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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte GERHARD GROSS and VINCENZO SPITALERI

Appeal No. 2003-1788
Application 09/403,081

ON BRIEF

Before PAK, TIMM, and PAWLIKOWSKI, Administrative Patent Judges.
PAWLIKOWSKI, Administrative Patent Judge.

DECISION ON APPEAL

This is an appeal under 35 U.S.C. § 134 from the examiner's final rejection of claims 2, 4-11, 13-15, 17, 18, and 21-24.

Claims 22 and 23 are representative of the subject matter on appeal and are set forth below, wherein text in bold is for emphasis only:

22. In a process for producing elemental sulfur by combustion of hydrogen sulfide or a hydrogen sulfide-containing gas in a combustion whereby the hydrogen sulfide or the hydrogen sulfide-containing gas is treated by partially combusting with addition of air as the oxidation medium, subjecting the partially combusted hydrogen sulfide or hydrogen sulfide-containing gas to

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afterburning by adding an oxygen-containing gas to the partially combusted gas, and feeding the reaction gas mixture to a waste-heat boiler and thereafter to one or more catalytic reactors, characterized in that an **afterburning zone is integrated into the combustion reactor located downstream and separate from a burner** by feeding the oxygen-containing gas directly into the combustion reactor by a multiplicity of individual nozzles, **and feeding the oxygen-containing gas into the combustion reactor at an intake velocity in the range between Mach number 0.4 and 2.**

23. An apparatus for procuring elemental sulfur by combustion of hydrogen sulfide or a hydrogen sulfide-containing gas, **comprising a combustion reactor to which a burner is fixed** in which the hydrogen sulfide or the hydrogen sulfide-containing gas is partially combusted with addition of air, a waste-heat boiler and one or more catalytic reactors, characterized in that a multiplicity of nozzles are directly fixed to **the combustion reactor downstream from the burner**, through which an oxygen-containing gas is fed into the combustion reactor, as a result of which the hydrogen sulfide or the hydrogen sulfide-containing gas is subjected to afterburning.

The examiner relies upon the following reference as evidence of unpatentability:

Gitman et al. (Gitman)

WO 89/12023

Dec. 14, 1989

Claims 2, 5, 14, 17, 22, 23, and 24 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Gitman.

Claims 2, 4-11, 13, 14, 15, 17, 18, and 21-24 stand rejected under 35 U.S.C. § 103 as being obvious over Gitman.

I. The Anticipation Rejection

We note that the initial burden of presenting a prima facie case of unpatentability on any ground rests with the examiner. See In re Oetiker, 977 F.2d 1443, 1445, 24 USPQ2d 1443, 1444 (Fed. Cir. 1992). To meet this burden, with regard to an anticipation rejection, the examiner must establish that a single prior art reference discloses each and every material element of the claim. In re Marshall, 578 F.2d 301, 304, 198 USPQ 344, 346 (CCPA 1978).

Critical to the anticipation issue in this appeal is the definition of "burner". The examiner states: "[n]o distinction is seen or has been shown in the manner in which the appellants add supplemental oxygen . . . into their region 8 . . . as compared to the manner in which Gitman adds supplemental air . . . into their region 102." Answer, page 8.

On the other hand, appellants state: "[t]he region 102 illustrated in Fig. 2 of Gitman and the region 8 illustrated in Figs. 1-3 of the present application have clearly different functions. Region 8 . . . is a combustion reactor (reaction chamber). The combustion reactor permits the chemical components to react with each other as completely as possible." Brief, page 7.

We find that Gitman introduces oxygen to preliminary burner 17 and to chambers 101 and 102, which are depicted as part of burner means 16, in Figure 2 of Gitman. It is reaction chamber 3 that is separate, downstream, and apart from burner means 16. See Figure 2 of Gitman.

We also find in Gitman that feed gas can be introduced into both the preliminary burner 17 (via line 5), and the chamber 102, (via line 108), of Gitman. See Figure 2 and page 22, lines 20-22 of Gitman.

A "burner" is a device that produces a flame. It must mix the fuel and an oxidizing agent in proportions that are within the limits of flammability for ignition as well as for steady combustion. See page 9-15 of Chemical Engineers' Handbook, fifth edition, 1973.¹

The aforementioned definition of a "burner" reinforces appellants' position made on page 7 of the Brief that their reaction chamber 8 functions differently from a burner. The definition also reinforces our finding that Gitman's chamber 102 is part of the burner means. Gitman can introduce the remaining feed gas, if any, to chamber 102 via line 108, in combination with oxygen feed. See page 13, lines 5-25.

On the other hand, no feed gas is introduced into appellants' region 8. For example, figures 1-3 of the specification each depicts that there are no lines for feeding feed gas into combustion chamber 8. Only inner tube 11 exists for feeding only oxygen gas (or an oxygen-rich gas) to combustion reactor 8. No lines are indicated for use in introducing a feed gas. Outer tube 12 (depicted in each of appellant's figures) is used to introduce a protecting gas to cool nozzle (9).

Appellant's specification also indicates that an afterburning zone is produced in reaction chamber 8 by highly turbulent self-priming oxygen jets. In this way, the already processed gas from the burner is subjected to complete afterburning in combustion reactor 8. In this way, the reactions taking place in the combustion chamber 8 proceed closer to the thermodynamic equilibrium. See specification page 7, line 37 through page 8, line 6. The oxygen is blown in, at high velocity, into the combustion reactor 8. See specification, page

¹ A copy of pages 9-15 from Chemical Engineers' Handbook, Fifth Edition, 1973, is provided herewith.

9, lines 16-25. For intensive mixing, the exit velocities of the oxygen from oxygen nozzles are preferably in a Mach number range between 0.4 and 2. See page 9, lines 35 through page 10, line 5.

Furthermore, appellants' reaction chamber 8, combined with appellant's claimed intake velocity values, creates appellant's claimed "afterburning." The examiner does not explain how such afterburning is created in Gitman. This is especially true because the examiner recognizes that the claimed velocity values are not set forth in Gitman, but states "it is reasonably concluded and surmised that this same oxygen-containing as entering the same combustion chamber . . . will inherently be injected at the same claimed velocity" Answer, page 10. We find that such surmise is insufficient to set forth a prima facie case of anticipation.

In view of the above, we determine that the examiner has not established that Gitman discloses feeding oxygen gas into a reaction chamber that is downstream and separate from a burner. As pointed out by appellants on page 10 of the brief, Gitman does not add oxygen to reactor 3.

In view of the above, we therefore reverse the rejection of claims 2, 5, 14, 17, 22, 23 and 24 under 35 U.S.C. § 102(b) as being anticipated by Gitman.

II. The Obviousness Rejection

We also reverse the 35 U.S.C. § 103 rejection of claims 2, 4-11, 13-15, 17, 18, and 21-24, because the examiner's obviousness rejection does not address the aforementioned differences between appellants' claimed subject matter and Gitman, and does not provide an analysis as to why it would have been obvious to have modified the differences of Gitman to arrive at appellants' claimed invention.

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PAK, Administrative Patent Judge, dissenting-in-part:

I do not agree with the majority's view that Gitman would not have rendered the subject matter of claims 17, 18, 21, 23 and 24 anticipated within the meaning of 35 U.S.C. § 102 and would not have rendered the subject matter of claims 2, 4 through 11, 13 through 15, 17, 18 and 22 through 24 obvious within the meaning of 35 U.S.C. § 103. However, I agree with the majority's view that Gitman would not have rendered the subject matter of claims 2, 4 through 11, 13 through 15 and 22 anticipated within the meaning of 35 U.S.C. § 102(b). My reasons for this determination follow.

I begin with the claim language. Gechter v. Davidson, 116 F.3d 1454, 1457, 1460 n.3, 43 USPQ2d 1030, 1032, 1035 n.3 (Fed. Cir. 1997). In proceedings before the U.S. patent and Trademark Office, claims must be interpreted by giving their words the broadest reasonable meanings in their ordinary usage, taking into account the written description found in the specification. In re Morris, 127 F.3d 1048, 1054, 44 USPQ2d 1023, 1027 (Fed. Cir. 1997). **This rule does not allow appellants or the majority to read the limitations or embodiments appearing in the specification into the claims on appeal.** Loctite, Corp. v. Ultraseal, Ltd., 781 F.2d 861, 867, 228 USPQ 90, 93 (Fed. Cir. 1985) ("Generally, particular limitations or embodiments appearing in the specification will not be read into the claims."); In re Priest, 582 F.2d 33, 37, 199 USPQ 11, 15 (CCPA 1978), citing In re Prater, 415 F.2d 1393, 1405, 162 USPQ 541, 551 (CCPA 1969) ("We have consistently held that no 'applicant should have limitations of the specification read into a claim where no express statement of the limitations is included in the claim.'"). It only requires that claim language be given the

broadest reasonable meanings in their ordinary usage in the field of the invention as defined in the specification. Cf. Toro Co. v. White Consol. Indus., 199 F.3d 1295, 1299, 53 USPQ2d 1065, 1067 (Fed. Cir 1999).

Applying this rule to the claims on appeal, I determine that the claims are directed to a conventional Claus sulfur process and apparatus in which multiple nozzles for injecting oxygen-containing gases are directly fixed to a combustion reactor² section downstream from a burner. See Jepson process claim 22 and apparatus claim 23. Claim 2, 4 through 11, 13 through 15 and 22 further limit the conventional Claus desulfurization process by indicating that an afterburning zone is integrated into the combustion reactor and the oxygen-containing gas is fed at a particular velocity. There is no requirement that the oxygen-containing gas be fed to the after-burning zone of the combustion reactor section of the apparatus.

The majority does not dispute that Gitman teaches a Claus sulfur apparatus having a burner, a waste-heat boiler and one or more catalytic reactors. Nor does the majority dispute that Gitman teaches a Claus sulfur process in which hydrogen sulfide or a hydrogen-sulfide-containing gas is combusted in the presence of air in an apparatus having a burner, a waste heat boiler and one or more catalytic reactors. Rather, the majority argues that Gitman does not teach placing a multiplicity of nozzles for injecting an oxygen-containing gas at a combustion reactor section of the apparatus downstream from a burner. According to

² According to page 284 of Webster's II New Riverside University Dictionary (1994), attached herewith, the term "combustion" means "[t]he process of **burning**" or "[a] rapid chemical change, esp. oxidation, that produces heat and light."

the majority, the burner **means** 16 described in Gitman must be defined to include only a burner.

Contrary to the majority's position, however, Gitman clearly states that the burner means 16 includes "a preliminary burner 17 [corresponding to the claimed burner] which is connected to a primary combustion chamber 101, which communicates with a secondary combustion chamber 102...." See page 22, lines 10-22, together with Figure 2. Gitman also teaches employing a multiplicity of nozzles for feeding oxygen-containing gases at the primary and secondary combustion chambers corresponding to the claimed combustion reactor downstream from the preliminary burner 17. See, e.g., pages 22 and 23 in conjunction with Figure 2. It follows that the examiner's finding of anticipation regarding the subject matter defined by claims 17, 18, 21, 23 and 24 under 35 U.S.C. § 102(b) is supported by substantial evidence.

Although the examiner has not established that the oxygen containing gases described in Gitman is inherently fed at the claimed velocity³, the majority ignores the fact that the determination of the optimum velocity of oxygen-containing gases in a known Claus sulfur process is well within the ambit of one of ordinary skill in the art. In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990) (When the difference between the claimed invention and the prior art is some variable within the claims, the appellants must show that the particular

³ Although the velocity of an oxygen-containing gas may be varied based on the pressure at which it is fed and the size of the nozzle opening at which it is discharged, the examiner has not referred to the pressure and/or the nozzle size to show that the oxygen containing gas described in Gitman is necessarily fed at the claimed velocity. See Ex parte Skinner, 2 USPQ2d 1788, 1789 (Bd. Pat. App. & Int. 1986) (Inherency "may not be established by probabilities or possibilities. The mere fact that a certain thing may result from a given set of circumstances is not sufficient.").

variable is critical.). This is especially true in this case since Gitman recognizes the importance of controlling the flow of oxygen-containing gases to optimize the combustion. See page 23, lines 31-37 and page 34, especially page 34 and lines 36-37. In other words, Gitman recognizes that the velocity of oxygen-containing gases is a result effective variable in its Claus sulfur process. See In re Boesch, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980) ("[D]iscovery of an optimum value of a result effective variable in a known process is ordinarily within the skill of the art."). Thus, I concur with the examiner that Gitman would have rendered the subject matter of claims 2, 4 through 11, 13 through 15, 17, 18 and 22 through 24 obvious within the meaning of 35 U.S.C. § 103.

In any event, I wish to emphasize that even without Gitman, the admittedly known knowledge imputed to one of ordinary skill in the art alone would have rendered the claimed subject matter obvious.⁴ Claim 22, for example, is written in Jepson format. Ex parte Jepson, 1917 Dec. Comm'r Pats. 62, 243 Off. Gaz. 525 (1917). Thus, the subject matter recited in the preamble of claim 22 is impliedly admitted to be old in the art. In re Ehrreich, 590 F.2d 902, 909, 200 USPQ 504, 510 (CCPA 1979);

⁴ Under 35 U.S.C. § 103, to establish a prima facie case of obviousness, there must be some objective teachings or suggestions in the applied prior art references and/or knowledge generally available to a person having ordinary skill in the art that would have led such person to arrive at the claimed subject matter. See generally, In re Oetiker, 977 F.2d 1443, 1447-48, 24 USPQ2d 1443, 1446-47 (Fed. Cir. 1992); In re Vaeck, 947 F.2d 488, 493, 20 USPQ2d 1438, 1442 (Fed. Cir. 1991). The knowledge generally available to a person having ordinary skill in the art includes appellants' admission regarding what was known in the art at the time of the claimed invention. In re Nomiya, 509 F.2d 566, 570-71, 184 USPQ 607, 611-12 (CCPA 1975); In re Davis, 305 F.2d 501, 503, 134 USPQ 256, 258 (CCPA 1962).

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In re Aldrich, 398 F.2d 855, 857, 158 USPQ 311, 312 (CCPA 1968).

The preamble of claim 22 includes:

In a process for producing elemental sulfur by combustion of hydrogen sulfide or a hydrogen-sulfide-containing gas in a combustion whereby the hydrogen sulfide or the hydrogen sulfide-containing gas is treated by partially combusting with addition of air as the oxidation medium, subjecting the partially combusted hydrogen sulfide or hydrogen-sulfide-containing gas to afterburning by adding an oxygen-containing gas to the partially combusted gas, and feeding the reaction gas mixture to a waste-heat boiler and thereafter to one or more catalytic reactors... (Emphasis ours).

Thus, from my perspective, one of ordinary skill in the art armed with such admittedly old knowledge would have led to provide a multiplicity of nozzles at the afterburning zone of the combustion reactors, motivated by a reasonable of expectation of introducing an oxygen-containing gas in the afterburning zone to promote full combustion.

In view of the foregoing, I would have affirmed the examiner's decision.

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Chung K. Pak) APPEALS AND
Administrative Patent Judge) INTERFERENCES

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