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BEFORE THE PATENT TRIAL AND APPEAL BOARD

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*Ex parte* MARK FRISBEE,
PAUL STAPLETON,
MILTON G. CARAWAN,
and FREDERIC PHILIPPE AMPOLINI

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Appeal 2020–001032
Application 14/802,137
Technology Center 3700

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Before ANTON W. FETTING, ULRIKE W. JENKS, and AMEE A. SHAH, *Administrative Patent Judges*.

FETTING, *Administrative Patent Judge*.

DECISION ON APPEAL

## STATEMENT OF THE CASE[1]

Mark Frisbee, Paul Stapleton, Milton G. Carawan, and Frederic Philippe Ampolini (Appellant[2]) seek review under 35 U.S.C. § 134 of a final rejection of claims 1–10, the only claims pending in the application on appeal. We have jurisdiction over the appeal pursuant to 35 U.S.C. § 6(b).

The Appellant invented an aerosol delivery devices that may utilize electrically generated heat for the production of aerosol. Specification 1:3–5.

An understanding of the invention can be derived from a reading of exemplary claim 1, which is reproduced below (bracketed matter and some paragraphing added).

1. A control body

coupleable with a cartridge

that is equipped with a heating element and contains an aerosol precursor composition,

the control body being coupleable with the cartridge

to form an aerosol delivery device

in which the heating element is configured to activate and vaporize components of the aerosol precursor composition,

the control body comprising:

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[1] Our decision will make reference to the Appellant's Appeal Brief ("Appeal Br.," filed June 10, 2019) and Reply Brief ("Reply Br.," filed November 18, 2019), and the Examiner's Answer ("Ans.," mailed September 18, 2019), and Final Action ("Final Act.," mailed December 13, 2018).

[2] 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 RAI Strategic Holdings, Inc. (Appeal Br. 1).

[1] a first positive conductor connectable with a power supply;

[2] a second positive conductor connectable with the heating element;

[3] a series pull-up resistor and switch connected to and between the first positive conductor and second positive conductor,

the switch being connected to and between the pull-up resistor and second positive conductor;

and

[4] a microprocessor configured

to operate the switch in a closed state in a standby mode

in which the pull-up resistor is configured to cause a logical high level of voltage at the second positive conductor when the control body is uncoupled with the cartridge,

and in which the heating element is unpowered and causes a logical low level of the voltage at the second positive conductor

when the control body is coupled with the cartridge,

wherein the microprocessor is configured to

measure the voltage at the second positive conductor

and

control operation of at least one functional element of the aerosol delivery device based thereon.

The Examiner relies upon the following prior art:

| Name | Reference | Date |
|---|---|---|
| Jordan | US 2016/0374397 A1 | Dec. 29, 2016 |

Claims 1–10 stand rejected under 35 U.S.C. § 102(a) as anticipated by Jordan.

## ISSUES

The issues of novelty turn primarily on whether Jordan describes the connections and voltage levels at those connections recited in the claims.

## FACTS PERTINENT TO THE ISSUES

The following enumerated Findings of Fact (FF) are believed to be supported by a preponderance of the evidence.

*Facts Related to the Prior Art*

*Jordan*

01. Jordan is directed to an electronic vaping (e-vaping) device. Jordan para. 3.
02. Jordan describes an electronic vaping (e-vaping) device that includes a replaceable cartridge (or first section), a reusable section (or second section), and light indicators. Jordan para. 59.
03. Jordan describes an electrical connection between the anode 110b of the power supply 110 and the heater 252 in the first section 50 established through the PCB 116, the anode portion (female anode) 102 in the second section 100, the male anode 208 in the first section 50, and a connection point 260 on the male anode 208 with a first electrical lead of the heater 252. Jordan para. 80.
04. Jordan describes the controller 500 applying power to the heater 252 according to the determined duty ratio. The microprocessor 502 controls the power modulation circuit 715 to provide a pulse width modulated power signal to the heater 252 according to the determined duty ratio. Jordan para. 133.

05. Jordan describes the heater control circuit as including a cartridge detector 1200. An input signal (or input voltage) Vin may be input into the cartridge detector at terminal 1240 of the cartridge detector. The terminal 1240 may be electrically connected to the anode 102 of the female connecting portion 106 through, for example, wire 128 (see FIG. 3A) or other electrical connections on the circuit board 116. Jordan para. 148.

06. Jordan describes a cartridge detector with a voltage divider. The voltage divider has two resistors and a switching element such as a MOSFET transistor. The MOSFET gate terminal connects to terminal 1245. The MOSFET source terminal connects to a resistor, and the MOSFET drain terminal connects to the other resistor at node A. That is, the resistors and switch are connected in series. Jordan para. 150.

07. Jordan describes input signal Vin depending on whether the sections are attached. For example, if the sections are detached, Vin is a low voltage level. If the sections are attached, Vin is a high voltage level, due to the electrical connection to the power supply. Jordan para. 154.

08. Jordan describes the switching element 1235 switching on and off according to the output voltage of the voltage divider 1205 at node A. For example, if the voltage at node A is above a threshold voltage of the switching element 1235, the switching element 1235 turns on to connect terminal 1250 to a common voltage (or ground voltage). Here, the detection signal DET is pulled into a low state in which the microprocessor 502 detects

> that the first section 50 is attached to the second section 100. If the voltage at node A is less than the threshold voltage, the switching element 1235 turns off and the detection signal DET returns to a high state in which the microprocessor 502 detects that the first section 50 is detached from the second section 100. Jordan para. 155.

ANALYSIS

Initially we must construe the term "connected to" in limitation 3 of claim 1. The Examiner determines that various components are connected to one another, but does not show how this is so in the Final Action. *See* Final Act. 2–3. Neither does the Examiner define how the term is used. *See id.* It is unclear from visual inspection how, in particular, the Examiner finds connections to the equivalent of the first positive connector as recited in limitation 3. This connection is to the positive contact of the power supply. The Examiner sheds some light on the interpretation in the Answer in determining that

> [t]he series pull-up resistor and switch are part of the circuit board 116, and as shown in Fig. 3A, the circuit board 116 is connected between the conductors 110a and 106a. The circuit board 116 is illustrated in Fig. 5A with connections to the battery 110, to the heater control circuit and therefore to the heater as shown in Fig. 7.

Ans. 4. Thus, the Examiner appears to be interpreting "connected to" as meaning joined or fastened together[3] irrespective of intervening components.

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[3] American Heritage Dictionary, https://www.ahdictionary.com/word/search.html?q=connected, last visited 9/8/2020.

The Examiner interprets all components in a circuit, no matter how far apart, as connected to one another. *See id.* As this is the first instance in which the Examiner shows this to be the interpretation, the Appellant replies that this is not a reasonable construction, citing *In re Power Integrations, Inc*., 884 F.3d 1370 (Fed. Cir. 2018). Reply Br. 3.

*Power Integration* had a similar construction issue, although the phrase there was "coupled to." The court there found the PTAB's construction to be unreasonably broad where

> [u]nder the board's overly expansive view of the term "coupled," every element anywhere in the same circuit is potentially "coupled" to every other element in that circuit, no matter how far apart they are, how many intervening components are between them, or whether they are connected in series or in parallel.

*Id.* at 1376. The court held that looking to the disclosure was necessary to determine how to construe the term. In the instant case, every instance shown in the drawings of the components referred to as connected to one another shows an immediate electrical connection such that there is no or negligible voltage drop across the connection. *See, e.g.,* Spec. 19–21, Fig. 3 That is to say the connection is a direct electrical circuit connection with no intervening components.

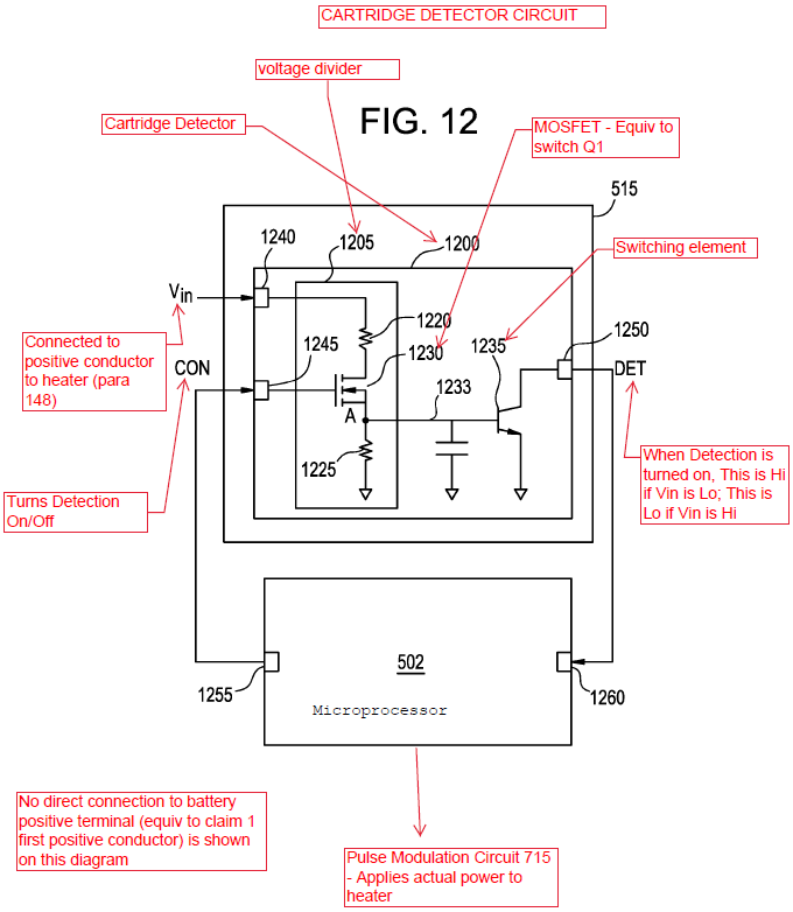
Thus we construe "connected to" as meaning connected using a direct electrical circuit connection with no intervening components. In particular, although Jordan describes how "electrical connection between the anode 110b of the power supply 110 and the heater 252 in the first section 50 [are] established through the PCB 116" (FF 03), because this is a connection through the entire printed circuit board, it has intervening components and is not within the scope of "connected to" as properly construed.

As to claim 1, the Examiner determines that Jordan describes

> a control body (100) coupleable with a cartridge (50) that is equipped with a heating element (250, 252) . . . , the control body comprising a first positive conductor (p.0072-0073) connectable with a power supply (110); a second positive conductor connectable with the heating element (p.0080); a series pull-up resistor and switch connected to and between the first positive conductor and second positive conductor (as shown in Fig. 12; p.0154-0155), the switch being connected to and between the pull-up resistor and second positive conductor (as shown in Fig. 12; p.0154-0155); and a microprocessor (500, 502) configured to operate the switch in a closed state in a standby mode in which the pull-up resistor is configured to cause a logical high level of voltage at the second positive conductor when the control body is uncoupled with the cartridge (p.0154-0155), and in which the heating element is unpowered and causes a logical low level of the voltage at the second positive conductor when the control body is coupled with the cartridge (p.0154-0155; p.0159-0160).

Final Act. 2–3.

Figure 12 that the Examiner refers to is below and is annotated.




Annotated Jordan Figure 12 showing a cartridge detection circuit.

The Appellant contends that Jordan's resistor (1225) and switch (1230) are not in series, at least given the presence of capacitive structure (1233); that Jordan's terminal (1240) and resistor (1220) are not connected to the first positive conductor (110a); and that Jordan's switch (1230) is not connected to either the first positive conductor (110a) or the second positive conductor (106a), and so Jordan's series resistor (1220) and switch (1230) are not connected to and between the first positive conductor (110a) or the second positive conductor (106a). Appeal Br. 4–5.

The Examiner answers that "[a]s shown in Fig. 3A, 5A, 7 and 12 . . . Jordan teaches a series pull-up resistor (1220, 1225) and switch (1230)

connected to and between the first positive conductor (110a) and second positive conductor (106a)." Ans. 4. The Appellant replies that "**terminal (1240) - and thus resistor (1220) - is connected to the anode (102), and not either the first positive conductor (110a) or the second positive conductor (106a).**" Reply Br. 4. We agree that the Examiner fails to show how Jordan describes connecting the resistor and switch to the equivalent of the recited first positive conductor. Instead, Jordan's resistor (1225) is connected to ground, equivalent to a negative conductor. We determine in the claim construction above that the Examiner's alternate theory that the resistors are connected to the first positive conductor through the printed circuit requires an unreasonable construction of "connected to," even under the broadest reasonable interpretation.

The Appellant also contends that Jordan does not describe that when the first and second sections (50, 100) are detached, resistor (1220) or resistor (1225) causes a logical high level at the second positive conductor (106a), because Jordan does not even describe that the second positive conductor (106a) has a logical high level when the first and second sections (50, 100) are detached, as required by limitation 4 of claim 1. Appeal Br. 6.

The Examiner answers that

> Jordan teaches a microprocessor (500, 502) configured to operate the switch in a closed state in a standby mode in which the pull-up resistor is configured to cause a logical high level of voltage at the second positive conductor when the control body is uncoupled with the cartridge (p.0154-0155). A logic high level of a detection signal is caused when the first section 50 is detached from the second section 100 (p.0155).

Ans. 5. The Appellant replies that "the logic high level of the detection signal DET is not a logical high level <u>at the second positive conductor</u>

(106a) (i.e., cathode portion 106a). The detection signal DET instead feeds directly into the microprocessor (502)." Reply Br. 6. We agree that the Examiner is referring to Jordan's terminal 1250, which connects to a microprocessor input, and not to any conductor that is connected electrically with the heater. Unlike instant claim 1 and Figure 3 which connect the cartridge detection signal connection directly to the positive terminal of the heater, Jordan directs the detection signal solely as an input to a microprocessor. FF 08. Indeed, Jordan describes the signal at the terminal connecting to the heater, which feeds Vin, as having the opposite relationship as claimed, being high when the heater is connected and low when disconnected. FF 07.

The Appellant similarly contends that Jordan does not describe that when the first and second sections (50, 100) are attached, resistor (1220) or resistor (1225) causes a logical low level at the second positive conductor (106a), because Jordan does not even describe that the second positive conductor (106a) has a logical low level when the first and second sections (50, 100) are attached. Appeal Br. 7. This is just the complementary operation to the detachment argument above, and is equally persuasive here.

We therefore determine that the Examiner's findings are erroneous as to both limitations 3 and 4 of claim 1. The remaining claims depend from claim 1.

## CONCLUSIONS OF LAW

The rejection of claims 1–10 under 35 U.S.C. § 102(a)(2) as anticipated by Jordan is improper.

## CONCLUSION

The rejection of claims 1–10 is reversed.

In summary:

| Claims Rejected | 35 U.S.C. § | Basis | Affirmed | Reversed |
|---|---|---|---|---|
| 1–10 | 102(a)(2) | Jordan | | 1–10 |

REVERSED