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(54) Title: A BLADDER SYSTEM FOR A SUBMERSIBLE

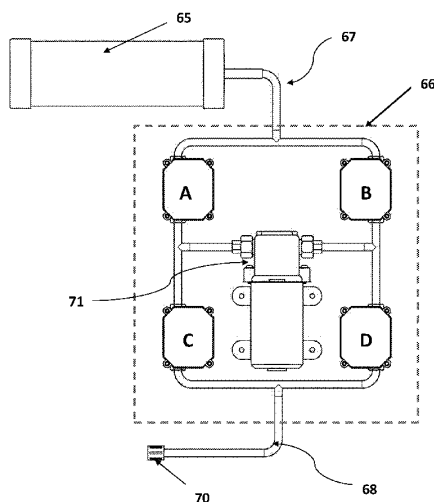


FIGURE 7

(57) Abstract: The ballast tank (65) is a cylindrical pressure chamber (86) with an end cap (81) that has a central opening for receiving and connecting to the venting input (67) from the pump system (66) and the venting path (68) to the outlet (70) that vents with the outside environment to the submersible. The ballast tank includes a rubber bladder (85) within the solid pressure chamber (86) that is fed by a manifold (83) leading from the end cap (81) opening and feeds through spaced holes into the bladder at spaced distances. This ensures a constant pressure buildup or release of the whole bladder rather than distorted expansion or reduction. Generally, pumps are notorious for being strong in one direction but not in the other. Further there is substantial weight and size limitation in submersibles of the size of less than 5 metres. A novel solution to this problem is to use a one-way pump with a switching valve system. More particularly it is to use a diaphragm pump (71) in a one-way operation with a switching flow operation system. In this way the pump (71) provides pressure control on both sides of the pump and valve system (66) and operates as strongly with flow in one direction as with flow in the opposite direction.

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