 2, ll. 8-9.

#### B. Procedural Background

Cardiac Pacemakers initiated the present suit on November 26, 1996, alleging that the defendants, St. Jude Medical, Inc., Pacesetter, Inc., and Ventritex, Inc. (together, "St. Jude") infringed three patents. Only the '191 patent is at issue in this appeal. On November 29, 2000, the district court issued an Entry on Claim Construction Issues, in which it construed the disputed limitations with the exception of the "third monitoring means." After holding an additional hearing, the district court issued a Supplemental Entry on Claim Construction Issues. In this Supplemental Entry, the court concluded that the "third monitoring means" limitation could not be construed "because no structure in the disclosed embodiments performs the functions as stated in the [sole independent] claim."

Following the court's claim construction ruling regarding the "third monitoring means" limitation, Cardiac Pacemakers and St. Jude stipulated that under the district court's construction, the claims of the '191 patent are invalid. The parties then jointly moved for entry of a final, appealable judgment. In response, the district court granted an Order of Partial Final

Judgment that claims 1-14 of the '191 patent are invalid for failure to satisfy the definiteness requirement of § 112, ¶ 2. This order expressly notes that “[t]he parties’ stipulation is without prejudice to plaintiffs’ right to appeal the court’s claim construction.”<sup>[2]</sup>

Cardiac Pacemakers so appeals. We have jurisdiction pursuant to 28 U.S.C. § 1295(a) (1).

On appeal, Cardiac Pacemakers contends that the specification adequately discloses structure corresponding to the “third monitoring means” for both the physician and the patient embodiments. This is so whether the limitation is interpreted to have one or two functions. In the physician embodiment, according to Cardiac Pacemakers, “the structure corresponding to the claimed functions can be discerned from two interpretive viewpoints.” The corresponding structure may be the external console 12, a single structure including the display, which monitors the ECG signal, and load data button, which activates the charging means. Alternatively, the display and load data button can be considered separate structures that correspond to the monitoring and activating functions, respectively. In the patient embodiment, Cardiac Pacemakers proffers only one interpretation of the corresponding structure. It contends that the QRS synchronization circuit 132 monitors, and that the timer 116 activates.

## II. STANDARD OF REVIEW

Claim construction is a matter of law, which we review *de novo*. Kemco Sales, Inc. v. Control Papers Co., Inc., 208 F.3d 1352, 1359-60, 54 USPQ2d 1308, 1312 (Fed. Cir. 2000) (citing Cybor Corp. v. FAS Techs., Inc., 138 F.3d 1448, 1451, 46 USPQ2d 1169, 1174 (Fed. Cir. 1998) (en banc)). This proposition applies with equal force to the interpretation of the scope and meaning of a means-plus-function limitation. J&M Corp. v. Harley-Davidson, Inc., 269 F.3d 1360, 1366, 60 USPQ2d 1746, 1750 (Fed. Cir. 2001) (citing Lockheed Martin Corp. v. Space Sys./Loral, Inc., 249 F.3d 1314, 1323, 58 USPQ2d 1671, 1677 (Fed. Cir. 2001)). Whether a limitation falls within § 112, ¶ 6 is likewise a question of law. Personalized Media Communications, LLC. v. Int’l Trade Comm’n, 161 F.3d 696, 702, 48 USPQ2d 1880, 1886 (Fed. Cir. 1998) (citing Mas-Hamilton Grp. v. LaGard, Inc., 156 F.3d 1206, 1213-14, 48 USPQ2d 1010, 1016-17 (Fed. Cir. 1998)). Finally, whether a claim is invalid for indefiniteness

pursuant to 35 U.S.C. § 112, ¶ 2, is also a question of law, and, as such, it is reviewed without deference. Id. (citing N. Am. Vaccine, Inc. v. Am. Cyanamid Co., 7 F.3d 1571, 1579, 28 USPQ2d 1333, 1339 (Fed. Cir. 1993)).

### III. DISCUSSION

As an initial matter we note that the parties agree, and the district court properly determined, that the “third monitoring means” limitation falls within § 112, ¶ 6. Use of the term “means” generally invokes § 112, ¶ 6, Lockheed Martin, 249 F.3d at 1324, 58 USPQ2d at 1678, and this claim's recitation of functional but not structural language keeps it within the statute's purview.

Construction of a means-plus-function limitation involves two steps. First, the court must identify the claimed function. Telemac Cellular Corp. v. Topp Telecom, Inc., 247 F.3d 1316, 1324, 58 USPQ2d 1545, 1549 (Fed. Cir. 2001) (citing Kemco, 208 F.3d at 1361, 45 USPQ2d at 1610); Micro Chem., Inc. v. Great Plains Chem. Co., Inc., 194 F.3d 1250, 1258, 52 USPQ2d 1258, 1263 (Fed. Cir. 1999). The court must construe the function of a means-plus-function limitation to include the limitations contained in the claim language, and only those limitations. Lockheed Martin, 249 F.3d at 1324, 58 USPQ2d at 1678. It is improper to narrow the scope of the function beyond the claim language. Id. It is equally improper to broaden the scope of the claimed function by ignoring clear limitations in the claim language. Id. Ordinary principles of claim construction govern interpretation of the claim language used to describe the function. Id.

After identifying the claimed function, the court must then determine what structure, if any, disclosed in the specification corresponds to the claimed function. Id. In order to qualify as corresponding, the structure must not only perform the claimed function, but the specification must clearly associate the structure with performance of the function. Medtronic, 248 F.3d at 1311, 58 USPQ2d at 1614 (quoting B Braun Med., Inc. v. Abbott Labs., 124 F.3d 1419, 1424, 43 USPQ2d 1896, 1900 (Fed. Cir. 1997)). This inquiry is undertaken from the perspective of a person of ordinary skill in the art. Amtel Corp. v. Info. Storage Devices, Inc., 198 F.3d 1374, 1378-79, 53 USPQ2d 1225, 1227-28 (Fed. Cir. 1999). Alternative embodiments may disclose

different corresponding structure, and the claim is valid even if only one embodiment discloses corresponding structure. See Ishida Co. v. Taylor, 221 F.3d 1310, 1316, 55 USPQ2d 1449, 1452-53 (Fed. Cir. 2000). If, however, this inquiry reveals that no embodiment discloses corresponding structure, the claim is invalid for failure to satisfy the definiteness requirement of § 112, ¶ 2. Budde v. Harley-Davidson, Inc., 250 F.3d 1369, 1376, 58 USPQ2d 1801, 1806 (Fed. Cir. 2001) (citing In re Dossel, 115 F.3d 942, 945, 42 USPQ2d 1881, 1884 (Fed. Cir. 1997)).

Cardiac Pacemakers' attempts to identify structure corresponding to the function of the "third monitoring means" limitation are in vain. As we explain below, the function identified by the claim language is dual: it requires the same means to monitor the ECG signal and to activate the charging means in the presence of abnormal cardiac rhythm. Because only the physician both monitors the ECG signal and activates the charging means in the presence of abnormal cardiac rhythm, and Cardiac Pacemakers concedes that the physician cannot be corresponding structure, the specification discloses no structure that corresponds to the claimed function. This renders the claim, and the claims depending from it, invalid for indefiniteness. This is so notwithstanding the presumption of validity, see S3 Inc. v. NVIDIA Corp., 259 F.3d 1364, 1367, 59 USPQ2d 1745, 1747 (Fed. Cir. 2001) ("The claims as granted are accompanied by a presumption of validity based on compliance with, inter alia, § 112, ¶ 2.") (citing Budde, 250 F.3d at 1376, 58 USPQ2d at 1806), and the issuance of dependent claim 15, in which the "third monitoring means" includes a display. Although it remains true that we will construe claims to preserve validity, if possible, see, e.g., Tate Access Floors, Inc. v. Interface Architectural Resources, Inc., 279 F.3d 1357, 1367, 61 USPQ2d 1647, 1654 (Fed. Cir. 2002), where the specification fails to disclose structure corresponding to the claimed function, it is impossible. As in this case, the claims are invalid.

#### A. The Claimed Function

The "third monitoring means" limitation reads as follows: "third monitoring means for monitoring the ECG signal produced by said detecting means for activating said charging means in the presence of abnormal cardiac rhythm in need of correction." Cardiac

Pacemakers contends that “[t]he language employed in the ‘third monitoring means’ limitation permits two alternative interpretations.” Under the first interpretation, the “third monitoring means” has only one function ? monitoring the ECG signal. Despite the fact that “for” generally signals a claimed function, under this interpretation, the language “for activating said charging means in the presence of abnormal cardiac rhythm in need of correction,” ‘191 patent col. 9, ll. 14 to 16, “merely states the purpose behind monitoring the ECG signal.” Cardiac Pacemakers’ counsel explained to the district court that, under this interpretation, the function would be defined as “monitoring the ECG signal produced by said detecting means so that said charging means can be activated in the presence of abnormal cardiac rhythm.” Under the second interpretation proffered by Cardiac Pacemakers, the “third monitoring means” has two functions: monitoring the ECG signal produced by the detecting means; and activating the charging means in the presence of abnormal cardiac rhythm in need of correction.

In this case, however, we do not find both interpretations of the claimed function equally plausible. The intrinsic evidence of record indicates that the third monitoring means performs dual functions. As the district court observed, the prosecution history contains references to the third monitoring means in which the applicant connected the “for monitoring” and “for activating” phrases with the conjunction “and.” Coupled with the general convention that “for” indicates a claimed function, these references from the prosecution history are sufficient to indicate that both clauses describe functions performed by the third monitoring means.

A series of amendments provides further support for this conclusion. During prosecution, the applicants, at one point, deleted the portion of the claim language reciting a “third monitoring means for monitoring the ECG signal produced by said detecting.” That amendment left intact the portion reciting “means for activating the charging means in the presence of abnormal cardiac rhythm in need of correction.” At the time of the amendment, therefore, the “activating” language must have constituted a claimed function because, without construing it as such, there would have been no claimed function. The reintroduction of the “monitoring” function to this means clause ? which was accomplished without underlining the

new material or otherwise calling the amended language to the examiner's attention pursuant to 37 C.F.R. § 1.121(2) ? did not render the “activating” language any less functional. In fact, at oral argument before both this court and the district court, Cardiac Pacemakers acknowledged that the prosecution history suggests that the third monitoring means performs two functions. We agree. Therefore, the “for activating” language refers to a function that the third monitoring means performs; it is not simply an explanatory reference to an unclaimed “purpose” for conducting the monitoring function.

Moreover, the language of the “third monitoring means” does not merely recite dual functions; it also requires the same means to perform them both. The language of the limitation at issue does not refer to “a means for doing x and y.” In such a case, the claim could potentially be ambiguous about whether the limitation required one means for performing both functions x and y, or simply one means for performing function x and one (potentially different) means for performing function y. Cf. Medtronic, 248 F.3d at 1313, 58 USPQ2d at 1615 (noting that a structure may perform two functions, and a single function may be performed by two structures, but that there must be a clear link between the claimed function and the corresponding structure). Here, however, the language of the claim compels the conclusion that the same means must perform both functions. The limitation at issue claims a “third monitoring means for monitoring . . . [and] for activating. . . .” '191 patent, col. 9, ll. 13 to 15 (emphasis added). The word “means” in a means-plus-function limitation is a generic term used to denote the corresponding structure. Chiuminatta Concrete Concepts Inc. v. Cardinal Indus. Inc., 145 F.3d 1303, 1308, 46 USPQ2d 1752, 1755-56 (Fed. Cir. 1998) (“[T]he 'means' term in a means-plus-function limitation is essentially a generic reference for the corresponding structure disclosed in the specification.”). Consequently, the claim at issue requires a monitoring means that activates. An alternative construction would render the first “monitoring” term meaningless. That construction is therefore improper; this court will not rewrite claims. Rhine v. Casio, Inc., 183 F.3d 1342, 1345, 51 USPQ2d 1377, 1379 (Fed. Cir. 1999). Consequently, we hold that in order to adequately disclose structure corresponding to the “third monitoring means” limitation, the specification must disclose a structure that both

monitors the ECG signal and activates the charging device in the presence of abnormal cardiac rhythm.

B. Corresponding Structure

Turning to the intrinsic evidence, it is clear that neither embodiment of the invention contains structure corresponding to the third monitoring means, with its dual functions. Indeed, there is only one entity referenced in the specification that could possibly both monitor the ECG signal and activate the charging means in the presence of abnormal cardiac rhythm: the physician. Cardiac Pacemakers concedes that the physician is plainly not structure corresponding to the claimed cardioverting device. Because Cardiac Pacemakers has waived any argument to the contrary, the physician cannot constitute corresponding structure. But because the specification fails to disclose a corresponding structure that performs both claimed functions other than the physician, the claim fails for indefiniteness.

The written description indicates that the claimed invention facilitates external monitoring.

The Summary of The Invention states:

Additional objects of the present invention are to provide an implanted device . . . whose discharges can be monitored from external to the skin of the patient.

'191 patent, col. 2, l. 67 to col. 3, l. 7 (emphasis added). In the disclosed embodiments, the physician, who is external to the patient, monitors the discharges representative of the ECG activity of the patient's heart. No such monitoring occurs in the patient embodiment.

It is clear that the patient embodiment contains no structure corresponding to the functions of the "third monitoring means." Cardiac Pacemakers contends that QRS synchronization circuit 132 monitors and timer 116 activates. It does not contend that the same means performs these dual functions in the patient embodiment. In fact, this embodiment lacks any means to facilitate external monitoring because in that embodiment everything except the activation magnet is implanted. The specification's reference to external monitoring negates any link between the internal QRS synchronization circuit 132 and the claimed monitoring function. Moreover, the activating function occurs when the patient senses abnormal cardiac rhythm. He or she activates the defibrillator (including the charging means)

by holding the magnet over the implanted device. This activation would occur even if the timer were not present. The timer therefore cannot properly be considered structure corresponding to the activating means. See *Asyst Techs., Inc. v. Empak, Inc.*, 268 F.3d 1364, 1370, 60 USPQ2d 1567, 1571 (Fed. Cir. 2001) ("Structural features that do not actually perform the recited function do not constitute corresponding structure and thus do not serve as claim limitations.") (citing *Chiuminatta*, 145 F.3d at 1308-09, 46 USPQ2d at 1755-56).

In the physician embodiment, additional portions of the specification demonstrate that the physician performs the monitoring and activating functions claimed in the "third monitoring means." A visual display allows the physician to monitor the patient's ECG activity. With reference to Figures 1 and 2, depicting the physician embodiment, the written description explains:

Console 12 includes circuitry for transmitting power and control information to the implanted device for receiving information about the nature of the cardioverting pulses from the implanted device as well as signals from other cardiac equipment, and for visually displaying selected cardiac information.

Id., col. 3, ll. 39 to 45 (emphasis added). The visually displayed information includes:

a cathode ray tube 42 shown as simultaneously displaying the periodic QRS complex 44 and, in broken lines, the discharge of the implanted storage capacitor.

Id., col. 4, ll. 37 to 40. The physician embodiment is thus set up to allow the physician to monitor the visually displayed ECG signals, and to activate the charging means by pressing the load data button when the physician determines the presence of abnormal cardiac rhythm so requires. The written description confirms:

At this time the unit is functional, with energy being transmitted to the implanted circuitry, and with ECG signals being displayed on the display device 32 as shown at 44. The physician then presses the load-data button 41 to transmit the instructions regarding the level of the discharge pulse to the implanted unit at which time the energy storage capacitor is charged to the desired level. When ready, the "discharge" button 40 is depressed, and either the test load or the heart is shocked at the proper time during the QRS complex. The test load is, of course, intended to verify attaining the proper level of discharge before a shock is actually applied to the heart. When the discharge level is verified, the physician simply moves switch 38 to the catheter position, presses the load-data button and then the "discharge" button 40 to deliver a pulse to the heart. Once a shock is actually applied to the heart, the physician observes the screen of CRT 42, and either concludes his activity if cardioversion is successful, or repeats the cardioverting attempt at perhaps a higher energy level if unsuccessful.

'191 patent, col. 4, l. 53 to col. 5, l. 5 (emphasis added).

Thus, the written description would indicate to one skilled in the art that only the physician both monitors the ECG signals and activates the charging means by pressing the load-data button in the presence of abnormal cardiac rhythm. No language describes any structure in either embodiment of the invention that both monitors and activates.

Cardiac Pacemakers attempts to escape this result by arguing that certain of this court's cases indicate that multiple disclosed structures can perform a single claimed function, and by citing several cases involving means-plus-function limitations in which the disclosed structure performed the claimed function only with human input. From these cases Cardiac Pacemakers concludes that the physician embodiment discloses corresponding structure because the display "monitors" and the load-data button "activates." But these cases do not lead to this conclusion.

First, although it is indeed true as a general proposition that multiple structures can perform a single claimed function, this is so only where the claim language permits, and only where the specification clearly identifies corresponding structures. Thus, in In re Knowlton, this court's predecessor reversed an indefiniteness rejection that appeared to be predicated on the misconception that each means-plus-function limitation "can only be read on a single mechanical element of the invention which performs the recited function without aid from other elements of the invention." 481 F.2d 1357, 1368, 178 USPQ 486, 494 (CCPA 1973) (emphasis in original). Instead, the court concluded that "the application describes and identifies apparatus combinations which perform each of the functions called for by the means-plus-function recitations of the claims, and further describes how those combinations are made, and that therefore the claims are adequately supported by the specification." Id. (emphasis added). In light of the emphasized language, we understand Knowlton to stand not for the proposition that multiple structures may always perform a single function claimed in a means-plus-function limitation, but rather that multiple structures may correspond to a single claimed function in certain instances, where the claim language permits. See also Ishida, 221

F.3d at 1317, 55 USPQ2d at 1454 (construing the claims to cover separate structures for performing "stripping" and "sealing" functions in means-plus-function limitation reciting "[a] pair of opposing sealing and stripping means . . . being adapted to cooperate. . .") (emphasis added). As we have already explained, in this instance, the claim language does not permit separate structures to perform the dual functions recited in the "third monitoring means."

The cases *Cardiac Pacemakers* cites in which certain means-plus-function limitations seem to have required human input also fail to support its argument that the specification discloses structure corresponding to the "third monitoring means." In making this argument, *Cardiac Pacemakers* relies primarily on *Texas Instruments, Inc. v. United States International Trade Commission*, 805 F.2d 1558, 231 USPQ 833 (Fed. Cir. 1986), and *Smith Industries Medical Systems v. Vital Signs, Inc.*, 183 F.3d 1347, 51 USPQ2d 1415 (Fed. Cir. 1999), to support its contention that although the physician observes the ECG signals and presses the load-data button, that does not convert the physician into corresponding structure. In *Texas Instruments* this court affirmed a finding of noninfringement, where the patent claimed, among other things, an "input means including a keyboard for entering digits of numbers and arithmetic commands" into the claimed calculator. 805 F.2d at 1560-61, 231 USPQ 833, 834. In *Smith Industries*, this court reversed a finding of obviousness and noninfringement on certain claims of a patent that recited, among other things, "a means for supplying gas." 183 F.3d at 1352-58, 51 USPQ2d at 1418-21. The specification disclosed a squeezebag for performing the function of "supplying gas." *Id.* at 1358, 51 USPQ2d at 1422. *Cardiac Pacemakers* argues that these limitations were not invalid simply because a human actually input data using the keyboard in *Texas Instruments* or supplied gas by squeezing the squeezebag in *Smith Industries*.

This argument is inapplicable to the "third monitoring means." First, neither *Texas Instruments* nor *Smith Industries* involved challenges to validity based upon indefiniteness. Second, assuming the means-plus-function limitations at issue in those cases satisfied the requirements of § 112, ¶ 2, that fails to contravene what the intrinsic evidence makes clear in this case: the "third monitoring means" requires the same means to monitor the ECG signals

and to activate the charging means in the presence of abnormal cardiac rhythm. Statements from the prosecution reinforce this conclusion. For example, Cardiac Pacemakers informed the examiner that:

As claimed, the cardioverting device senses abnormal cardiac activity and in response to its detection, starts to charge the storage device in order to store the energy necessary for conversion of an abnormal cardiac rhythm to normal sinus rhythm.

Excluding the physician, no structure accomplishes the claimed monitoring of ECG signals and activation of the charging means in the presence of abnormal cardiac rhythm. It is insufficient that the specification discloses structure that enables the physician to perform the claimed functions. Because no structure disclosed in the embodiments of the invention actually performs the claimed dual functions, the specification lacks corresponding structure.

It remains true, of course, that corresponding structure need not include all things necessary to enable the claimed invention to work. It is equally true, however, that corresponding structure must include all structure that actually performs the recited function. See Asyst, 268 F.3d at 1371, 60 USPQ2d at 1571-72. In Asyst, this court emphasized that the determination of what structure corresponds to a claim function is contingent upon the language of the claims. Id. at 1372, 60 USPQ2d at 1573. After holding that the structure disclosed in the specification did not correspond to certain means-plus-function limitations, we explained:

The language of [the "fourth means"] limitation is significantly different. . . . The "fourth means" assigns two functions to the means ? controlling activities on the workstation and transmitting information to the transportable container. The written description makes clear that the first function is performed by the local process controller 20 and the second function is performed by the communication means 50. The "means" that performs those two functions therefore consists of the entire complex comprising local process controller 20 and communication means 50. Because the "fourth means" encompasses both the local process controller 20 and the communication means 50, it also necessarily encompasses structure that connects the two, i.e., communication line 51.

Id. (emphasis added). A person of ordinary skill in the art would understand that, apart from the physician, no structure connects the two functions. Therefore, the external console, which includes both the display and the load-data button, is insufficient corresponding structure. The

physician monitors the ECG signal by observing the display and activates the charging means by pressing the load-data button. The display certainly does not activate the charging means, nor does the load-data button monitor the ECG signals.

#### IV. CONCLUSION

Because the district court correctly concluded that the specification fails to disclose structure corresponding to the "third monitoring means," the district court's judgment invalidating claims 1-14 the '191 patent for indefiniteness is,

AFFIRMED.

No costs.

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[1] The written description refers to the display as 32; however, Figure 2 improperly labels the display as duplicate element 34.

[2] Although dependent claim 15 was added to the '191 patent on reexamination on April 6, 2000, claim 15 was not included in the parties' joint stipulation or in the district court's order of partial final judgment with respect to the '191 patent. Consequently, our holding is limited, as a technical matter, to claims 1-14.