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**Boyd et al.**

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(54) **APPLIANCE IMMERSION COOLING SYSTEM**

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 patent is extended or adjusted under 35  
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This patent is subject to a terminal dis-  
 claimer.

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(65) **Prior Publication Data**

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 application No. PCT/US2013/075126 on Dec. 13,  
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(Continued)

(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**; **H05K**  
**7/20327**; **H01L 23/44**

See application file for complete search history.

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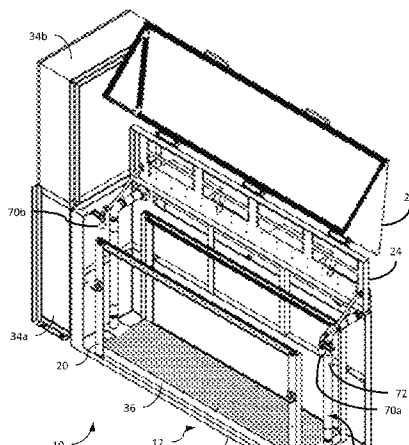
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(57) **ABSTRACT**

A appliance immersion tank system comprising: a generally rectangular tank adapted to immerse in a dielectric fluid a plurality of appliances, each in a respective appliance slot distributed vertically along, and extending transverse to, the long axis of the tank; a primary circulation facility adapted to circulate the dielectric fluid through the tank; 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 plenum, positioned adjacent the bottom of the tank, is adapted to dispense the dielectric fluid substantially uniformly upwardly through each appliance slot. A weir, integrated horizontally into a long wall of the tank, is adapted to facilitate substantially uniform recovery of the dielectric fluid flowing through each appliance slot. All active and most passive components of both the primary and secondary fluid circulation facilities, and the control facility are fully redundant, and are adapted automatically to operate in a fail-soft mode.

**10 Claims, 7 Drawing Sheets**



**Related U.S. Application Data**

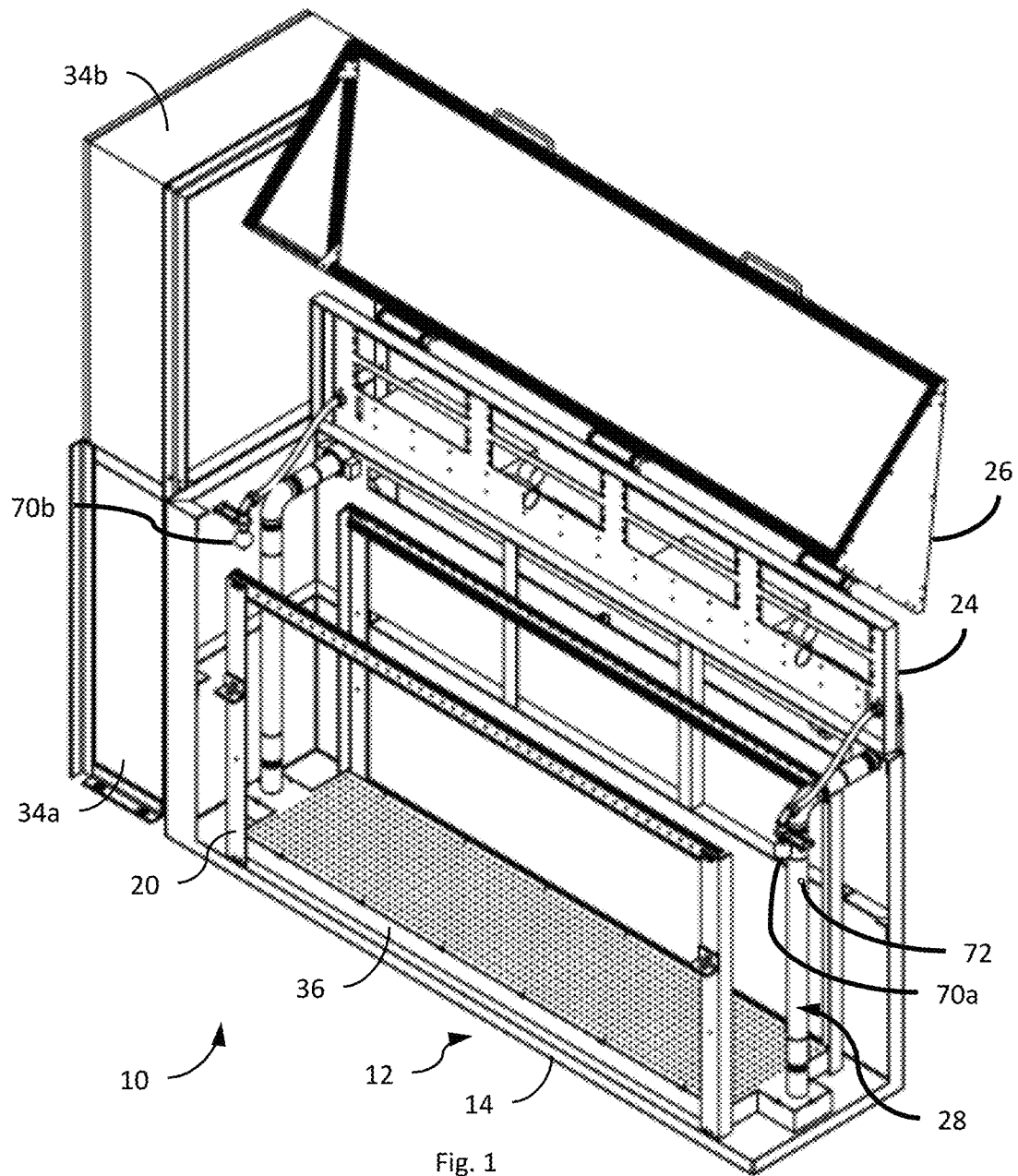
- (60) Provisional application No. 61/832,211, filed on Jun. 7, 2013.

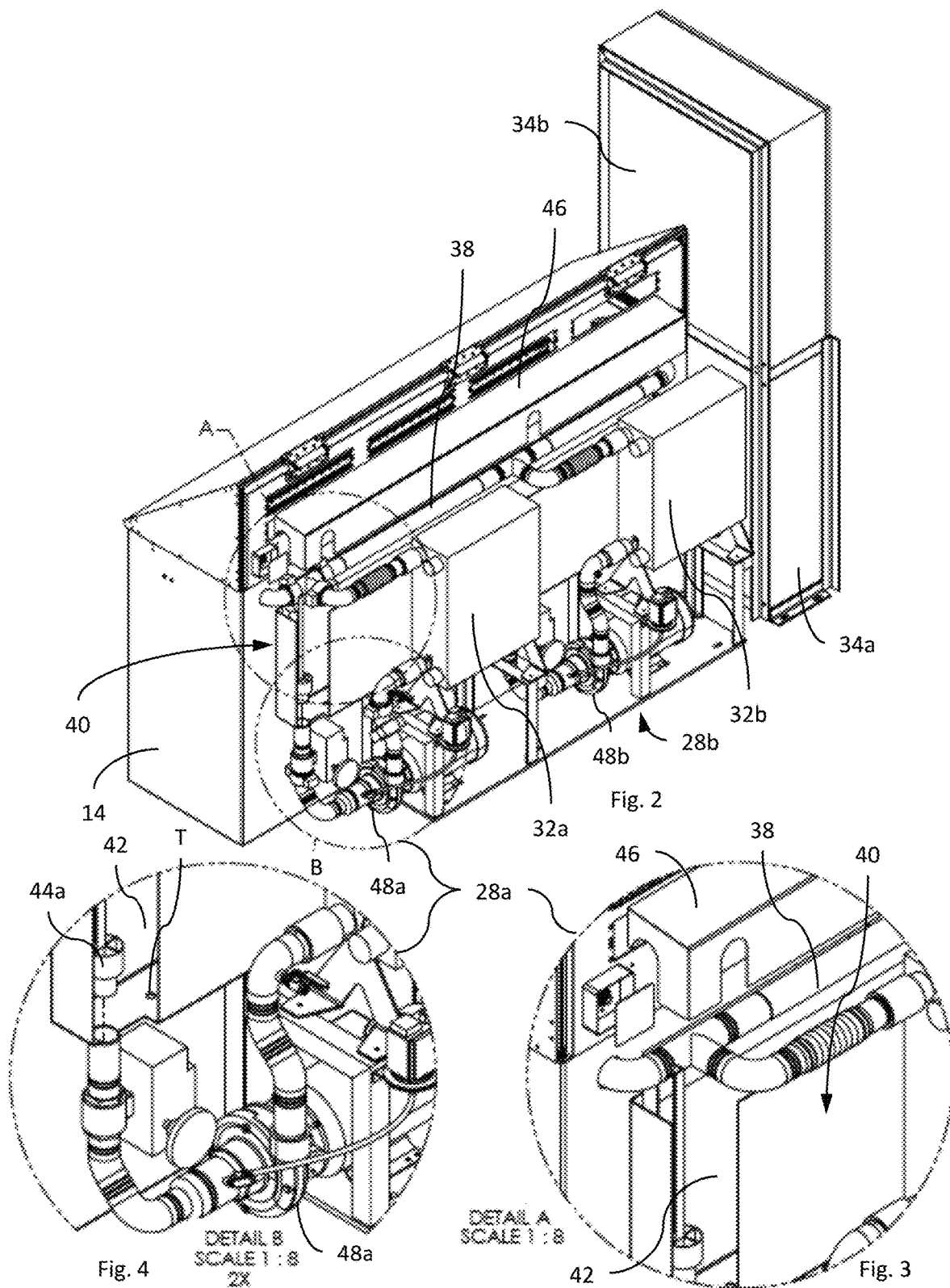
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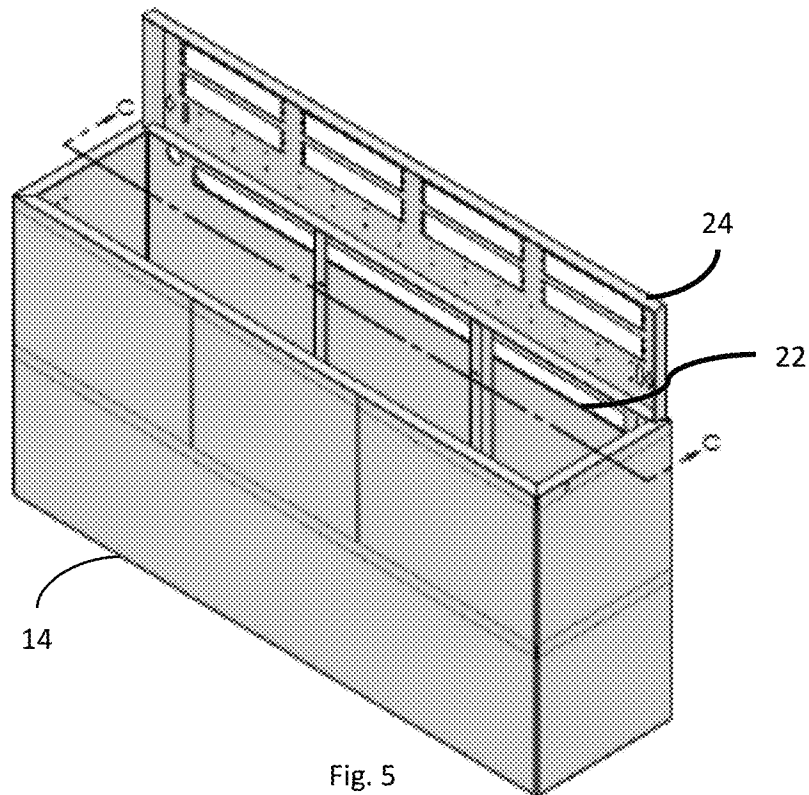
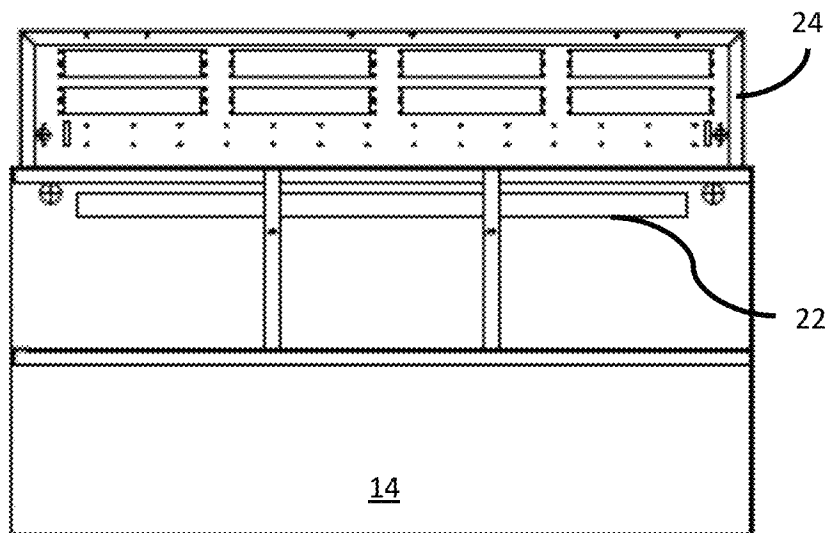


Fig. 5



Section C-C  
Fig. 6

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