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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
14/624,672	02/18/2015	Jason D. Smith	GARL 200387US01	2868
27885	7590	09/02/2020	EXAMINER	
FAY SHARPE LLP 1228 Euclid Avenue, 5th Floor The Halle Building Cleveland, OH 44115			USELDING, JOHN E	
			ART UNIT	PAPER NUMBER
			1763	
			NOTIFICATION DATE	DELIVERY MODE
			09/02/2020	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte JASON D. SMITH, JOSEPH W. MELLOTT II,
MELISSA RUS, DAVID SOKOL, and JULIA HOLLAND

Appeal 2019-005697
Application 14/624,672
Technology Center 1700

Before JEFFREY B. ROBERTSON, MICHAEL G. McMANUS, and
JANE E. INGLESE, *Administrative Patent Judges*.

McMANUS, *Administrative Patent Judge*.

DECISION ON APPEAL

Pursuant to 35 U.S.C. § 134(a), Appellant¹ seeks review of the Examiner’s decision to reject claims 1, 4–16, and 44. We have jurisdiction under 35 U.S.C. § 6(b).

We affirm in part.

¹ We use the word “Appellant” to refer to “applicant” as defined in 37 C.F.R. § 1.42. Appellant identifies the real party in interest as Garland Industries, Inc. Appeal Brief dated Jan. 10, 2019 (“Appeal Br.”) 1.

CLAIMED SUBJECT MATTER

The present application generally relates to a modified bitumen. Specification filed Feb. 18, 2015 (“Spec.”) 1. The Specification teaches “a modified bitumen that includes a polyurethane wherein the polyisocyanate-terminated compound of any polymer backbone can be reacted with specific constituents of bitumen to take advantage of hydroxyl and amine functionality within said constituents and form an isocyanate-bitumen adduct.” *Id.* The Specification further teaches that “any residual diisocyanate not reacted with the bitumen are reacted further with polyol(s) to form a weatherproofing product (e.g., membrane, etc.)” *Id.*

Claim 1 is illustrative of the subject matter on appeal and is reproduced below with certain limitations bolded for emphasis:

1. An actively modified polymer-modified bitumen formulation comprising:

25–75 wt.% of a first component that consists of **bitumen, coal tar, or combinations** thereof;

2–45wt. % of a second component that consists of polyurethane, or blend of polyurethane and rubber, said polyurethane including isocyanate end groups, said polyurethane formed from at least one polyisocyanate compound and **two or more polyols**, at least two of said polyols selected from the group consisting of propylene glycol, polycarbonate diol, polybutadiene glycols and polybutadiene polyols, said two or more polyols **include a 1000–5000 molecular weight compound**, a content of said two or more polyols creating a **NCO/OH equivalent ratio of about 1.2–15:1** in said bitumen formulation, said polyurethane content is no more than 25 wt.% of said bitumen formulation, a weight ratio of said polyurethane to said first component is 0.1–0.5:1;

1–66 wt.% of a filler, said filler including two or more compounds selected from the group consisting of potassium

polyphosphate, calcium carbonate, ammonium polyphosphate, alumina trihydrate and $Mg(OH)_2$;

wherein a weight percent of said first component is greater than a weight percent of said second component, said isocyanate end groups in said polyurethane reacting with hydroxyl end groups in said bitumen, said coal tar, or combinations thereof, said formulation can be used to create a membrane having improved mineral retention and weatherability.

Appeal Br. 49 (Claims App.) (reformatted for clarity).

REFERENCES

The Examiner relies upon the following prior art:

Name	Reference	Date
Walters	US 4,659,381	Apr. 21, 1987
Rajalingam, et al. ("Rajalingam")	US 6,271,305 B1	Aug. 7, 2001
Clemens, et al. ("Clemens")	US 2002/0114940 A1	Aug. 22, 2002
Bindschedler, et al. ("Bindschedler")	US 2005/0101210 A1	May 12, 2005
Zhou et al. ("Zhou")	US 2014/0215937 A1	Aug. 7, 2014
J. Read, et al., <i>The Shell Bitumen Handbook</i> , 5 th ed. (2003) ("Read")		

REJECTIONS

The Examiner maintains the following rejections:²

1. Claims 1, 4, 10–15, and 44 are rejected under 35 U.S.C. § 103 as being unpatentable over Bindschedler in view of Walters and further in view of Zhou. Final Action dated Sept. 25, 2018 (“Final Act.”) 2–5.
2. Claim 5 is rejected under 35 U.S.C. § 103 as being unpatentable over Bindschedler in view of Walters, Zhou, and Rajalingam. *Id.* at 5–6.
3. Claim 6 is rejected under 35 U.S.C. § 103 as being unpatentable over Bindschedler in view of Walters, and Zhou as evidenced by Read. *Id.* at 6.
4. Claim 7 is rejected under 35 U.S.C. § 103 as being unpatentable over Bindschedler in view of Walters, Zhou, and Rajalingam as evidenced by Read. *Id.* at 6–7.
5. Claim 8 is rejected under 35 U.S.C. § 103 as being unpatentable over Bindschedler in view of Walters, Zhou, and Rajalingam. *Id.* at 7.
6. Claim 9 is rejected under 35 U.S.C. § 103 as being unpatentable over Bindschedler in view of Walters, Zhou, and Clemens. *Id.* at 7–8.

² Appellant filed an Amendment After Final on January 8, 2019, which canceled claims 21–43 and 45–49. The Amendment was entered Feb. 21, 2019.

7. Claim 16 is rejected under 35 U.S.C. § 103 as being unpatentable over Bindschedler in view of Walters, Zhou, Clemens, and Rajalingam. *Id.* at 8–9.

DISCUSSION

Rejection 1. The Examiner rejects claims 1, 4, 10–15, and 44 as obvious over Bindschedler in view of Walters and further in view of Zhou. *Id.* at 2–5.

Claim 1

In support of the rejection of claim 1, the Examiner finds that Bindschedler teaches a formulation comprising 60 to 80% bitumen and 15 to 40% polyurethane. *Id.* at 2. The Examiner additionally finds that Bindschedler teaches a process where bitumen is heated and polyols and isocyanates are added such that synthesis of polyurethane takes place in situ in the bitumen. *Id.* (citing Bindschedler ¶ 52). The Examiner further finds that Bindschedler teaches that the polyol has a molecular weight of 1000 to 5000. *Id.* (citing Bindschedler ¶ 51). The Examiner also finds that Bindschedler teaches to use “more than a single polyol compound to form their polyurethane.” *Id.* The Examiner finds that two polyols taught by Bindschedler are polycarbonate diol and 1,4-butanediol and that 1,4-butanediol “is very structurally similar to propylene glycol.” *Id.*

The Examiner additionally finds that Bindschedler teaches a ratio of isocyanate/polyol of 1.1 which is “very close to the claimed ratio of 1.2.” *Id.* at 3. The Examiner determines that this is sufficiently close that one skilled in the art would have expected compositions with such ratios to have the same properties. *Id.*

The Examiner further determines that Walters and Zhou would have taught one of skill in the art to use ammonium polyphosphate and aluminum trihydrate in the composition of Bindschedler to improve the flame resistance of the composition. *Id.* at 3–4.

Appellant argues that the rejection is in error in several respects. Appeal Br. 31–41.

First, Appellant argues that Bindschedler does not teach that the claimed urethane is formed from the reaction of at least one polyisocyanate with “two or more polyols, at least two of said polyols selected from the group consisting of propylene glycol, polycarbonate diol, polybutadiene glycols and polybutadiene polyols, said two or more polyols include a 1000-5000 molecular weight compound.” Appeal Br. 35–36.

Appellant asserts that Bindschedler teaches that 1,4-butanediol, hexanediol, neopentylglycol, 2-ethyl, and 1,3-hexanediol are chain lengtheners that can be used with the polyol and isocyanate to form the polyurethane. *Id.* at 36. Appellant argues that, because the chain lengthening agent is defined in Bindschedler as different from the polyol, there is no teaching that the listed compounds are polyols that can be used to react with isocyanate to form a polyurethane. *Id.*

The Examiner asserts that “[t]he chain lengthening agent of Bindschedler et al., 1,4-butanediol, is a polyol used in the formation of the polyurethane. Therefore, it meets the claimed ‘polyol.’” Answer 11. This is consistent with the Specification’s use of the term polyol to include diols as well as the use of the term “diols” in claim 44. *See* Spec. 6; Appeal Br. 52 (Claims App.). Bindschedler’s description of a diol as a chain lengthening agent does not change its nature. *See Whitserve, LLC v.*

Comput. Packages, Inc., 694 F.3d 10, 21 (Fed. Cir. 2012) (a reference “need not satisfy an *ipsisimis verbis* test”). Accordingly, we are not persuaded of error in this regard.

Second, Appellant argues that “Bindschedler teaches that the chain lengthener agent has a molecular weight of 50-500” while claim 1 requires a molecular weight falling in a range of 1,000 to 5,000. Appeal Br. 36.

The Examiner contends that claim 1 should be construed to require only a single polyol having a molecular weight from 1000 to 5000. *Id.*

Claim 1 requires, in part, as follows:

two or more polyols, at least two of said polyols selected from the group consisting of propylene glycol, polycarbonate diol, polybutadiene glycols and polybutadiene polyols, said two or more polyols include a 1000-5000 molecular weight compound.

Appeal Br. 49 (Claims App.) (emphasis added). The Examiner is of the view that “[t]he keyword in that phrase is ‘a’. Claim 1 requires that in all of the polyols that are used at least one of the polyols [is] a 1000–5000 molecular weight compound.” Answer 11.

In its Reply, Appellant quotes the same term and asserts that, “[b]ased on this language, a minimum of two of the polyols are formed of a 1000-5000 molecular weight compound. This interpretation of the claim language is consistent with the plain meaning of the claim and the teachings of the originally filed Specification.” Reply Brief dated July 15, 2019 (“Reply Br.”) 9.

During examination, claim terms must be given their broadest reasonable construction consistent with the Specification. *In re ICON Health and Fitness, Inc.*, 496 F.3d 1374, 1379 (Fed. Cir. 2007). As to

whether the language in question — “said two or more polyols include a 1000-5000 molecular weight compound” — requires that one or two polyols must fall within the claimed weight range, we are of the view that the plain meaning of the language, “include *a* 1000-5000 molecular weight compound,” favors the Examiner’s interpretation that the claim requires only a single polyol of the claimed weight. This is the broader construction. Given the rule requiring that we adopt the broadest reasonable construction, as well as the most natural reading of the claim, we interpret “said two or more polyols include a 1000-5000 molecular weight compound” to require only a single polyol having the claimed weight.

In view of the foregoing construction, we are not persuaded of error in the Examiner’s finding that the composition of Bindschedler satisfies the limitation at issue.

Third, Appellant argues that Bindschedler does not teach “a content of said two or more polyols creating a NCO/OH equivalent ratio of about 1.2–15:1 in said bitumen formulation” as required by claim 1. Appeal Br. 36–37.

In finding that Bindschedler teaches the claimed ratio, the Examiner determines that “[t]he ratio of 1.1 is very close to the claimed ratio of 1.2” and that “[a] prima facie case of obviousness exists where the claimed ranges and prior art ranges do not overlap but are close enough that one skilled in the art would have expected them to have the same properties.” Final Act. 3. Bindschedler teaches that “the ratio of isocyanate/polyol is comprised between 1.0 and 1.1 and is preferably about 1.05.” Bindschedler ¶ 53.

Appellant argues that “Bindschedler teaches that such ratio is between 1 and 1.1; thus, below 1.1 and greater than 1, and preferably 1.05” while claim 1 “teaches the use of a substantial excess of NCO to OH in the actively modified polymer-modified bitumen formulation.” Appeal Br. 37.

Claim 1 requires that the ratio of “NCO/OH” be “**about** 1.2–15:1.” Accordingly, we construe “about 1.2” to include values falling below 1.2. Additionally, Bindschedler teaches the 1.1:1 ratio merely as a preferred embodiment. Bindschedler ¶ 53. Given such construction, and the exemplary nature of the Bindschedler ratio, we are not persuaded of error in the Examiner’s finding that the claimed (“about 1.2”) and prior art ranges (1.1) are “close enough” that one of ordinary skill in the art would have expected the claimed and prior art compositions to have the same properties. *Titanium Metals Corp. of America v. Banner*, 778 F.2d 775, 783 (Fed. Cir. 1985).

Fourth, Appellant argues that the references do not teach the claimed fillers. Appeal Br. 38–39. Claim 1 further requires a quantity of filler that includes “two or more compounds selected from the group consisting of potassium polyphosphate, calcium carbonate, ammonium polyphosphate, alumina trihydrate and Mg(OH)₂.” *Id.* at 49 (Claims App.).

The Examiner finds that “Walters teaches that due to stringent building code regulations roofing membranes require flame retardants” and to add “about 1–5 wt% of ammonium polyphosphate . . . and up to about 30 wt% of aluminum trihydrate.” Final Act. 3–4. The Examiner further finds that Zhou teaches aluminum trihydrate and ammonium polyphosphate are “exemplary non-halogenated flame retardants” in roof membranes. *Id.* at 4.

Appellant acknowledges that Walters and Zhou each teach two or more of the claimed fillers. Appeal Br. 39. Appellant argues, however, that the references do not “teach the specific combination of fillers defined in independent claim 1.” *Id.* Appellant argues that one could arrive at the claimed fillers only by extensive experimentation. *Id.* Appellant does not offer argument or evidence of criticality. *Id.*

This is not persuasive of error. The disclosure of multiple combinations of flame retardants does not make any particular combination less obvious. *See Merck & Co. v. Biocraft Labs. Inc.*, 874 F.2d 804, 807 (Fed. Cir. 1989) (“That the [reference] discloses a multitude of effective combinations does not render any particular formulation less obvious.”); *see also In re Susi*, 440 F.2d 442, 445 (CCPA 1971) (obviousness rejection affirmed where the disclosure of the prior art was “huge, but it undeniably include[d] at least some of the compounds recited in appellant's generic claims and it is of a class of chemicals to be used for the same purpose as appellant’s additives”).

Accordingly, Appellant has not shown error with regard to the rejection of claim 1.

Claim 4

Claim 4 depends from claim 1 and further requires that “said filler includes three or more compounds selected from the group consisting of calcium carbonate, ammonium polyphosphate, and alumina trihydrate, said filler constituting 5-40 wt.%.” Appeal Br. 50 (Claims App.).

In support of patentability, Appellant relies on its arguments presented with regard to the “filler” limitation of claim 1. *Id.* at 40. As we have not

found such arguments to be persuasive, we determine that Appellant has not shown error with regard to the rejection of claim 4.

Claims 10 and 11

Claims 10 and 11 depend from claim 1. Appeal Br. 50 (Claims App.). Appellant argues that the rejection of claims 10 and 11 should be reversed for the same reason presented with regard to the rejection of claim 1. *Id.* at 39. As we have not found such arguments to be persuasive, we determine that Appellant has not shown error with regard to the rejection of claims 10 and 11.

Claims 12 and 13

Claim 12 depends from claim 1 and further specifies particular ranges of bitumen and/or coal tar, polyurethane, and filler by weight percent. Appeal Br. 51 (Claims App.). Claim 13 is similar but requires a more narrow range of each component. *Id.*

In the Final Action, the Examiner finds that “Bindschedler et al. teach 40 to 90% bitumen, 10 to 50% polyurethane, 0 to 10 wt% oil, and 0 to 50% filler.” Final Act. 4. The Examiner determines that the claimed ranges are prima facie obvious in view of the overlap between Bindschedler’s teachings and the several claimed ranges. *Id.*

Appellant makes assertions consistent with the Examiner’s findings in the “Cited Art” section of its brief. Appeal Br. 12. Appellant subsequently argues that the “references do not specifically teach a formulation that has the weight percentage ranges of the components defined in dependent claims

12-13” and that the Examiner did not address these limitations in the Final Action. Appeal Br. 40.

A prior art reference that discloses a range overlapping the claimed range is sufficient to establish a prima facie case of obviousness. *In re Geisler*, 116 F.3d 1465, 1469–71 (Fed. Cir. 1997); *In re Peterson*, 315 F.3d 1325, 1330 (Fed. Cir. 2003). Here, Bindschedler teaches the same components for the same purposes in overlapping ranges. There is no evidence of criticality. Accordingly, Appellant has not shown error in the Examiner’s prima facie case.

Claims 14 and 15

Claims 14 and 15 each depend from claim 1. Appeal Br. 51–52 (Claims App.). Each of these two claims includes the same limitations as claim 13 and additionally includes a limitation specifying an amount of process oil. *Id.* In the Final Action, the Examiner finds that Bindschedler teaches “0 to 10 wt% oil.” Final Act. 4. Similar to the rejection of claims 12 and 13, the Examiner determines that the prior art range overlaps the claimed range and establishes a prima facie case of obviousness. *Id.*

Appellant argues that none of the prior art references “specifically teach a formulation that has the weight percentage ranges of the components defined in dependent claims 14-15.” Appeal Br. 40. This is not persuasive of error. The prior art’s teaching of overlapping ranges supports the prima facie case of obviousness. There is no evidence of criticality. Accordingly, Appellant has not shown error in the Examiner’s prima facie case.

Claim 44

Claim 44 depends from claim 1 and further requires that “said polyols include both diols and triols, a weight ratio of said diols to said triols is about 1–5:1.” Appeal Br. 52 (Claims App.).

The Examiner finds that “[t]he structure of Bindschedler et al. is similar to the claimed structure,” and a “prima facie case of obviousness may be made when chemical compounds have very close structural similarities and similar utilities.” Final Act. 4.

Appellant argues that “Bindschedler does not teach or suggest the use of both diols [and] . . . triols in the modified polyurethane bituminous binder, nor a weight ratio of diols to triols in the modified polyurethane bituminous binder.” Appeal Br. 41. Appellant further directs us to a portion of the Specification discussing such ratio. *Id.* (citing Spec. 8:24–29).

In the Answer, the Examiner asserts that the limitation is a product by process limitation. Answer 15. The Examiner further asserts that diols are sufficiently structurally similar to triols so as to establish a prima facie case of obviousness. *Id.*

This is inadequate to establish obviousness. With regard to the Examiner’s product by process determination, Federal Circuit precedent teaches that “when considering the patentability of product claims that contain process limitations, claim scope is generally based on the product itself, not the process. If the process limitation connotes specific structure and may be considered a structural limitation, however, that structure should be considered.” *In re Nordt Dev. Co., LLC*, 881 F.3d 1371, 1374 (Fed. Cir. 2018) (internal citations omitted). Here, Appellant has referred us to teachings in the Specification that indicate the claimed ratio affects the blend

characteristics. Specifically, the Specification teaches that “[a] weight ratio of greater than 5:1 has been found to cause the cross-link density to decrease, and eventually the tensile strength of the cured blend is not affected by the triol” and that “[a] ratio of less than 1:1 (by weight) increases the chance of the polymer approaching or exceeding its gel point.” Spec. 8. Accordingly, Appellant has shown that polyol ratio may affect polymer physical characteristics and should be accorded patentable weight.

Similarly, the cited portion of the Specification teaches that the distinction between diols and triols is significant for purposes of the present composition such that their structural similarity will not establish a prima facie case of obviousness.

Accordingly, Appellant has shown error with regard to the rejection of claim 44.

Rejection 2. The Examiner rejects claim 5 as obvious over Bindschedler in view of Walters, Zhou, and Rajalingam. Final Act. 5–6.

Claim 5 depends from claim 1 and further requires that the second component (a “polyurethane, or blend of polyurethane and rubber”) “includes said polyurethane and said rubber, said rubber including one or more compounds selected from the group consisting of SBS, SEBS, SIS, and nitrile rubber, a weight ratio of said rubber to said polyurethane is 1:0.2–15.” Appeal Br. 50 (Claims App.).

In support of the rejection, the Examiner finds that Rajalingam teaches adding 0–75 wt.% of SBS to an analogous composition. Final Act. 5. The Examiner finds that Rajalingam teaches that the addition of rubber

improves the miscibility as well as the physical and mechanical properties of the composition. *Id.* (citing Rajalingam col. 2:25–36).

Appellant argues that a person of ordinary skill in the art would not have looked to Rajalingam because “the type of bituminous polyurethane material taught by Rajalingam is the type of bituminous polyurethane material that was improved upon in Bindschedler.” Appeal Br. 42.

Appellant further argues that Bindschedler teaches that “prior art bituminous polyurethane material was not formulated to be able to form prefabricated sealing membranes.” *Id.* (citing Bindschedler ¶¶ 10–19).

In the Answer, the Examiner asserts that Bindschedler’s statement that certain products were not suitable to form prefabricated membranes was specific to “the French and European applications” discussed therein.

Answer 15. The Examiner further contends that Bindschedler does not “teach against” the addition of SBS to its composition. *Id.* at 16.

Appellant’s arguments are not persuasive of error. Appellant argues that “the type of bituminous polyurethane material taught by Rajalingam is the type of bituminous polyurethane material that was improved upon in Bindschedler.” Appeal Br. 42. It is correct that Bindschedler discusses prior art compositions that include block elastomers. *See* Bindschedler ¶ 5. This, however, is not directly responsive to the Examiner’s finding that the addition of rubber improves the miscibility as well as the physical and mechanical properties of the composition (Final Act. 5). Further, Appellant’s argument regarding prefabricated sealing membranes is not persuasive because Appellant does not direct us to any teaching that the French and European applications include elastomers or that the presence of such elastomers renders them unsuitable for use in prefabricated membranes.

Appellant additionally argues that Rajalingam does not teach the claimed weight ratio of rubber to polyurethane of 1:0.2–15. Appeal Br. 43. Appellant asserts that Rajalingam only teaches that the rubber content of the coating can be 0–75 wt.% which is “much broader” than the claimed range. *Id.*; *see also* Reply Br. 11.

In the Answer, the Examiner finds that Rajalingam teaches 0–75 wt% SBS and Bindschedler teaches 10 to 50% polyurethane, thus, providing an overlapping ratio. Answer 16. The Examiner further finds that it would have been obvious to optimize the amount of SBS added to the Bindschedler composition to achieve the desired miscibility and physical and mechanical properties. *Id.*

Appellant’s general allegation that the prior art range is “much broader” than the claimed range is insufficient to show error in the Examiner’s determination. Accordingly, we are not persuaded of error in this regard.

Rejection 3. The Examiner rejects claim 6 as obvious over Bindschedler in view of Walters and Zhou as evidenced by Read. Final Act. 6. Appellant argues that the rejection of claim 6 is in error for the same reasons presented with regard to the rejection of claim 1. Appeal Br. 44. As we have not found such arguments to be persuasive, we determine that Appellant has not shown error with regard to the rejection of claim 6.

Rejection 4. The Examiner rejects claim 7 as obvious over Bindschedler in view of Walters, Zhou, and Rajalingam as evidenced by Read. Final Act. 6–7. Claim 7 depends from claim 1 and further requires

that “said first component includes said coal tar having a softening point of 40-80°C (ASTM D3461).” Appeal Br. 50 (Claims App.).

In support of the rejection, the Examiner finds that Rajalingam teaches that coal tar is a type of bitumen to be used in an analogous composition and that Rajalingam further teaches a coal tar with the claimed softening point. Final Act. 6 (citing Rajalingam col. 7:49–62 and Read, Table 4.1).

Rajalingam teaches that “[b]ituminous material’ is meant to include bitumen, asphalt, coal tar, and performance-rated asphalt.” Rajalingam col. 1:36–37. Rajalingam similarly teaches that “[e]xamples of bituminous materials include the numerous grades of asphalt, performance grade asphalt (also known as polymer modified asphalt), and coal tar.” Rajalingam col. 7:49–51. Rajalingam further teaches that “[t]he bituminous material preferably has a penetration index number between 16 and 195.” *Id.* at 7:51–53. Table 4.1 of Read appears to be relied upon to correlate the penetration index values taught by Rajalingam to bitumen softening points.

Appellant argues that the teachings of Read are directed to bitumen properties and that reliance on Read is inappropriate because “coal tar and bitumen are two different materials” that can have different properties. Appeal Br. 45.

In the Answer, the Examiner asserts that “Read provides evidence that Rajalingam teaches bituminous materials with the claimed softening point. Therefore, it have been obvious to select the coal tar as the bituminous material from Rajalingam and to use a coal tar with the claimed softening point.” Answer 17.

The claims and Specification draw a distinction between bitumen and coal tar. *See* Appeal Br. 49–50 (Claims App.) (claims 1 and 7); Spec. 1, 3–4. Similarly, Read teaches that bitumen is manufactured from crude oil while coal tar is produced when coal is “carbonised or destructively distilled in the absence of air.” Read 8. Thus, the Examiner has not clearly shown that the table relied upon supplies the teachings necessary to support the rejection.

Further, the Examiner has not adequately stated a basis for substitution of coal tar for bitumen in the composition of Bindschedler. *KSR Int’l Co. v. Teleflex Inc.*, 550 U.S. 398, 418 (2007) (“[T]here must be some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness.”).

Accordingly, Appellant has shown error in this regard.

Rejection 5. The Examiner rejects claim 8 as obvious over Bindschedler in view of Walters, Zhou, and Rajalingam. Final Act. 7. Claim 8 depends from claim 1 and further requires that the “first component includes a blend of said coal tar and said bitumen, a weight ratio of said coal tar and said bitumen is 1:0.1–10.” Appeal Br. 50 (Claims App.).

The Examiner finds that Rajalingam teaches that “coal tar is a type of bitumen to be used in an analogous composition” and that it would have been obvious “to select coal tar as taught by Rajalingam et al. as the bitumen in Bindschedler et al.” Final Act. 7 (citing Rajalingam col. 1:36–37). The Examiner further concludes that, “[s]ince coal tar is a type of bitumen the ratio is 1:1.” *Id.*

Appellant argues that Rajalingam “does not teach that the bituminous composition can include two types of bituminous materials wherein one type is bitumen and another type of coal tar.” Appeal Br. 43. Appellant further argues that Rajalingam does not teach or suggest any weight ratio of bitumen to coal tar. *Id.*

In the Answer, the Examiner asserts that Rajalingam teaches that coal tar is a type of bitumen and, therefore, “when coal tar is present in the composition so is bitumen.” Answer 16. This is inadequate to articulate a sufficient basis for combination. As above, the Specification and claims differentiate between coal tar and bitumen. *See* Appeal Br. 49–50 (Claims App.) (claims 1 and 7); Spec. 1, 3–4. Rajalingam also distinguishes between coal tar and bitumen. Rajalingam col. 1:36–37. Additionally, the rejection does not cite to an adequate teaching regarding the claimed ratio. Accordingly, Appellant has shown error in this regard.

Rejection 6. The Examiner rejects claim 9 as obvious over Bindschedler in view of Walters, Zhou, and Clemens. Final Act. 7–8. Claim 9 depends from claim 1. Appellant argues that the rejection of claim 9 should be reversed for the same reasons advanced in regard to the rejection of claim 1. Appeal Br. 45–46. As we have not found such arguments to be persuasive, we determine that Appellant has not shown reversible error with regard to the rejection of claim 9.

Rejection 7. The Examiner rejects claim 16 as obvious over Bindschedler in view of Walters, Zhou, Clemens, and Rajalingam. Final Act. 8–9. Claim 16 depends from claim 1 and further specifies ranges of

concentrations for several components. Appeal Br. 52 (Claims App.). In support of the rejection, the Examiner cites to teachings in Bindschedler and Rajalingam to teach overlapping ranges of the claimed components. Final Act. 8. The Examiner additionally finds that Clements teaches adding an antioxidant and that one of ordinary skill in the art would have had reason to add the antioxidant as claimed. *Id.* The Examiner concludes that “[t]he subject matter as a whole would have been obvious . . . since it has been held that choosing the overlapping portion, of the range taught in the prior art and the range claimed by the applicant, has been held to be a prima facie case of obviousness.” *Id.* at 9.

Appellant generally alleges that the cited references “do not specifically teach a formulation that has the weight percentage ranges of the components defined in dependent claim 16.” Appeal Br. 47. For the reasons set forth above in regard to the rejection of claims 12–15, this is insufficient to show error in the stated rejection.

CONCLUSION

For the reasons set forth in the Final Action, the Examiner’s Answer, and above, the rejections of claims 1, 4–6, and 9–16 are affirmed. For the reasons set forth above, the rejections of claims 7, 8, and 44 are reversed.

In summary:

Claims Rejected	35 U.S.C. §	Reference(s)/Basis	Affirmed	Reversed
1, 4, 10–15, 44	103	Bindschedler, Walters, Zhou	1, 4, 10–15	44
5	103	Bindschedler, Walters, Zhou, Rajalingam	5	
6	103	Bindschedler, Walters, Zhou, Read	6	
7	103	Bindschedler, Walters, Zhou, Rajalingam, Read		7
8	103	Bindschedler, Walters, Zhou, Rajalingam		8
9	103	Bindschedler, Walters, Zhou, Clemens	9	
16	103	Bindschedler, Walters, Zhou, Clemens, Rajalingam	16	
Overall Outcome			1, 4–6, 9–16	7, 8, 44

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

AFFIRMED IN PART