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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE PATENT TRIAL AND APPEAL BOARD

Ex parte STEVEN R. PETERS, PAUL E. DENNEY, TERRANCE J. WIKBERG, and MICHAEL D. LATESSA

Appeal 2017-000508
Application 13/212,025[1]
Technology Center 3700

Before: LINDA E. HORNER, JEFFREY A. STEPHENS, and BRENT M. DOUGAL, *Administrative Patent Judges*.

DOUGAL, *Administrative Patent Judge*.

DECISION ON APPEAL

STATEMENT OF THE CASE

Appellants appeal under 35 U.S.C. § 134 from a final rejection of claims 1, 8, 9, 12, and 32–43. We have jurisdiction under 35 U.S.C. § 6(b).

We reverse.

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[1] Appellants identify Lincoln Global, Inc., a subsidiary of Lincoln Electric Holdings, Inc., as the real party in interest. Appeal Br. 3.

CLAIMED SUBJECT MATTER

The claims are directed generally to a method of welding with a hot filler wire and a high intensity energy source. Spec., Abstract. The invention is directed specifically to measuring a voltage applied between the filler wire and a workpiece to determine when the filler wire is, or is not, in contact with the workpiece. *Id.* at ¶¶ 5, 31. This information can be used to help prevent undesired arcing. *Id.* at ¶¶ 38–39. Claims 1, 8, 9, and 12 are independent. Claim 1, reproduced below, is illustrative of the claimed subject matter, with the pertinent claim language shown in italics:

> 1. A method of welding, comprising:
>
> creating a weld puddle with at least one high intensity energy source;
>
> determining a first upper threshold value for a parameter of a filler wire heating signal;
>
> determining a second upper threshold value for said filler wire heating signal to prevent arc creation between a filler wire and said weld puddle;
>
> heating said filler wire with said filler wire heating signal from a power source to a temperature such that said filler wire melts in said weld puddle when said filler wire is in contact with said weld puddle;
>
> directing said filler wire to said weld puddle such that said filler wire maintains contact with said weld puddle during a welding operation;
>
> monitoring a feedback from said filler wire;
>
> maintaining said parameter of said filler wire heating signal at said first upper threshold value;
>
> *shutting off said filler wire heating signal when, based on said feedback, said second upper threshold value is reached by said filler wire heating signal such that no arc is generated between said filler wire and said weld puddle*; and
>
> turning on said filler wire heating signal to continue heating said filler wire.

REFERENCES

The prior art relied upon by the Examiner in rejecting the claims on appeal is:

Manz et al.	US 3,483,354	Dec. 9, 1969
Lessmann et al.	US 3,924,092	Dec. 2, 1975
Ogasawara et al.	US 4,546,234	Oct. 8, 1985
Stol	US 4,580,026	Apr. 1, 1986
Hori et al.	US 4,904,843	Feb. 27, 1990
Parks et al.	US 4,954,691	Sept. 4, 1990

REJECTION

Claims 1, 8, 9, 12, and 32–43 are rejected under pre-AIA 35 U.S.C. § 103(a) as being unpatentable over either Lessmann or Stol in combination with Hori, Manz, and one of Parks or Ogasawara.

OPINION

Appellants argue, as to claim 1, that the cited references do not teach or suggest:

> shutting off said filler wire heating signal when, based on said feedback, said second upper threshold value is reached by said filler wire heating signal such that no arc is generated between said filler wire and said weld puddle.

Appeal Br. 17–19. Appellants further argue that the cited references do not teach or suggest the similar limitations of independent claims 8, 9, or 12. *Id.* at 21–24.

In rejecting claim 1, the Examiner finds that Lessmann and Stol teach, *inter alia*, a method of welding using a high intensity energy source and a hot filler wire, but they do not teach the relevant limitation highlighted by Appellants ("shutting off said filler wire heating signal . . ."). Final Act. 2–

3. The Examiner then proceeds to discuss the teachings of Hori, Manz, Parks, and Ogasawara and makes an obviousness determination based on these combined teachings. *Id.* at 3–5. Specifically, the Examiner finds that Hori teaches that "it is known to prevent an arc between the filler wire and the base workpiece with a current cutoff circuit . . . when the filler wire gets separated from a base workpiece." *Id.* at 3; *see also id.* at 7.

Appellants argue that "the arc current cut-off circuit B in Hori is based on the welding current to tungsten electrode 5 - not the heating current through filler wire 9." Appeal Br. 18. Specifically, Appellants assert that Hori's current cut-off circuit B is used to prevent arcing by turning off the transistor 15-5 to prevent the arc current from flowing into the filler wire 9 when the filler wire 9 is separated from the base metal 6 while the tungsten electrode 5 is positive. *Id.* (citing Hori col. 8:17–39, Figs. 13(a)–(c)). In this way, Hori controls undesirable current flow of the arc current.

The Examiner states that "[t]his argument is not deemed persuasive since the need to have the synchronized system in Hori is to prevent arc, and this arc prevention is controlled by the controlling of the supply power 15 by the Arc Current Cut-off Circuit B." Ans. 6. Though it is true that the arc current cut-off circuit B is within the filler wire heating power supply 15, the stated purpose of the *arc current* cut-off circuit B is "to prevent the *arc current* from flowing into the filler wire **9** when the filler wire **9** is separated from the base metal **6**." Hori, col. 7:61–63, Fig. 10 (emphasis added). Hori's *arc current* cut-off circuit B prevents the arc current from flowing to the filler wire. We further note Hori teaches that the transistor 15-5 is turned off (i.e., the arc current cut-off circuit B is active) when the arc current waveform is being generated, but is on (i.e. the arc current cut-off circuit B

is inactive) when the wire current waveform is generated. *Id.* at col. 8:17–39, Figs. 13(a)–(c). The Examiner does not identify any teaching in Hori to suggest control of the *filler wire heating current* to prevent arcing.

Concerning Manz, the Examiner finds that it "teaches that it is known in the art that a spark or arc would occur when the power supplied to a filler wire (13) is greater than that necessary to melt the wire." Final Act 3. The Examiner also finds that Manz teaches using "a controller to balance the [filler] wire feed speed and the power supply to the [filler] wire so that the [filler] wire will not spark or cause to arc as power output is reduced or ramped down." *Id.* at 4. As explained below, Manz prevents arcing through control of the amount of voltage used to heat the filler wire but does not teach shutting off the voltage to the filler wire.

Manz is directed at improving the TIG (tungsten inert gas) welding process. Manz, Abstract. Manz teaches moving the heated filler wire to "the rear of the weld puddle behind the arc" to add material to the weld puddle, and to deliver it at a steep angle from the workpiece. *Id.* at col. 3:12–13, 40–44. This allows for separation of voltage used for the heating of the filler wire from the voltage used to create the molten pool of metal with the arc "so that the deposition rate [of the filler wire] can be controlled almost independently of the arc." *Id.* at col. 3:3–6. Manz further teaches that undesired arcing can be prevented by using the above method while also heating the filler wire with a "voltage . . . well below an arc sustaining voltage." *Id.* at col. 5:7–8.

Thus, Manz does teach of the issue of high heat of the filler wire and undesired arcing, however, it teaches that this can be solved by lowering the voltage to "below an arc sustaining voltage." Thus, Manz also does not

support a finding that the art suggests control of the heating signal based on feedback to shut off the heating signal to prevent arcing.

The Examiner finds that "Parks and Osagawa [sic] show it is known to monitor a feedback signal from a filler wire to further control a supply power to the filler wire via a voltage/current detector." *Id.* at 4. The Examiner further finds that these feedback systems use threshold values (that correspond to an arc creation point) to reduce or shutoff the voltage when the threshold is exceeded, thereby preventing arcing. *Id.*

However, in response to Appellants' arguments, the Examiner restates the teachings of Parks and Ogasawara as teaching "a feedback signal via the current/voltage sensor to control a *welding signal*," as opposed to "a supply power to the filler wire." *Id.* at 7. The Examiner then clarifies that these teachings "are related with a welding current and not necessarily with a [filler wire] heating current." *Id.* at 8. Thus, the Examiner appears to agree with Appellants that the teachings of Parks and Ogasawara are directed to the use of feedback to shutoff *arc voltage*, rather than shutting off a filler wire heating signal. Appeal Br. 19–20.

Nevertheless, the Examiner explains that these teachings "show how . . . current or voltage values can be evaluated as a feedback signal to further control the current/power signal which would also be applicable to the control of the filler wire that can create the arc as shown in Parks and Ogasawara." Final Act. 8. The Examiner does not further explain this point (that Parks and Ogasawara's teachings "would also be applicable to the control of the filler wire") or provide a reason why one of skill in the art would have found it obvious to "control . . . the filler wire" heating signal based on Parks and Ogasawara teaching of "a feedback signal . . . to control

a *welding signal*." Nor does the Examiner *clearly explain* how these teachings relate to the teachings of Hori and Manz to result in the claimed invention.

In view of the above discussion, we do not sustain the rejection of the claims as Appellant has rebutted the rejection by showing that the Examiner failed to articulate adequate reasons to combine the prior art teachings in the manner claimed.

DECISION

The Examiner's rejection of claims 1, 8, 9, 12, and 32–43 is reversed.

REVERSED