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Kistler et al.

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(54) **LARGE CRYOGENIC TANK LOGISTICS FOR IN-SPACE VEHICLES**

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(22) Filed: **Jun. 22, 2007**

Related U.S. Application Data

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12, 2007.

(51) **Int. Cl.**
B64G 1/00 (2006.01)
B64G 1/64 (2006.01)

(52) **U.S. Cl.** **244/172.3; 244/172.4**

(58) **Field of Classification Search** **244/172.2,**
244/172.3, 135 A, 135 R
See application file for complete search history.

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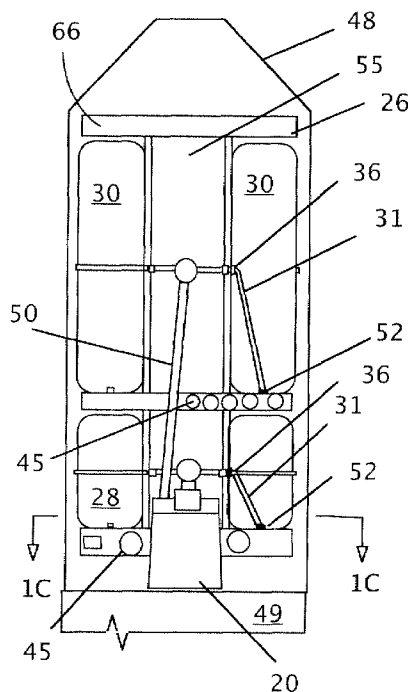
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(57) **ABSTRACT**

An aerospace frame accommodates propellant tanks for facilitating propellant operations in space. The frame includes at least two plates for supporting the propellant tanks; at least one brace supporting the plates; and a cavity between two plates that accommodates a removable propellant tank.

16 Claims, 16 Drawing Sheets



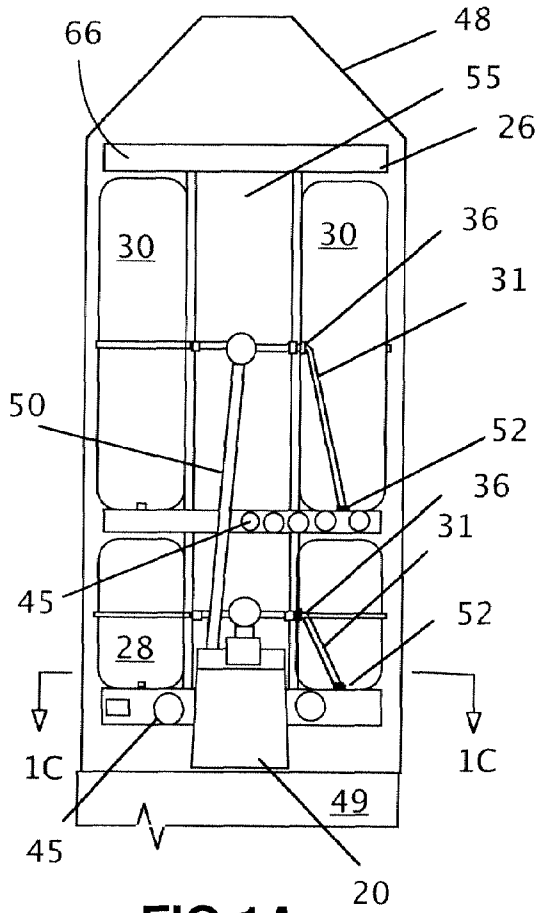


FIG. 1A

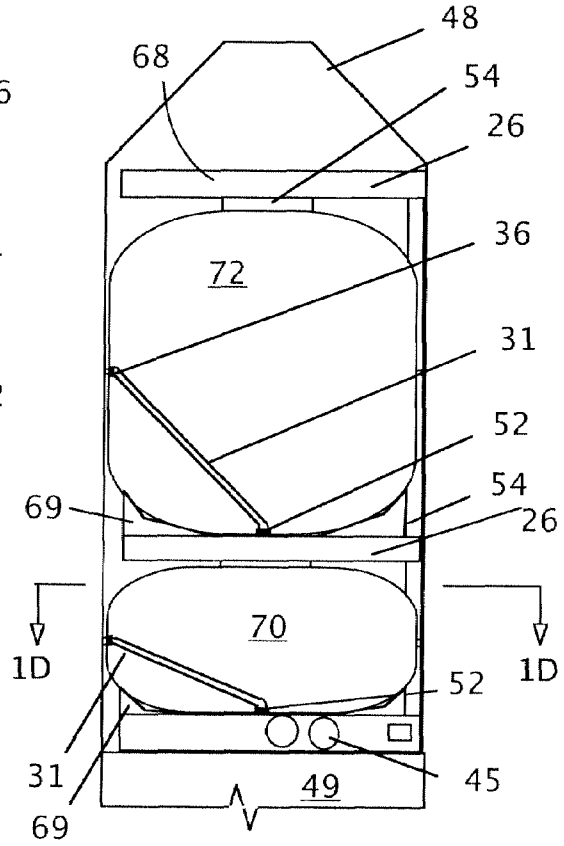


FIG. 1B

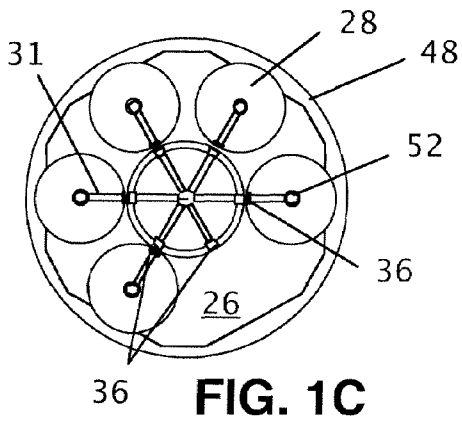


FIG. 1C

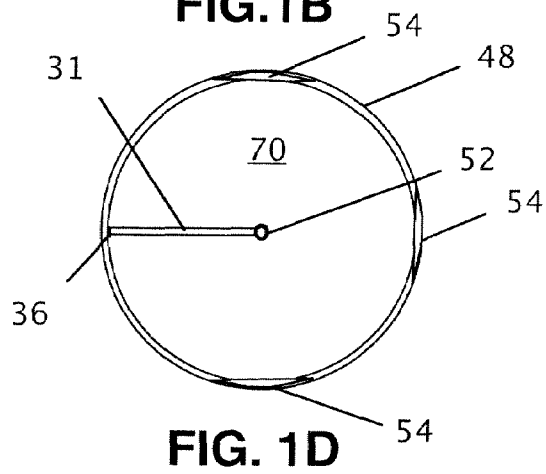
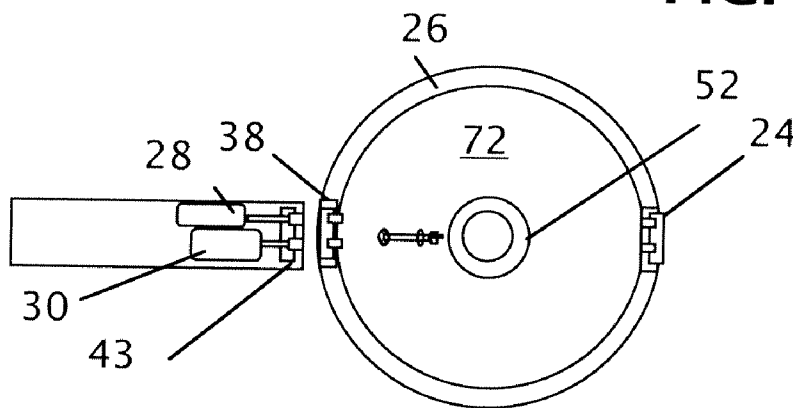
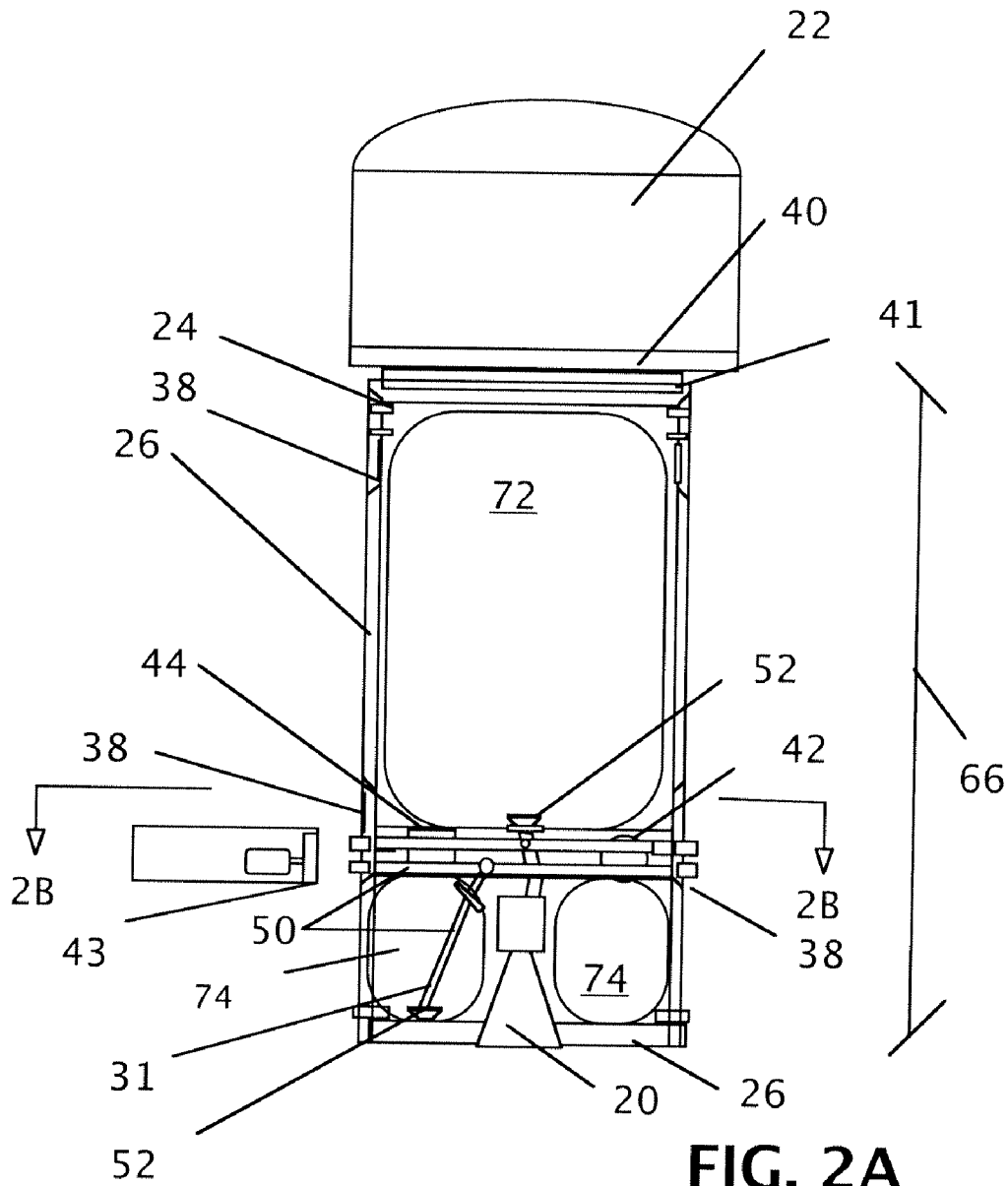


FIG. 1D



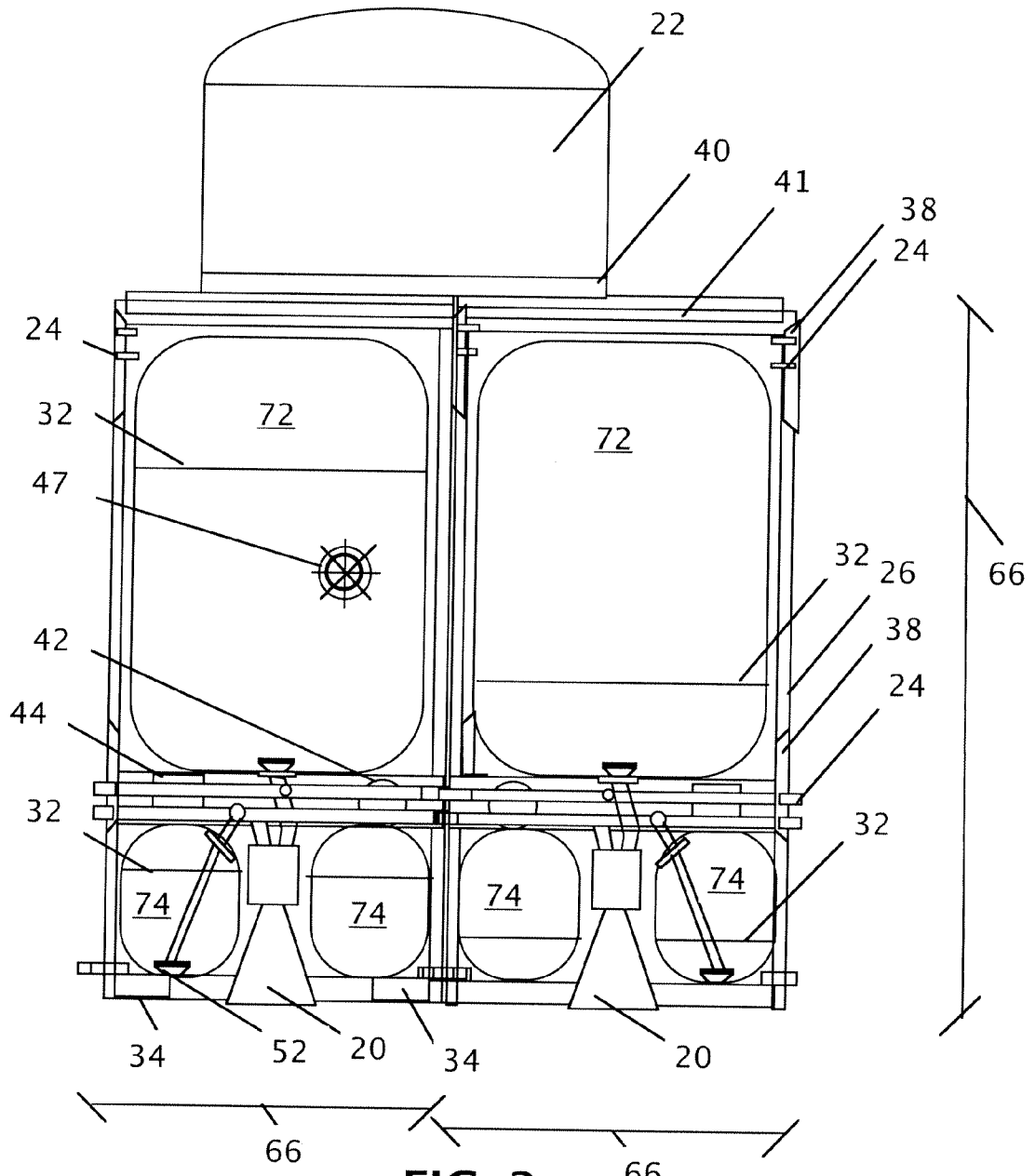


FIG. 3

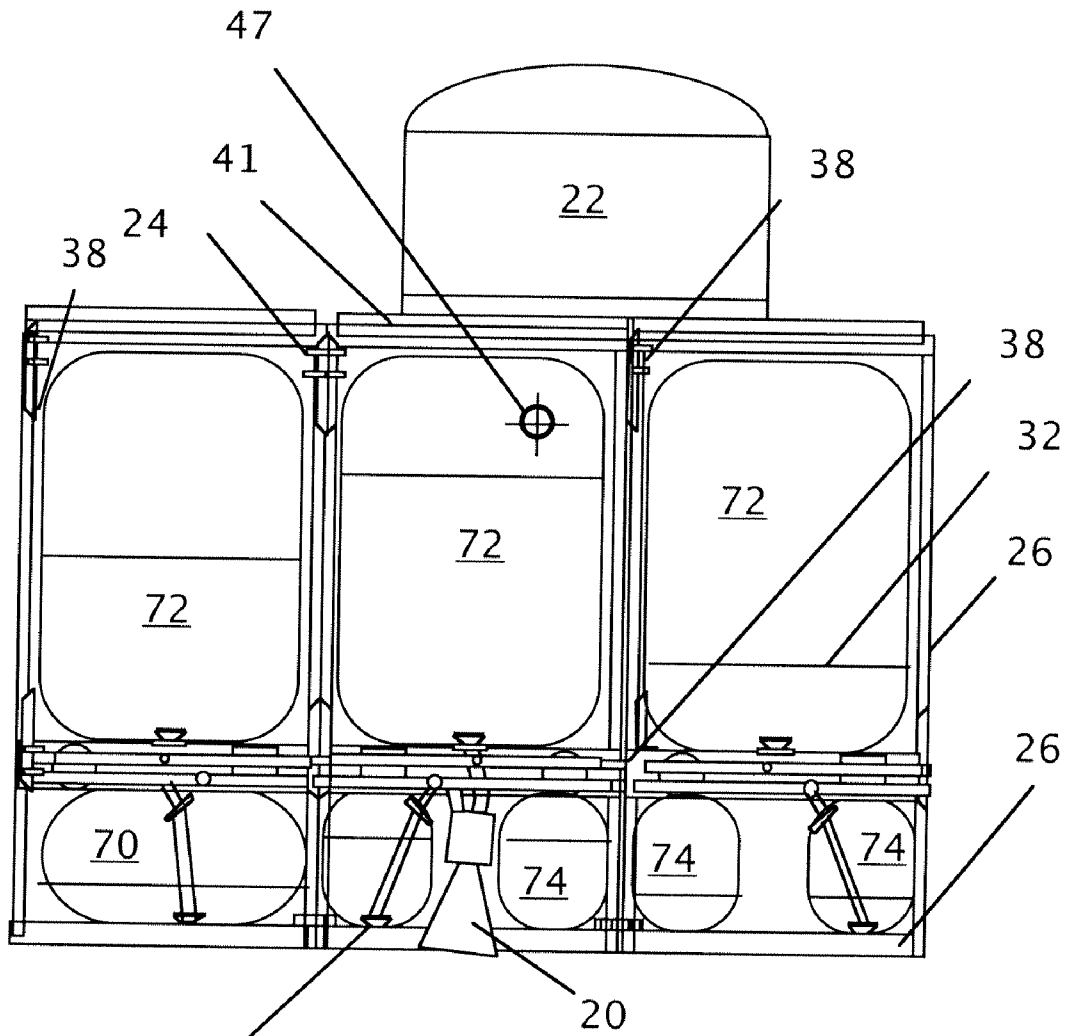
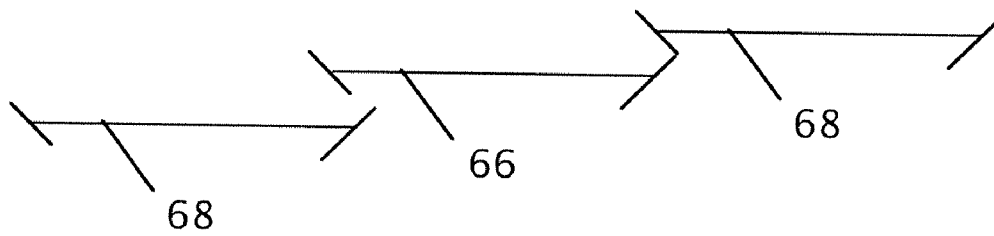


FIG. 4



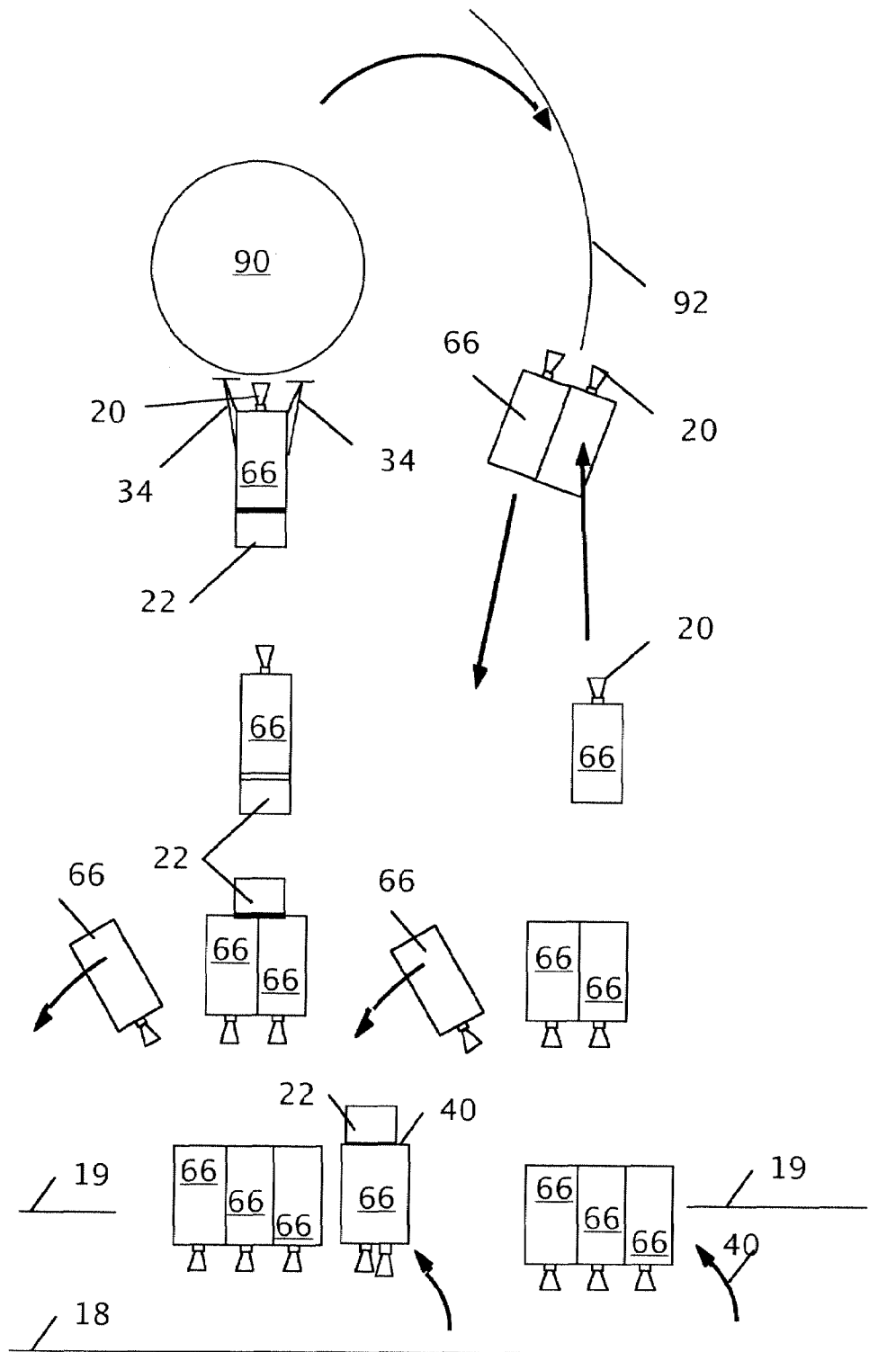
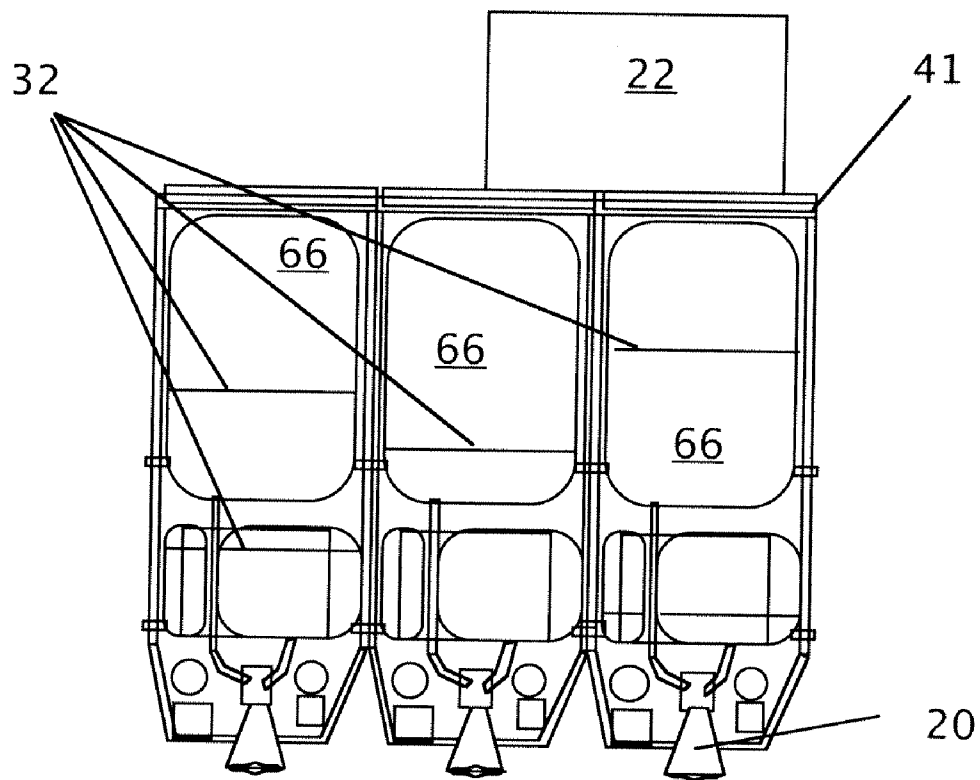
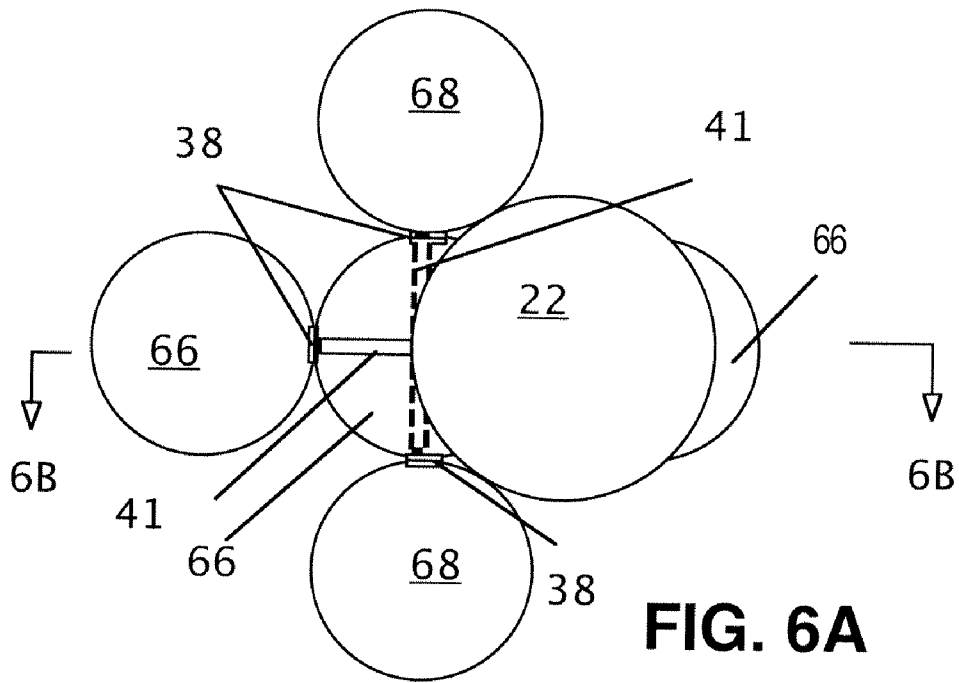
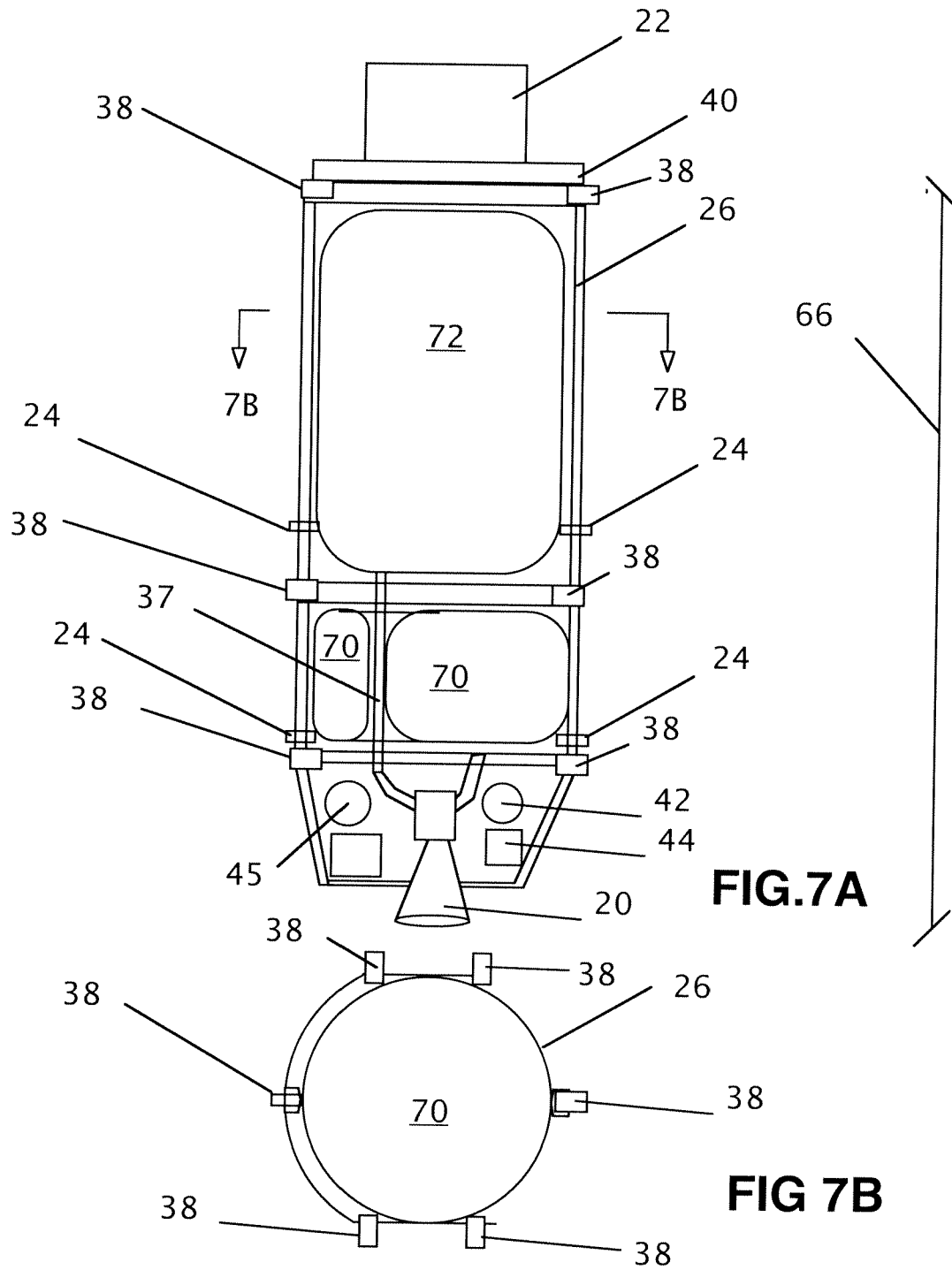


FIG. 5





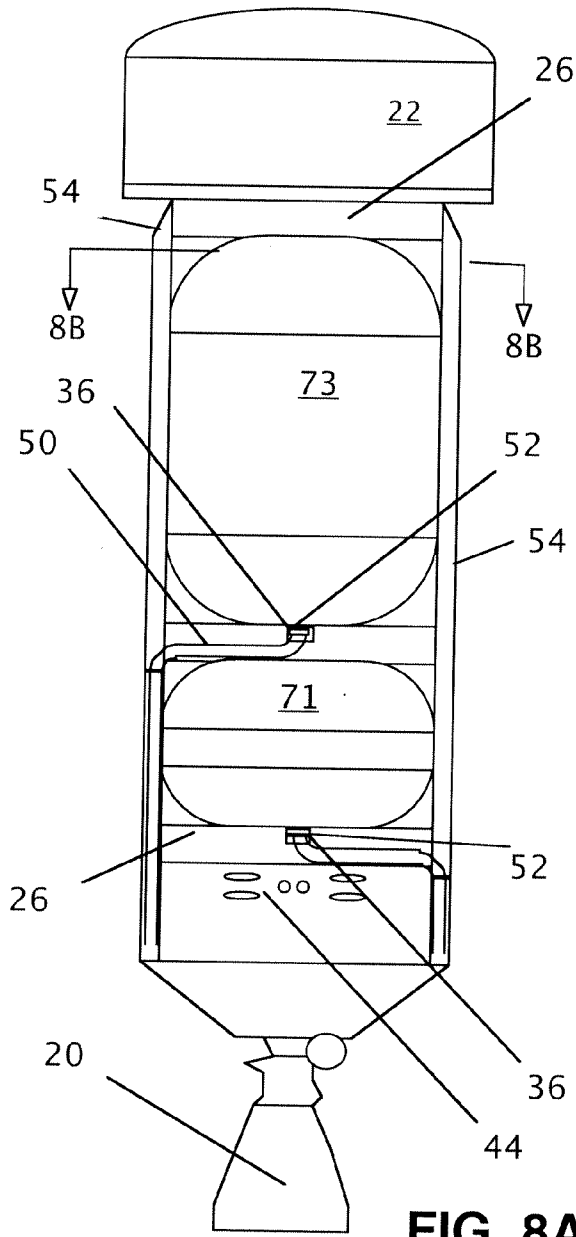


FIG. 8A

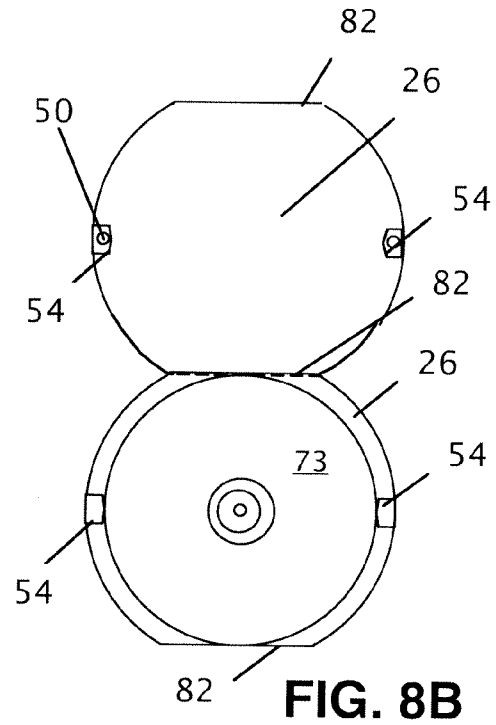


FIG. 8B

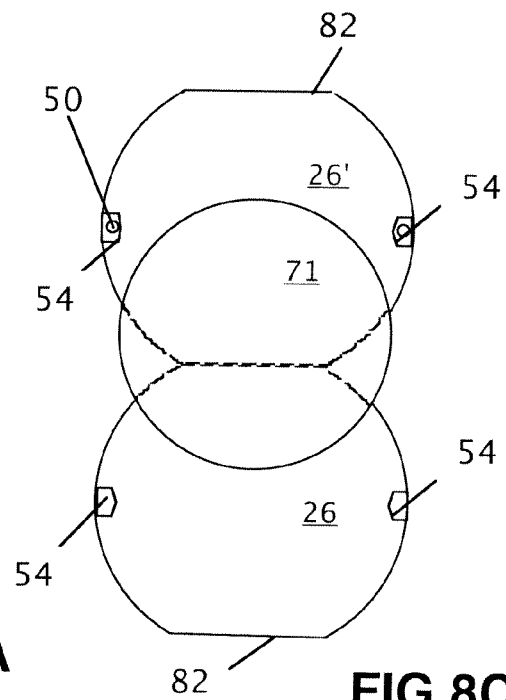


FIG. 8C

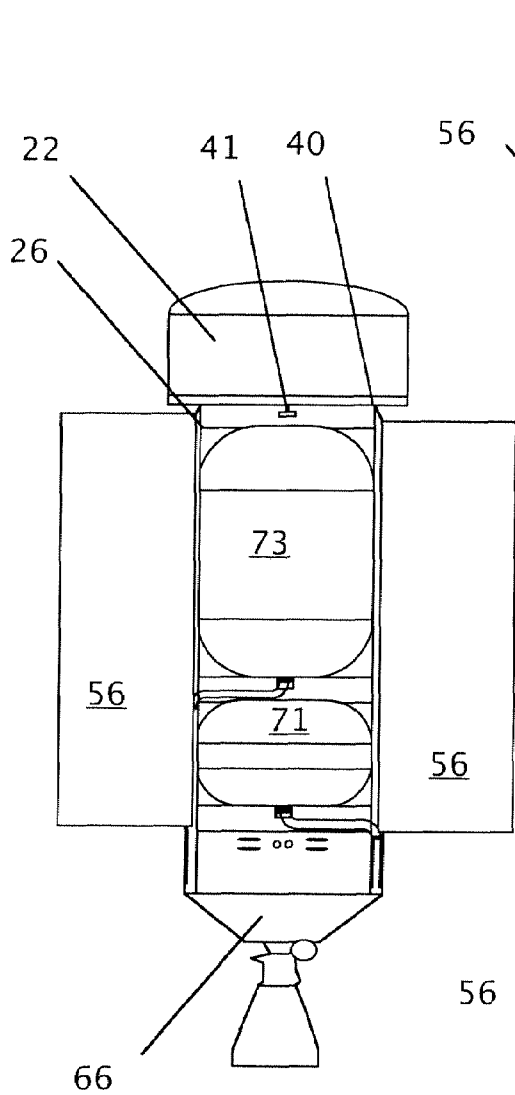


FIG. 9A

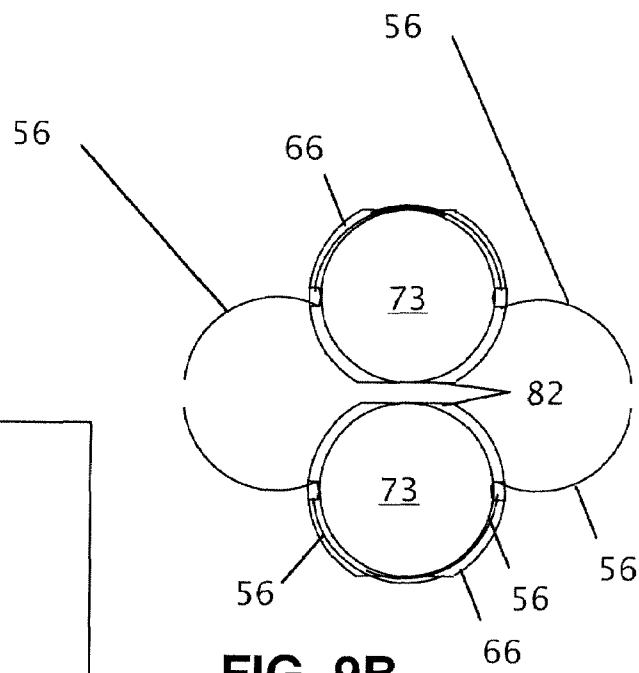


FIG. 9B

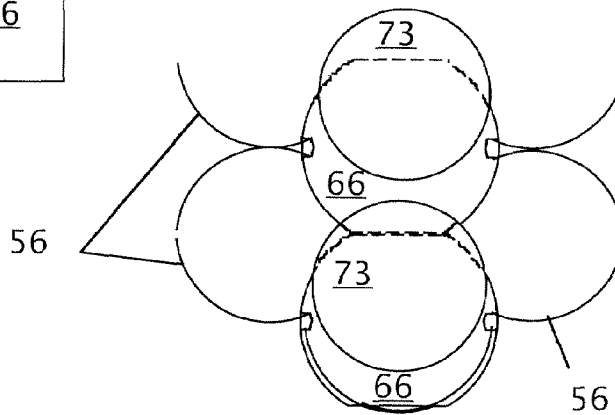


FIG. 9C

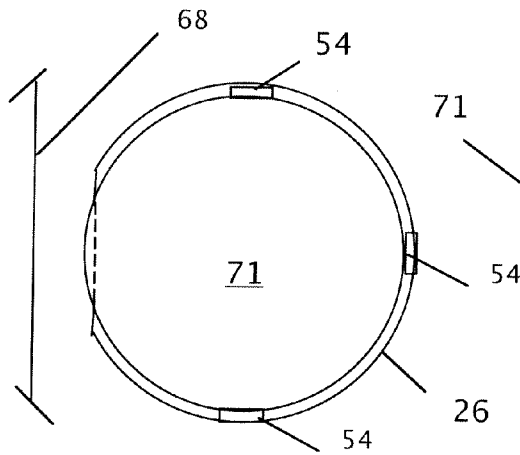


FIG. 10B

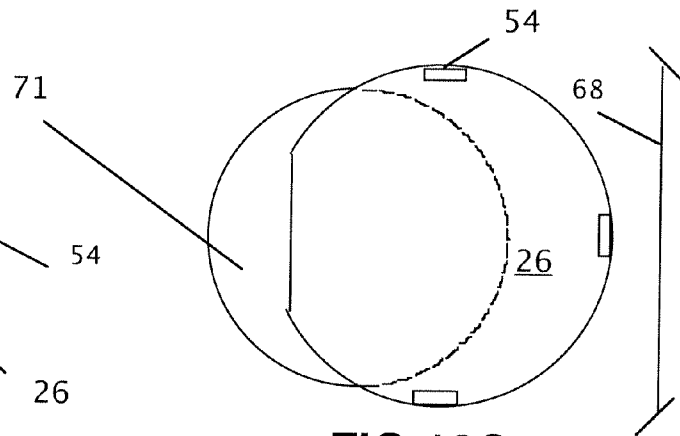


FIG. 10C

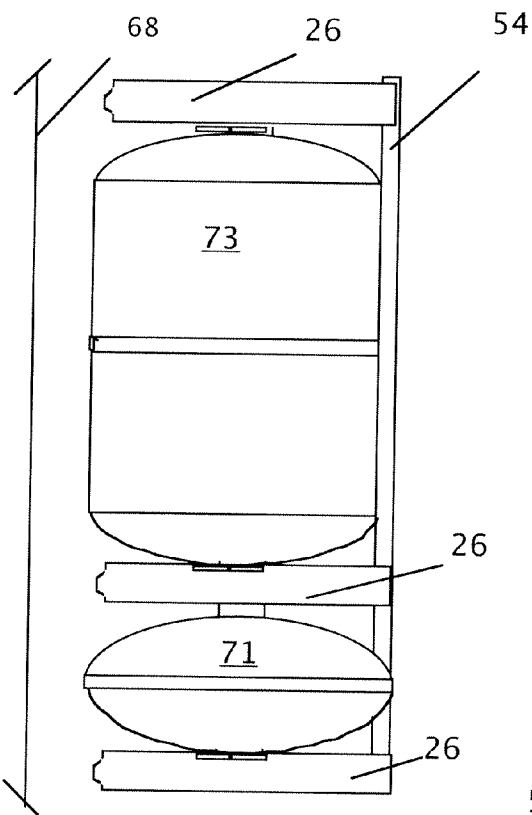


FIG. 10A

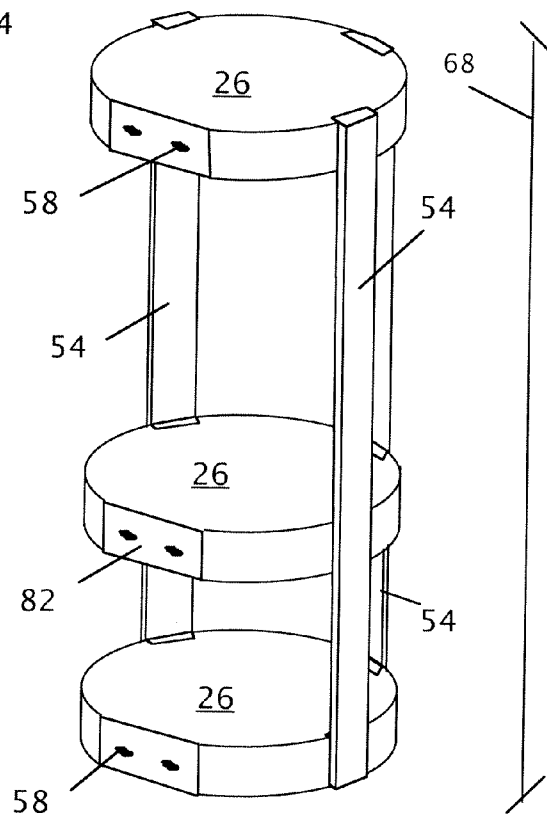


FIG. 10D

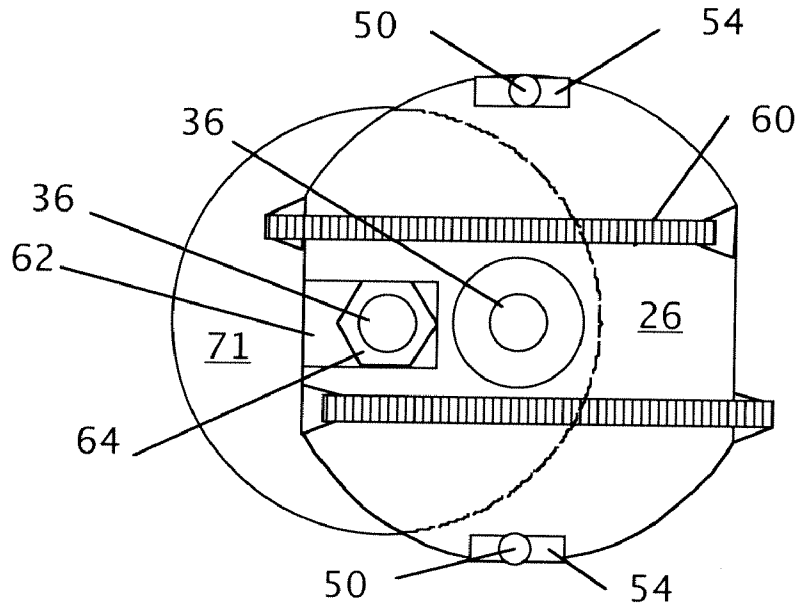


FIG. 11A

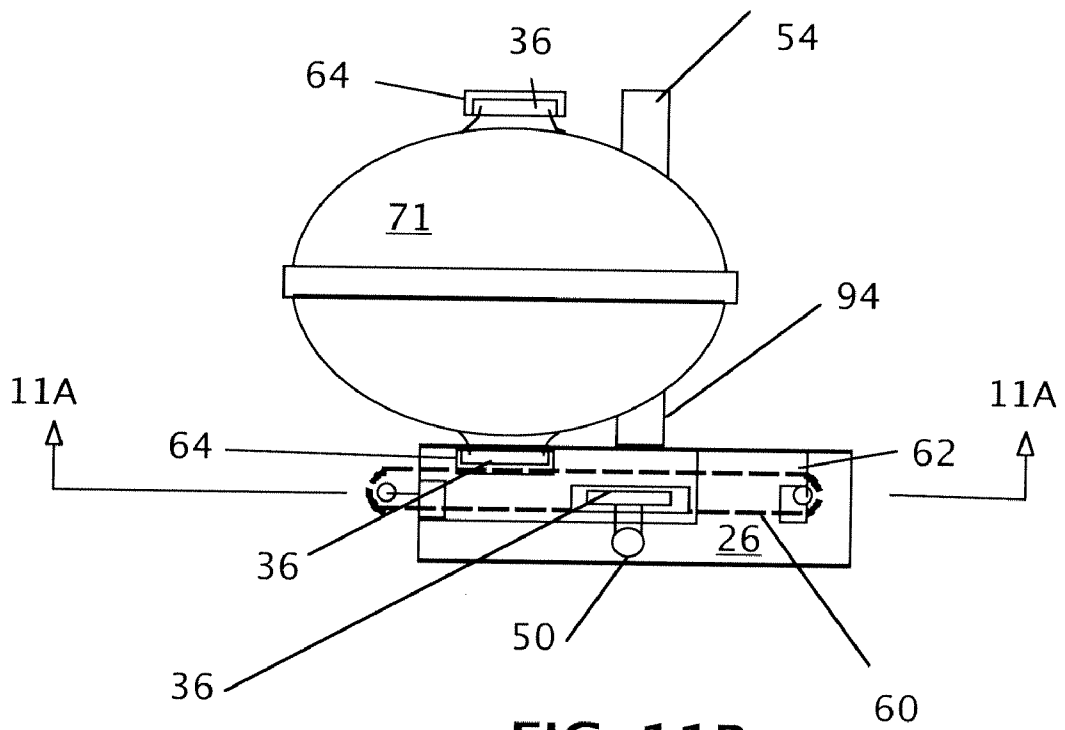


FIG. 11B