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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte KENNETH HEIDT MATTHEWS, BEN JOHN IVERSON,
ANDREW DAVID VOS, and CHRISTOPHER RAY BELL

Appeal 2019-006219
Application 15/313,325
Technology Center 2800

Before JEFFREY T. SMITH, MERRELL C. CASHION, JR., and
JANE E. INGLESE, *Administrative Patent Judges*.

INGLESE, *Administrative Patent Judge*.

DECISION ON APPEAL

Appellant¹ requests review under 35 U.S.C. § 134(a) of the Examiner's final rejection of claims 1–3, 5–13, and 16–22.² We have jurisdiction under 35 U.S.C. § 6(b).

We AFFIRM IN PART.

¹ We use the word “Appellant” to refer to the “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies Halliburton Energy Services, Inc. as the real party in interest. Appeal Brief filed April 26, 2019 (“Appeal Br.”) at 3.

² Final Office Action entered December 14, 2018 (“Final Act.”) at 1.

CLAIMED SUBJECT MATTER

Appellant claims a paddle (independent claim 1), an assembly (independent claim 11), and a method (independent claim 17). Appeal Br. 4–5. Claims 1 and 17 illustrate the subject matter on appeal, and read as follows:

1. A paddle, comprising:
 - a central shaft* having a first end and a second end; one or more lateral blades extending laterally from the central shaft, each lateral blade including a geared end positioned adjacent the central shaft and a distal end opposite the geared end, wherein each lateral blade provides a blade gear at the geared end; and
 - a drive shaft movably positioned within the central shaft* and operatively coupled to the one or more lateral blades such that rotation of the drive shaft about a central axis rotates the one or more lateral blades about a corresponding one or more blade axes, the one or more lateral blades being movable between a horizontal position and a vertical position.

17. A method, comprising:
 - rotating a canister within a pressure vessel, the canister having a paddle positioned therein that includes a central shaft, one or more lateral blades extending laterally from the central shaft, and a drive shaft movably positioned within the central shaft and operatively coupled to the one or more lateral blades;
 - stirring a fluid composition present within the canister with the paddle as the canister rotates;
 - rotating the drive shaft about a central axis with one or more drivers operatively coupled to the drive shaft and thereby rotating the one or more lateral blades about a corresponding one or more blade axes* of the one or more lateral blades; and
 - measuring torque assumed by the one or more drivers via the drive shaft with one or more torque sensors operatively

coupled to the one or more drivers to measure torque assumed by the one or more drivers.

Appeal Br. 16, 18–19 (Claims Appendix) (emphasis added).

REJECTIONS

The Examiner maintains the following rejections in the Examiner’s Answer entered June 27, 2019 (“Ans.”):

I. Claims 1–3 and 6–9 under 35 U.S.C. § 102(a)(1) as anticipated by Callanen;³

II. Claims 5 and 10 under 35 U.S.C. § 103 as unpatentable over Callanen; and

III. Claims 11–13 and 16–22 under 35 U.S.C. § 103 as unpatentable over Ruyak⁴ in view of Callanen.

FACTUAL FINDINGS AND ANALYSIS

Upon consideration of the evidence relied upon in this appeal and each of Appellant’s contentions, we affirm the Examiner’s rejection of claims 1–3 and 6–8 under 35 U.S.C. § 102(a)(1), and rejections of claims 5, 11–13, and 16–22 under 35 U.S.C. § 103, for the reasons set forth in the Final Action, the Answer, and below. We reverse the Examiner’s rejection of claim 9 under 35 U.S.C. § 102(a)(1), and rejection of claim 10 under 35 U.S.C. § 103, for the reasons set forth in the Appeal Brief and below.

We review appealed rejections for reversible error based on the arguments and evidence the Appellant provides for each issue the Appellant identifies. 37 C.F.R. § 41.37(c)(1)(iv); *Ex parte Frye*, 94 USPQ2d 1072,

³ US 2,905,451, issued September 22, 1959.

⁴ US 4,466,276, issued August 21, 1984.

1075 (BPAI 2010) (precedential) (*cited with approval in In re Jung*, 637 F.3d 1356, 1365 (Fed. Cir. 2011) (explaining that even if the Examiner had failed to make a prima facie case, “it has long been the Board’s practice to require an applicant to identify the alleged error in the examiner’s rejections”)).

Rejection I

We first address the Examiner’s rejection of claims 1–3 and 6–9 under 35 U.S.C. § 102(a)(1) as anticipated by Callanen.

Appellant presents arguments directed to independent claim 1, and to claim 9, which depends from claim 1. Appeal Br. 6–11. We, therefore, limit our discussion to claims 1 and 9, and the remaining claims subject to this rejection (claims 2, 3, and 6–8) stand or fall with claim 1. 37 C.F.R. § 41.37(c)(1)(iv).

Claims 1–3 and 6–8

The Examiner finds that Callanen discloses a paddle comprising central shaft 22 having a first end and a second end; one or more lateral blades 64, 164, 264, 364 that each extend laterally from central shaft 22 and include a geared end positioned adjacent central shaft 22 and a distal end opposite the geared end, where lateral blades 64, 164, 264, 364 provide blade gears 62, 162, 262, 362, respectively, at each geared end; and drive shaft 22 movably positioned within central shaft 22 and operatively coupled to one or more of lateral blades 64, 164, 264, 364, such that rotation of drive shaft 22 about a central axis rotates one or more of lateral blades 64, 164, 264, 364 about a corresponding one or more blade axes, one or more lateral blades 64, 164, 264, 364 being movable between a horizontal position and a vertical position. Final Act. 2 (citing Callanen col.

3, l. 48–col. 4, l. 31; Fig. 1).

Appellant argues that the Examiner “has interpreted the mixing structure of Callanen to be equated to the claimed paddle.” Appeal Br. 8. Appellant argues that the preamble of claim 1 recites a “paddle,” which “does not merely recite a purpose or intended use of a structure.” *Id.* Appellant argues that the Examiner “is ignoring the preamble of the claim and, in doing so, is incorrectly equating a container [Callanen’s mixing vessel 10] in which a paddle may be used with a portion of the paddle itself.” *Id.*

We point out initially that the Examiner does not mention Callanen’s mixing vessel 10 in the rejection of claim 1 as set forth in the Final Action. Final Act. 2. Consequently, on the record before us, we find no indication that the Examiner equates Callanen’s mixing vessel 10 with the paddle recited in claim 1, as Appellant asserts. Indeed, the Examiner explains in the Answer that “[t]he Examiner is clear that one of ordinary skill in the art would not attempt to use an entire mixing vessel as a paddle.” Ans. 3.

Furthermore, although recitation of “a paddle” in the preamble of claim 1 may “not merely recite a purpose or intended use of a structure” as Appellant argues, this recitation nonetheless does not add any structural limitations to claim 1 beyond those recited in the body of the claim. In other words, recitation of “[a] paddle” in the preamble of claim 1 does not set forth any particular structural element or elements that serve the limit the scope of claim 1.

As discussed above, the Examiner finds that Callanen discloses each element set forth in the body of claim 1, and the Examiner does not rely on Callanen’s mixing vessel 10 as corresponding to one of the recited elements.

Appellant's arguments, therefore, do not identify reversible error in the Examiner's rejection of claim 1.

Appellant argues that Callanen does not disclose a drive shaft movably positioned within a central shaft, and instead discloses single shaft 22. Appeal Br. 10. Appellant argues that the Examiner improperly construes shaft 22 as both the central shaft and the drive shaft recited in claim 1. *Id.*

In response to Appellant's arguments, the Examiner explains in the Answer that, in the Final Action, "the Office Action incorrectly identifies both the central shaft and the drive shaft as element 22." Ans. 4. The Examiner finds, however, that "it can be readily seen from Figure 1 of Callanen that a drive shaft, 22, rotates within a central shaft structure which encloses the drive shaft and supports the blade structures." *Id.*

Consistent with the Examiner's findings, Callanen discloses mixing vessel 10 formed by wall 12, bottom 14, and cover member 16. Callanen col. 3, ll. 48–54; Fig. 1. Callanen discloses that shaft 22 extends through aperture 24 in cover member 16 of vessel 10 through thrust collar 26. Callanen col. 3, ll. 56–58; Fig. 1. Callanen discloses that a gear train assembly is supported within vessel 10 by adapter sleeve 52 having shoulder 56 that abuts against bottom collar 58. Callanen col. 4, ll. 5–7; Fig. 1. Callanen discloses that "[c]ollar 58 has an inner central aperture 60 conforming to the outer shape of shaft 22 . . . so that collar 58 may be dropped on the shaft and will rotate in either direction with the rotation of the shaft." Callanen col. 4, ll. 7–11; Fig. 1.

Callanen discloses that bevel spur gears 62 are "[r]otatably mounted and outwardly extending from collar 58," and "[e]ach spur gear 62 carries,

attached to its flat end surface, an impeller blade 64.” Callanen col. 4, ll. 11–15; Fig. 1. Callanen discloses that “[s]haft 22 next carries a double bevel gear 66 having gear surfaces 68 and 70.” Callanen col. 4, ll. 15–17 Fig. 1. Callanen discloses that “bevel gear 68 is rotatably mounted on shaft 22 by means of sleeve bearing 72 which fits the shaft in a non-rotating relationship providing outer sliding or bearing surface 74.” Callanen col. 4, ll. 19–21; Fig. 1. Callanen discloses that the “next collar 158 carries spur gears 162 and impeller blades 164 in an identical arrangement engaging ring gear surface 68 of double bevel gear 66.” Callanen col. 4, ll. 22–24; Fig. 1. Callanen discloses that “[a]ny number of such epicyclic gear arrangements may be assembled in shaft 22 to include double bevel gear 166, sleeve bearing 172, collar 258, bevel spur gears 262, impellers 264, sleeve bearing 272; double bevel gear 266, collar 358, bevel spur gears 362 and impellers 364.” Callanen col. 4, ll. 24–29; Fig. 1. Callanen discloses “top-most bevel gear 76 having circumferential bevel ring gear surface 78 is carried on shaft 22 by means of sleeve bearing 80, being similar to bearings 72 but of lesser depth.” Callanen col. 4, ll. 32–35; Fig. 1. Callanen thus discloses shaft 22 (drive shaft) movably positioned within collar 58, sleeve bearing 72, collar 158, sleeve bearing 172, collar 258, sleeve bearing 272, collar 358, and sleeve bearing 80.

Appellant argues in the Reply Brief that Callanen discloses “single shaft [22] surrounded by gears, collars, and sleeve bearings,” and “[i]t is improper for the Examiner to construe a central shaft as a series of gears, collars, and sleeve bearings.” Reply Br. 5.

Claim 1, however, does not preclude the recited paddle from including more than one central shaft, due to the “comprising” transitional phrase

recited in the claim. *Gillette Co. v. Energizer Holdings, Inc.*, 405 F.3d 1367, 1371–72 (Fed. Cir. 2005) (“The word ‘comprising’ transitioning from the preamble to the body signals that the entire claim is presumptively open-ended.”). Callanen’s shaft 22 corresponds to a drive shaft as recited in claim 1, and collar 58, which “has an inner central aperture 60 conforming to the outer shape of shaft 22 . . . so that collar 58 may be dropped on the shaft and will rotate in either direction with the rotation of the shaft,” corresponds to a central shaft as recited in claim 1 because shaft 22 (drive shaft) is movably positioned within collar 58 (central shaft). Callanen col. 4, ll. 7–11; Fig. 1. Similar to collar 58, sleeve bearing 72, collar 158, sleeve bearing 172, collar 258, sleeve bearing 272, collar 358, and sleeve bearing 80 also each correspond to a central shaft as recited in claim 1 because shaft 22 (drive shaft) is movably positioned within each of these elements.

Appellant’s arguments, therefore, do not identify reversible error in the Examiner’s rejection of claims 1–3 and 6–8 under 35 U.S.C. § 102(a)(1) as anticipated by Callanen, which we accordingly sustain.

Claim 9

Claim 9 recites that the paddle of claim 1 further comprises a base positioned at the second end of the central shaft, and opposing sidewall blades extending vertically from the base.

The Examiner finds that “Callanen teaches a base (14) positioned at the second end of the central shaft; and opposing sidewall blades (12) extending vertically from the base.” Final Act. 3 (citing Callanen col. 3, ll. 48–62; Fig. 1).

As Appellant points out (Appeal Br. 10–11), however, and as discussed above, Callanen discloses mixing vessel 10 formed by wall 12,

bottom 14, and cover member 16. Callanen col. 3, ll. 48–54; Fig. 1.

Callanen discloses that shaft 22 (drive shaft) extends through aperture 24 in cover member 16, and discloses impeller blades 64, 164, 264, 364 (lateral blades), collar 58, sleeve bearing 72, collar 158, and sleeve bearing 80 (central shaft) disposed within mixing vessel 10. Callanen Fig. 1.

On the record before us, the Examiner does not identify any disclosure in Callanen indicating that wall 12 of mixing vessel 10 functions as a sidewall blade. Nor does the Examiner provide technical reasoning that explains why one of ordinary skill in the art would have understood Callanen’s wall 12 of mixing vessel 10 to correspond to a “sidewall blade” as this term is used in Appellant’s Specification. *See e.g.*, Spec. ¶ 23. *In re ICON Health and Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007) (During prosecution of patent applications, “the PTO must give claims their broadest reasonable construction consistent with the specification. . . . Therefore, we look to the specification to see if it provides a definition for claim terms.”); *TF3 Ltd. v. Tre Milano, LLC*, 894 F.3d 1366, 1372 (Fed. Cir. 2018) (“[I]t is not reasonable to read the claims more broadly than the description in the [S]pecification.”).

Consequently, the Examiner does not provide a sufficient factual basis to establish that Callanen discloses a paddle including opposing sidewall blades extending vertically from a base, as recited in claim 9. We, accordingly, do not sustain the Examiner’s rejection of claim 9 under 35 U.S.C. § 102(a)(1) as anticipated by Callanen.

Rejection II

We turn now to the Examiner’s rejection of claims 5 and 10 under 35 U.S.C. § 103 as unpatentable over Callanen.

Claim 5

Claim 5 depends from claim 2, which depends from claim 1 and recites that “the one or more lateral blades are grouped into one or more blade sets, each blade set including at least one lateral blade and being spaced from any adjacent blade sets along an axial height of the central shaft.” Claim 5 recites that “the one or more blade sets includes at least two blade sets, and wherein the at least two blade sets are angularly offset from each other about an outer circumference of the central shaft.”

The Examiner finds that Callanen discloses at least two blade sets, but “does not explicitly teach wherein the at least two blade sets are angularly offset from each other about an outer circumference of the central shaft.” Final Act. 4 (citing Callanen col. 4, ll. 11–31; Fig. 1). The Examiner determines, however, that “this would appear to be a simple matter of rearranging the blade sets to a known configuration and therefore it would be obvious to one having ordinary skill in the art at the time the invention was filed to offset the blade sets with predictable results.” Final Act. 4.

Appellant argues that the Examiner “never takes Official Notice and provides no support for this conclusory assessment” that claim 5 “encompass[es] a ‘simple structure change’ that would be obvious.” Appeal Br. 11.

An obviousness analysis takes into consideration not only the disclosures of the prior art, but also whether “the differences between the claimed invention and the prior art are such that the claimed invention as a whole would have been obvious . . . to a person having ordinary skill in the art to which the claimed invention pertains.” 35 U.S.C. § 103. Whether “differences” between the claimed invention and the prior art would have

rendered a claimed invention obvious to one of ordinary skill in the art necessarily depends on such an artisan's knowledge. *Dow Jones & Co. v. Abblaise Ltd.*, 606 F.3d 1338, 1349, 1353 (Fed. Cir. 2010) (the obviousness "analysis requires an assessment of the ' . . . background knowledge possessed by a person having ordinary skill in the art'" (quoting *KSR Int'l Co. v. Teleflex, Inc.*, 550 U.S. 398, 401 (2007))); *see also Randall Mfg. v. Rea*, 733 F.3d 1355, 1362–63 (Fed. Cir. 2013) (determining that "[a]s *KSR* established, the knowledge of such an artisan is part of the store of public knowledge that must be consulted when considering whether a claimed invention would have been obvious").

A person of ordinary skill in the art is "not an automaton," and an obviousness analysis, therefore, "need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *KSR*, 550 U.S. at 418; *see also ClassCo, Inc. v. Apple, Inc.*, 838 F.3d 1214, 1219 (Fed. Cir. 2016) ("The rationale of *KSR* does not support [the] theory that a person of ordinary skill can only perform combinations of a puzzle element A with a perfectly fitting puzzle element B."); *see also In re Preda*, 401 F.2d 825, 826 (CCPA 1968) ("[I]t is proper to take into account not only specific teachings of the reference but also the inferences which one skilled in the art would reasonably be expected to draw therefrom.").

Callanen discloses a mixing device that includes "a series of spaced horizontal impeller blades in a plurality of planes perpendicular to the supporting shaft." Callanen col. 1, ll. 15–23; col. 2, ll. 1–7. Callanen discloses that "[a]ny combination of numbers and arrangements of impellers

may be used,” but “it is preferred that at least two of the spur gears on each collar carry impellers and that these be oppositely positioned, that is, at 180° from each other.” Callanen col. 6, ll. 54–59. Callanen discloses that such pairs of imposed impeller blades may be “located in relation to each other [so] that at any one moment in their rotation they pass the next lower or upper impeller, on the same side position relative to the supporting shaft.” Callanen col. 6, ll. 59–63.

In view of these disclosures in Callanen, and taking into the consideration the exemplary mixing device illustrated in Callanen’s Figure 1, one of ordinary skill in the art would have recognized that two possibilities exist for the relative positioning of opposed impeller blade pairs along the vertical supporting shaft of Callanen’s mixing device. The impeller blade pairs could either be arranged so that they align exactly with each other about an outer circumference of the vertical supporting shaft, or could be arranged so that they are angularly offset from each other about an outer circumference of the vertical supporting shaft, as recited in claim 5.

Notably, claim 5 does not specify any particular degree of angular offset, and, therefore, encompasses impeller blade pairs that are angularly offset from each other by any degree about an outer circumference of the vertical supporting shaft. On the record before us, Appellant does not direct us to any objective evidence establishing that the configuration of blade sets recited in claim 5 serves a unique or critical function or purpose. Nor does Appellant direct us to any showing—such as factual data—demonstrating that the recited arrangement achieves results that would have been unexpected by one of ordinary skill in the art at the time of Appellant’s invention relative Callanen’s device, the closest prior art. *In re Woodruff*,

919 F.2d 1575, 1578 (Fed. Cir. 1990) (Explaining that Appellants can evince the criticality of a feature of the claimed invention, “generally by showing that the claimed [feature] achieves unexpected results relative to the prior art” feature.)

Accordingly, due to lack of any evidence to the contrary on the record before us, developing a suitable arrangement for the impeller blade pairs in Callanen’s device, such as the configuration recited in claim 5, would have involved nothing more than ordinary skill and creativity at the time of Appellants’ invention. *KSR*, 550 U.S. at 418.

We, accordingly, sustain the Examiner’s rejection of claim 5 under 35 U.S.C. § 103 as unpatentable over Callanen.

Claim 10

Claim 10 depends from claim 9. We reverse the Examiner’s rejection of claim 10 because the Examiner does not rely on any disclosure in Callanen in the rejection of claim 10 that remedies the deficiencies of the Examiner’s reliance on Callanen in the rejection of claim 9, discussed above. Final Act. 4–5.

Rejection III

Finally, we turn to the Examiner’s rejection of claims 11–13 and 16–22 under 35 U.S.C. § 103 as unpatentable over Ruyak in view of Callanen.

Appellant separately argues each of independent claims 11 and 17, and does not present arguments directed to any of the dependent claims subject to this ground of rejection. Appeal Br. 12–13. We, therefore, limit our discussion to independent claims 11 and 17, and dependent claims 12, 13, 16, and 18–22 stand or fall with the independent claim from which they

depend. 37 C.F.R. § 41.37(c)(1)(iv).

Claims 11–13 and 16

To address the rejection of claim 11, Appellant repeats the argument that Appellant presents for claim 1 (discussed above) that Callanen does not disclose a paddle including a central shaft and lateral blades, and “instead discloses a mixing vessel and a shaft and lateral blades.” Appeal Br. 12. Appellant argues that because Callanen lacks disclosure of a paddle including a central shaft and lateral blade, modifying Ruyak’s consistometer with blades 164, 264, 364 and shaft 22 of Callanen’s mixing vessel as proposed by the Examiner “still fails to disclose or suggest a drive shaft movably positioned within the central shaft of a paddle and still fails to disclose or suggest Appellant’s claimed paddle within a canister.” *Id.*

As discussed above, however, Callanen discloses shaft 22 (drive shaft) movably positioned within collar 58, sleeve bearing 72, collar 158, sleeve bearing 172, collar 258, sleeve bearing 272, collar 358, and sleeve bearing 80 (central shafts), as recited in claim 11. As also discussed above, Callanen discloses mixing vessel 10 (canister) formed by wall 12, bottom 14, and cover member 16. Callanen discloses that shaft 22 (drive shaft) is disposed within mixing vessel 10 (canister), along with impeller blades 64, 164, 264, 364 (lateral blades), and collar 58, sleeve bearing 72, collar 158, sleeve bearing 172, collar 258, sleeve bearing 272, collar 358, and sleeve bearing 80 (central shaft), as recited in claim 11.

We, accordingly, sustain the Examiner’s rejection of claims 11–13 and 16 under 35 U.S.C. § 103 as unpatentable over Ruyak in view of Callanen.

Claims 17–22

Claim 17 recites a method comprising, in part, “rotating the drive shaft about a central axis with one or more drivers operatively coupled to the drive shaft and thereby rotating the one or more lateral blades about a corresponding one or more blade axes of the one or more lateral blades.”

Appellant argues that “operating the proposed Ruyak-Callanen consistometer does not disclose rotating the drive shaft about a central axis with one or more drivers operatively coupled to the drive shaft and thereby rotating the one or more lateral blades about a corresponding one or more blade axes of the one or more lateral blades.” Appeal Br. 13. Appellant argues that, instead, Callanen discloses a method involving a series of drive shafts 22, 34, 86 arranged parallel to each other in and around a canister, and discloses rotating impeller blades by stopping motor 32 and powering motor 90 to rotate shaft 86, causing counter-clockwise rotation of spur gears, resulting rotation of impeller blades about their axes. *Id.* Appellant argues that “Callanen does not disclose rotating concentric drive shafts around a central axis but instead discloses rotating a series of drive shafts around axes parallel to one another,” and, therefore, “all elements of claim 17 are not disclosed by the combination of Ruyak and Callanen.” *Id.*

We point out initially that claim 17 does not recite “rotating concentric drive shafts around a central axis.” Appellant’s arguments asserting lack of such disclosure in Callanen are, therefore, based on subject matter that is not recited in claim 17, and, consequently, are unpersuasive of reversible error in the Examiner’s rejection. *In re Self*, 671 F.2d 1344, 1348 (CCPA 1982) (“[A]ppellant’s arguments fail from the outset because . . . they are not based on limitations appearing in the claims.”).

Furthermore, although Callanen does disclose that motor 32 *may* be stopped while applying power through motor 90 to rotate impeller blades 64, 164, 264, 364 about their axes (col. 5, ll. 60–64), Callanen is not limited to this disclosure. Rather, Callanen discloses a further embodiment in which motor 32 rotates shaft 22 (drive shaft) while motor 90 simultaneously rotates shaft 86, causing impeller blades 64, 164, 264, 364 to rotate about their axes. Callanen col. 6, ll. 6–26. Callanen thus discloses rotating shaft 22 (drive shaft) about a central axis with motor 32 (driver), while rotating impeller blades 64, 164, 264, 364 about their axes, as recited in claim 17.

We, accordingly, sustain the Examiner’s rejection of claims 17–22 under 35 U.S.C. § 103 as unpatentable over Ruyak in view of Callanen.

CONCLUSION

Claims	35 U.S.C. §	Reference(s)/ Basis	Affirmed	Reversed
1–3, 6–9	102	Callanen	1–3, 6–8	9
5, 10	103	Callanen	5	10
11–13, 16– 22	103	Ruyak, Callanen	11–13, 16– 22	
Overall Outcome			1–3, 5–8, 11–13, 16– 22	9, 10

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 IN PART