The opinion in support of the decision being entered today was *not* written for publication and is *not* binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte STEPHEN WAYNE TEFFT,
PAUL CHARLES MADIX, JAMES ROBERT REINHARDT,
and TAG ALLEN KOENIG

Appeal 2007-0074
Application 10/758,381
Technology Center 1700

Decided: December 5, 2006

Before KIMLIN, WALTZ, and JEFFREY T. SMITH, *Administrative Patent Judges*.

KIMLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 12-25. Claim 12 is illustrative:

12. A method for forming a deposit on a deposition substrate, comprising the steps of

providing a deposition gun that burns a mixture of a fuel and an oxidizer to form a deposition gas flow, mixes a powder into the deposition

gas flow to form a deposition mixture flow, and projects the deposition mixture flow therefrom, wherein the deposition gun is provided with a flowing coolant;

measuring a flow rate of the fuel to the deposition gun, a flow rate of the oxidizer to the deposition gun, a flow rate of the powder to the deposition gun, and a cooling capacity of the coolant flow; and

set-point controlling the flow rate of the fuel, the flow rate of the oxidizer, the flow rate of the powder, and the cooling capacity of the coolant flow, all responsive to the step of measuring.

The Examiner relies upon the following references as evidence of obviousness:

Nakagawa	US 5,958,522 A	Sep. 28, 1999
Moore	US 2003/0161946 A1	Aug. 28, 2003

R. Knight, HVOF Sprayed 80/20 NiCr Coatings – Process Influence Trends, *Thermal Spray: International Advances in Coatings Technology*, 159-64 (1992).

Appellants' claimed invention is directed to a method for forming a deposit on a substrate using a deposition gun, such as a high-velocity oxyfuel deposition gun. Appellants acknowledge that such a deposition gun was known in the art at the time of filing the present application. To wit, Appellants state that "[t]he basic structure and operation of such a deposition gun 32 has been known" (Br. 3, ¶ 3). Appellants explain that identifying the governing process parameters in the coating method "is the biggest challenge, because there are many, many parameters that can be measured,

and an even greater number of combinations of the process parameters that could be selected for control" (Br. 3, ¶ 4), and that they have "discovered that some specific deposition process parameters are to be measured and then used as the control parameters" (Br. 3, ¶ 5). In particular, the process parameters measured and controlled by the present invention are the flow rates of the fuel, oxidizer, and powder to the deposition gun and the coolant flow. Appellants' method measures these parameters and utilizes feedback signals to control them.

Appealed claims 12-17 and 19-24 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Moore in view of Knight. Claims 18 and 25 stand rejected under 35 U.S.C. § 103(a) over the stated combination of references further in view of Nakagawa.

We have thoroughly reviewed each of Appellants' arguments for patentability. However, we are in complete agreement with the Examiner's reasoned analysis and application of the prior art, as well as her cogent disposition of the arguments raised by Appellants. Accordingly, we will adopt the Examiner's reasoning as our own in sustaining the rejections of record, and we add the following for emphasis only.

Moore, like Appellants, discloses the use of a high-velocity fuel deposition gun for forming a deposit on a deposition substrate (Moore 2, cols. 1-2). The principal argument advanced by Appellants is that the sensors referred to in the portion of Moore cited by the Examiner "are not sensors of gas flows, powder flows, and/or coolant flows, the process

parameters of the deposition gun which may be controlled" (Br. 5, ¶ 3). Appellants urge that "[t]he 'sensors' are described in para. [0028] of Moore, and include sensors of parameters of the coating itself, such as visual image, electrical properties of the coating, distance between the spray gun and the coating, temperature of the coating/substrate, and coating thickness" (*id*.). Appellants contend that "Moore never suggests measuring gas flow rates, powder flow rates, and cooling capacity of the deposition gun, and then controlling the deposition gun responsive to those measurements" (*id*.).

We totally reject Appellants' argument as not being in keeping with the entirety of the Moore disclosure as it would be understood by one of ordinary skill in the art. Certainly, paragraph [0028] of Moore discusses "some embodiments" for measuring interior surface 30 of the pipe 11 and the coating thereon. However, as emphasized by the Examiner, Moore is not limited to this embodiment or teaching. Manifestly, the disclosure in paragraphs [0032], [0033], and [0034] clearly teaches the control of the flow rates for the fuel, oxidizer, and powder, as well as the coolant, and utilizing controller 15 to use the measurements of the flow rates to provide automatic feedback control of the rates. In particular, paragraph [0033] provides the disclosure that "[o]perational aspects of the coating process, such as the flow rate of gases and powder to the spray gun **14**, the flow rates of coolant fluid through the cooling systems, initiation of the arc with a plasma spray gun **14** and others may be controlled to produce a uniform coating with desired characteristics." Also, paragraph [0034] provides "[c]ontrollers **15** may

monitor the coating process using the sensors, as preciously [sic, previously] discussed, and either provide feedback to an operator who makes adjustments or automatically adjust the operation to stay within selected coating parameters in response to variations in temperature, fluctuations in coating process parameters, the rate of coating deposition or any other detectable variations in the coating process."

Hence, based on the Moore disclosure alone, we are convinced that it would have been obvious for one of ordinary skill in the art to perform the claimed method of depositing a coating on a substrate using a high-velocity oxyfuel deposition gun by monitoring the flow rates of fuel, oxidizer, powder, and coolant, and using feedback control based on the monitored measurements to control such rates. In our view, the Knight disclosure is not necessary for arriving at the legal conclusion that the claimed method would have been prima facie obvious to one of ordinary skill in the art. However, we fully concur with the Examiner that Knight further supports the conclusion that the claimed flow rates are result effective variables in coating methods using a high-velocity oxyfuel deposition gun, and that it would have been obvious for one of ordinary skill in the art to determine through routine experimentation the optimum values for such rates. *In re Boesch*, 617 F.2d 272, 276, 205 USPQ 215, 219 (CCPA 1980).

We also reject Appellants' argument that a parameter may be controlled without being measured and using such measurement to control the parameter. While certainly it is possible to control a flow rate without

measuring it, it was notoriously well known in the chemical engineering art at the time of filing the present application to employ measurement of flow rates and feedback control in a wide variety of operational systems. We note that Appellants do not maintain that they have discovered the use of measurement and feedback control of flow rates but, rather, they submit that their discovery is identifying the process parameters that should be controlled in the claimed method. However, as explained above, both Moore and Knight provide ample evidence that the parameters identified by Appellants, namely, the flow rates for fuel, oxidizer, powder, and coolant, were known in the art as result-effective variables before Appellants' discovery.

Appellants rely upon experimental comparative data in the present Specification at paragraph [0029] as evidence of "surprising and unexpected improvements in the performance of the sprayed coatings" (Br. 8, ¶ 4). However, we totally agree with the Examiner that the demonstrated improvement utilizing control of known result-effective variables would hardly be considered unexpected by one of ordinary skill in the art when compared to a system lacking such controls. The burden of demonstrating unexpected results rests on the party asserting them, and Appellants have not established on this record that the Specification results would be considered truly unexpected by one of ordinary skill in the art. *In re Merck & Co.*, 800 F.2d 1091, 1099, 231 USPQ 375, 381 (Fed. Cir. 1986); *In re Klosak*, 455 F.2d 1077, 1080, 173 USPQ 14, 16 (CCPA 1972).

As for the separately argued claims, and the rejection of claims 18 and 25 over the further disclosure of Nakagawa, we will not burden the record with additional comments but rely upon the rationale expressed in the Examiner's Answer. Suffice it to say that we agree with the Examiner that controlling the ratio of fuel to oxygen is tantamount to controlling the flow rates of these gases. We find no merit in Appellants' argument that the fuel and oxygen ratio discussed by Knight "is a very different parameter than a separately measured 'flow rate of fuel' and 'flow rate of oxidizer', separate variables that are absolute flow rates, not ratios" (Reply Br. 6, ¶ 1). Manifestly, controlling the ratio of flow rates requires controlling the rates of each gas expressed in the ratio. As for Appellants' argument that "[n]either reference ever describes the structural details of its deposition device" (Br. 9, last ¶), Appellants acknowledge that deposition devices within the scope of the appealed claims were known in the art, as stated by Moore and evidenced by Knight.

In conclusion, based on the forgoing and the reasons well stated by the Examiner, the Examiner's decision rejecting the appealed claims is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 CFR § 1.136(a)(1)(iv) (2004).

AFFIRMED

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