



Direct Examination of Dr. Alfonso Ortega

Debtors' Amended Omnibus Objection to Claim Numbers 004, 062, and 068-072 filed by
Midas Green Technologies, LLC

In re: RHODIUM ENCORE LLC, et al.

September 23, 2025



Dr. Alfonso Ortega

The James R. Bile Professor of Energy Technology, Villanova University

Education

Ph.D., Mechanical Engineering, Stanford University, June 1986 (Supervisor: Prof. Robert J. Moffat)

M.S., Mechanical Engineering, Stanford University, August 1978

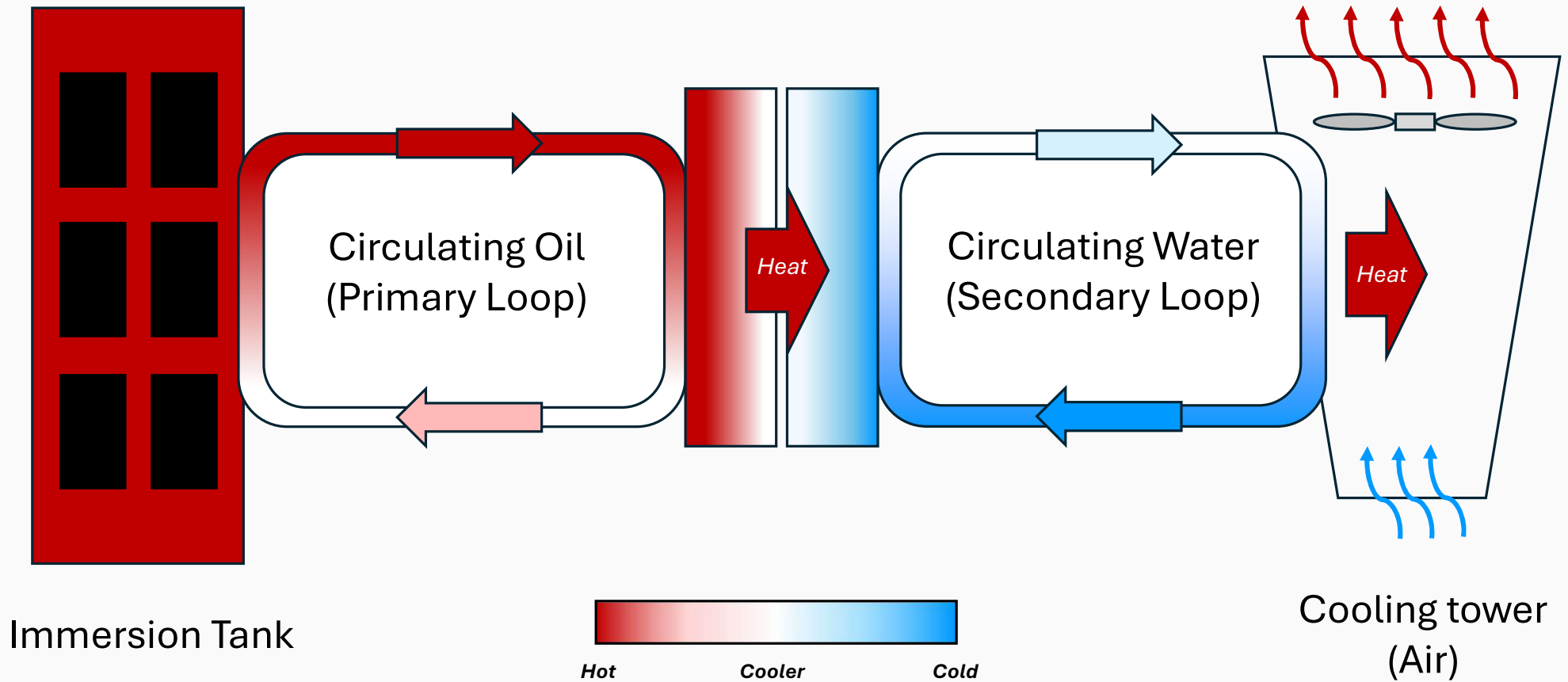
B.S., Mechanical Engineering, University of Texas at El Paso, August 1976

Other Current Positions


Founder and Director, The Laboratory for Advanced Thermal and Fluid Systems, University of Arizona (1990-2004), Villanova University (2005-present)

Founding Director, The National Science Foundation Industry/University Cooperative Research Center (I/UCRC) on Energy Smart Electronic Systems (ES2)

Basic Immersion Cooling Principles



U.S. Patent No. 10,405,457



US010405457B2

(12) **United States Patent**
Boyd et al.

(10) **Patent No.:** **US 10,405,457 B2**
(45) **Date of Patent:** **Sep. 3, 2019**

(54) **APPLIANCE IMMERSION COOLING SYSTEM**

(71) Applicants: **Christopher L. Boyd**, Austin, TX (US); **James P. Koen**, Round Rock, TX (US); **David Christopher Laguna**, Austin, TX (US); **Thomas R. Turner**, Georgetown, TX (US); **Kenneth D. Swinden**, Hutto, TX (US); **Mario Conti Garcia**, Austin, TX (US); **John Charles Tribou**, Austin, TX (US)

(72) Inventors: **Christopher L. Boyd**, Austin, TX (US); **James P. Koen**, Round Rock, TX (US); **David Christopher Laguna**, Austin, TX (US); **Thomas R. Turner**, Georgetown, TX (US); **Kenneth D. Swinden**, Hutto, TX (US); **Mario Conti Garcia**, Austin, TX (US); **John Charles Tribou**, Austin, TX (US)

(73) Assignee: **Midas Green Technologies, LLC**, Austin, TX (US)

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 680 days.

(21) Appl. No.: **14/355,533**

(51) **Int. Cl.**
H01L 23/44 (2006.01)
H05K 7/20 (2006.01)

(52) **U.S. Cl.**
CPC **H05K 7/20236** (2013.01); **H01L 23/44** (2013.01); **H05K 7/20272** (2013.01)

(58) **Field of Classification Search**
CPC **H05K 7/20236**; **H05K 7/20272**; **H01L 23/42**; **H01L 23/44**
(Continued)

(56) **References Cited**
U.S. PATENT DOCUMENTS

4,590,538 A * 5/1986 Cray, Jr. **H05K 7/20236**
361/700
5,167,511 A * 12/1992 Krajewski **H01R 4/01**
361/785
(Continued)

FOREIGN PATENT DOCUMENTS

JP 5956100 B1 * 7/2016 **G06F 1/20**
RU 2042294 C1 8/1995
SU 1764094 A1 9/1992

Primary Examiner — Devon Russell
(74) *Attorney, Agent, or Firm* — Jeffrey Van Myers

APPLIANCE IMMERSION COOLING SYSTEM

Title of the '457 Patent

Independent Claim 1
Dependent Claim 5

Asserted Claims of the '457 Patent

'457 Patent

Asserted Claims of '457 Patent

“1 . An appliance immersion cooling system comprising:
a tank adapted to immerse in a dielectric fluid a plurality of electrical appliances, each in a respective appliance slot distributed vertically along, and extending transverse to, a long wall of the tank, the tank comprising . . . ”

Claim 1 of the '457 Patent (excerpted)

“5 . The system of claim 1
wherein the control facility further comprises a communication facility adapted to facilitate monitoring and control of the control facility from a remote location.”

Claim 5 of the '457 Patent (excerpted)

Appliance Slots

“1 . An appliance immersion cooling system comprising: a tank adapted to immerse in a dielectric fluid a plurality of electrical appliances, each in a respective appliance slot distributed vertically along, and extending transverse to, a long wall of the tank, the tank comprising:

a weir, integrated horizontally into the long wall of the tank adjacent all appliance slots, having an overflow lip adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot; and; . . . ”

Claim 1 of the '457 Patent (excerpted)

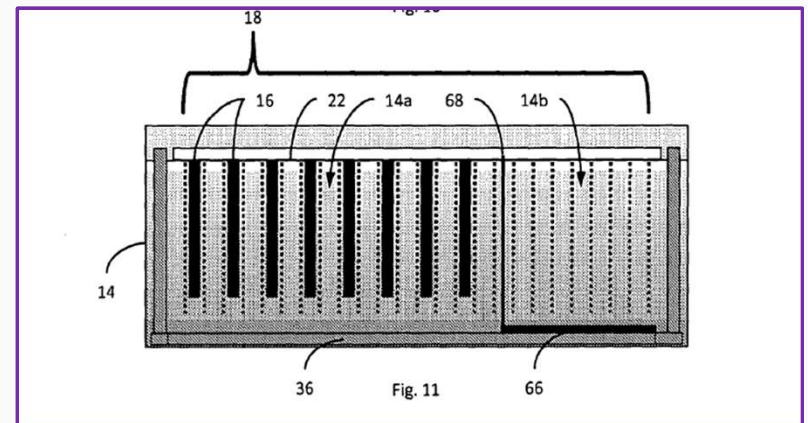


Fig. 11 of the '457 Patent

Figure 1 of the '457 Patent

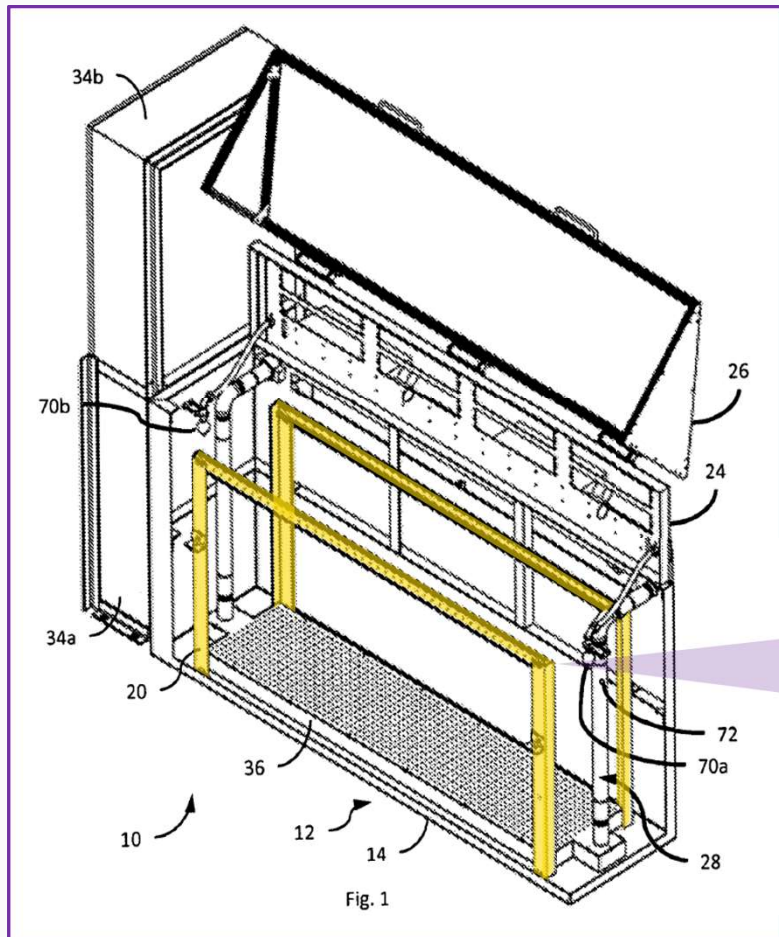
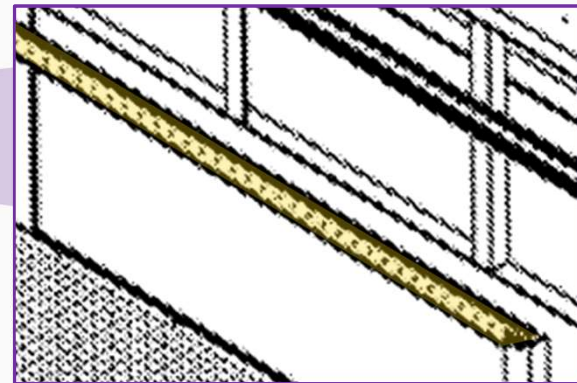


Fig. 1 of the '457 Patent (color added)

“... an appliance rack facility **20** of convention design adapted to suspend the appliance **16**...”

Col. 3, ll. 49-51 of '457 Patent
(excerpted)



Rhodium's Tanks

Exhibit No. 31

Filed Under Seal

Exhibit No. 32

Filed Under Seal

Primary & Secondary Fluid Circulation Facilities

“1 . An appliance immersion cooling system comprising . . .

a **secondary fluid circulation facility** adapted to extract heat from the dielectric fluid circulating in the primary circulation facility, and to dissipate to the environment the heat so extracted; and . . .”

Claim 1 of the '457 Patent (excerpted)

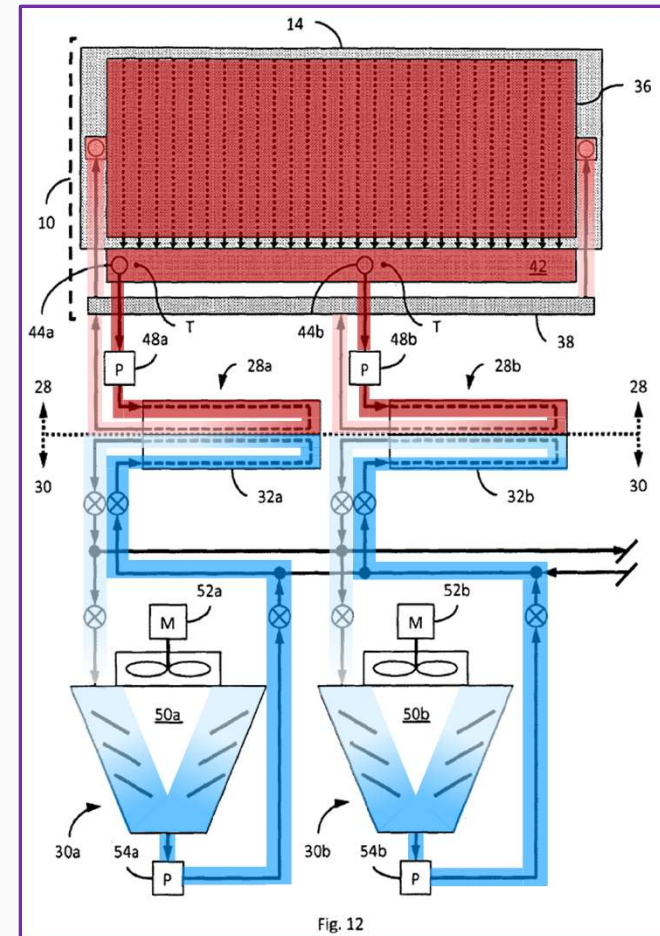
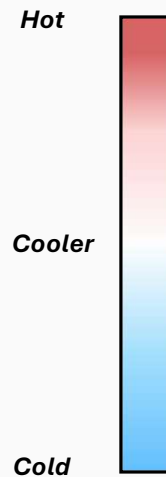
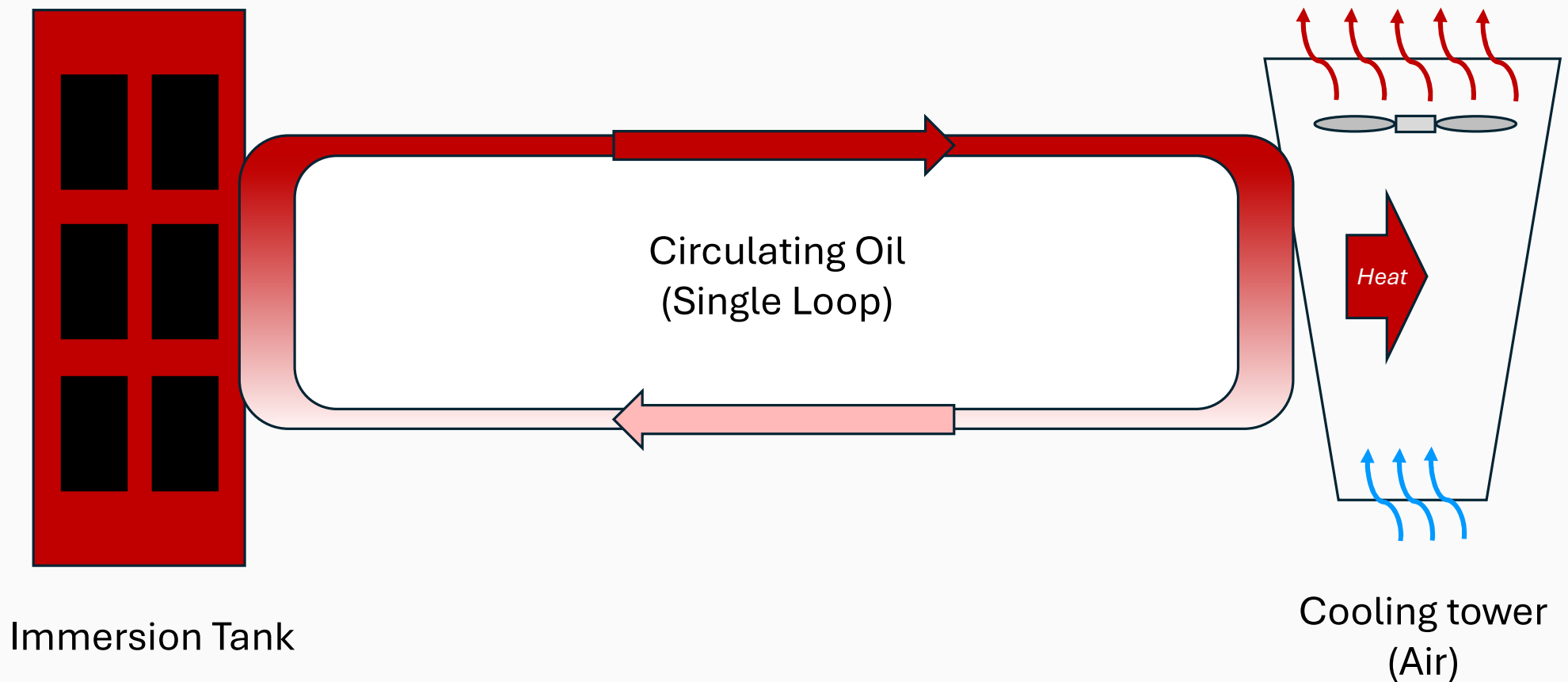


Fig. 12 of the '457 Patent (color added)

Rhodium's Single Loop Cooling System



Control Facility

1. An appliance immersion cooling system comprising:
 - a tank adapted to immerse in a dielectric fluid a plurality of electrical appliances, each in a respective appliance slot distributed vertically along, and extending transverse to, a long wall of the tank, the tank comprising:
 - a weir, integrated horizontally into the long wall of the tank adjacent all appliance slots, having an overflow lip adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot; and;
 - a dielectric fluid recovery reservoir positioned vertically beneath the overflow lip of the weir and adapted to receive the dielectric fluid as it flows over the weir;
 - a primary circulation facility adapted to circulate the dielectric fluid through the tank, comprising:
 - a plenum, positioned adjacent the bottom of the tank, adapted to dispense the dielectric fluid substantially uniformly upwardly through each appliance slot;
 - a secondary fluid circulation facility adapted to extract heat from the dielectric fluid circulating in the primary circulation facility, and to dissipate to the environment the heat so extracted; and
 - a control facility adapted to coordinate the operation of the primary and secondary fluid circulation facilities as a function of the temperature of the dielectric fluid in the tank.

“ . . . a control facility adapted to coordinate the operation of the primary and secondary fluid circulation facilities as a function of the temperature of the dielectric fluid in the tank.”

Claim 1 of the '457 Patent (excerpted)