



Aquaponics: Paradigm Shift with Airlift part 2

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Olomana Gardens



Aquaponics: Paradigm Shift with Airlift Webinar Series

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Introduction to

Glenn Martinez

O Olomana Gardens ʻŌ

Oahu, Hawaii

<http://www.olomanagardens.com>

**permaculture, inventing, designing,
sustainable food growing systems,
from backyard & schools to large scale farms**







American Samoa October 2011



Necessity is the Mother of Invention



American Samoa October 2011



The Principle by which Airlift Pump is Operating:

- The only energy required is provided by compressed air
- This air is usually compressed by a compressor or a blower
- The air is injected in the lower part of a pipe that transports a liquid
- It usually bubbles into another larger diameter pipe



The Principle by which Airlift Pump is Operating:

- By buoyancy the air, which has a lower density than the liquid, rises quickly
- By fluid pressure, the liquid is taken in the ascendant air flow and moves in the same direction as the air



The Principle by which Airlift Pump is Operating:

- The calculation of the volume flow of the liquid is possible thanks to the physics of **two-phase flow**.
- Airlift pump technology is superb due to its simple structure.



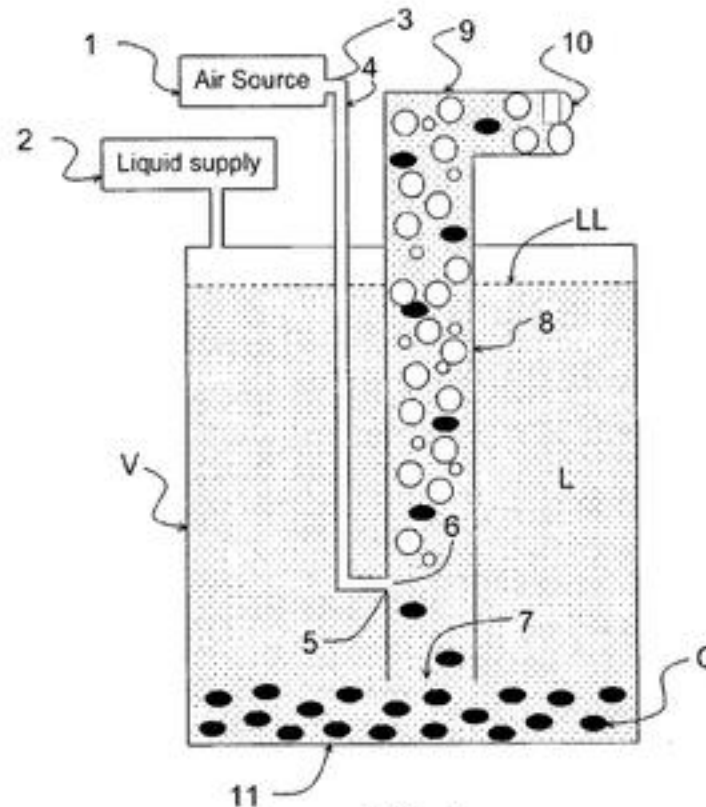


FIG. 1

US 2007/0166171 A1

An airlift pump, powered by compressed air, raises fluid by entraining gas to reduce its density. 1. Air supply. 2. Liquid supply. 3. Air inlet port. 4. Air supply line. 5. Air port. 6. Air outlet. 7. Fluid intake. 8. Riser tube. 9. Air liquid mixture. 10. Pump outlet. L:Liquid, usually wastewater. LL:Liquid level. V:Vessel G:Gravel or solids.



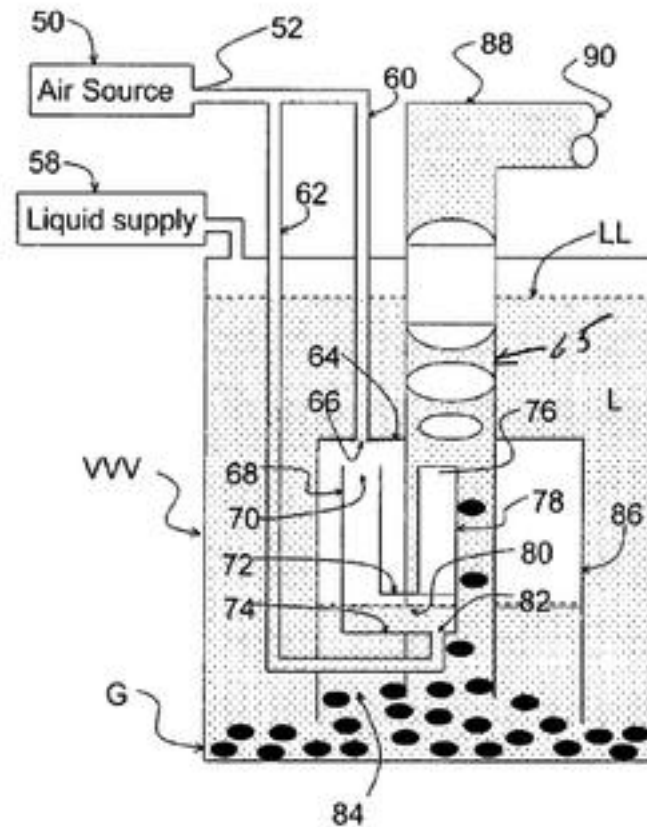


FIG. 7

US 2007/0166171 A1

A **geyser pump**, an improved airlift pump, powered by compressed air, raises fluid by forcing rising bubbles to displace fluid. 50. Air supply. 52. Air inlet port. 58. Liquid supply. 60,62. air supply lines. 64. upper end of air tank 86. 66,82. Air ports. 70. Upper air inlet of u-shaped elbow 74. 76 Air outlet. 84. Fluid intake. 65. Riser tube. 88. Displaced liquid. 90. Pump outlet. L:Liquid, usually wastewater. LL:Liquid level. VVV:Vessel G:Gravel or solids







Different Types of Airlift Pumps















Spring to Koi Pond



Spring to Koi Pond – “Butterfly”



Spring to Koi Pond How To “Butterfly” Water



Spring to Koi Pond

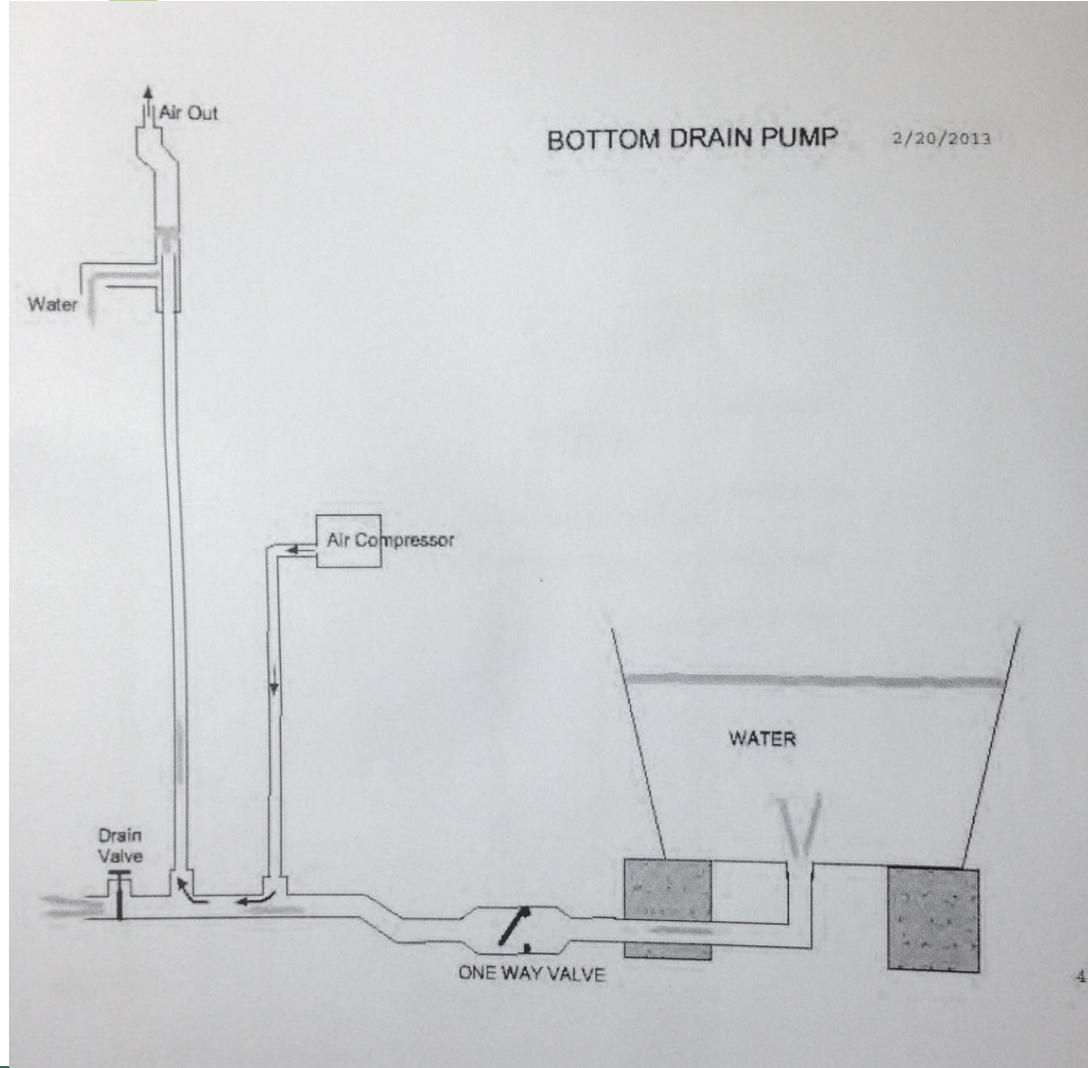


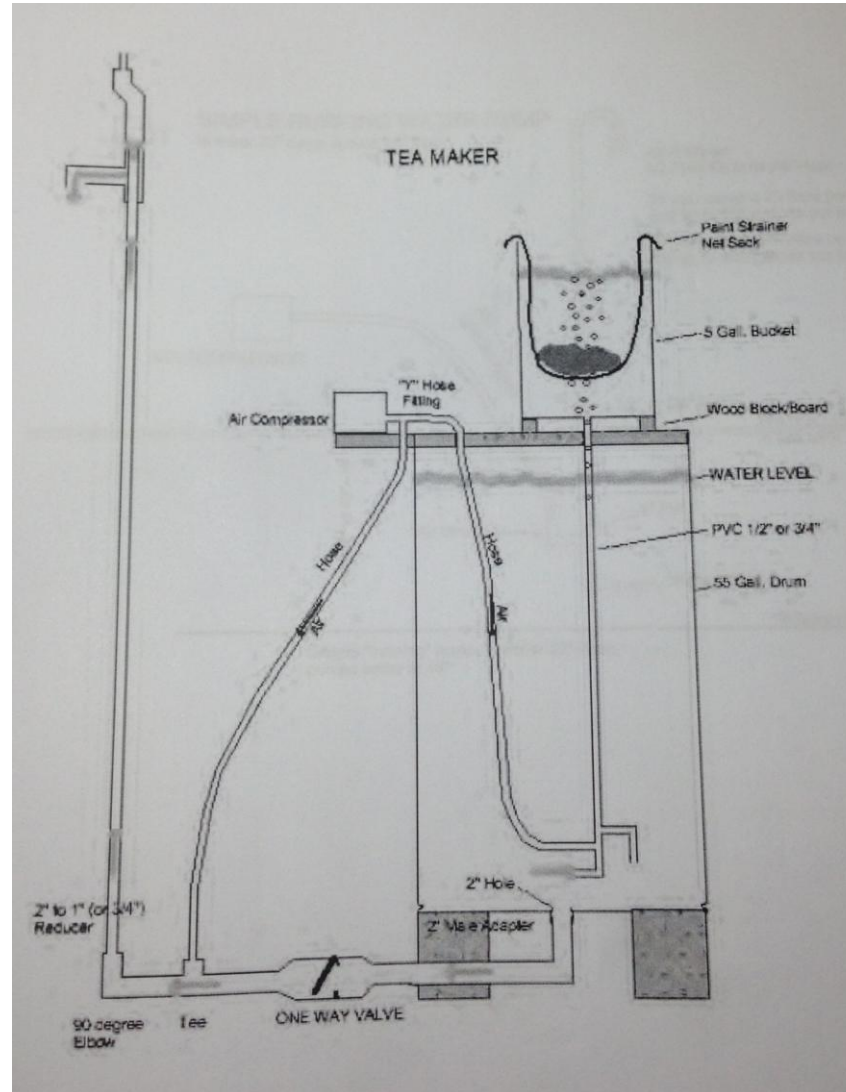
Up Over the Roof

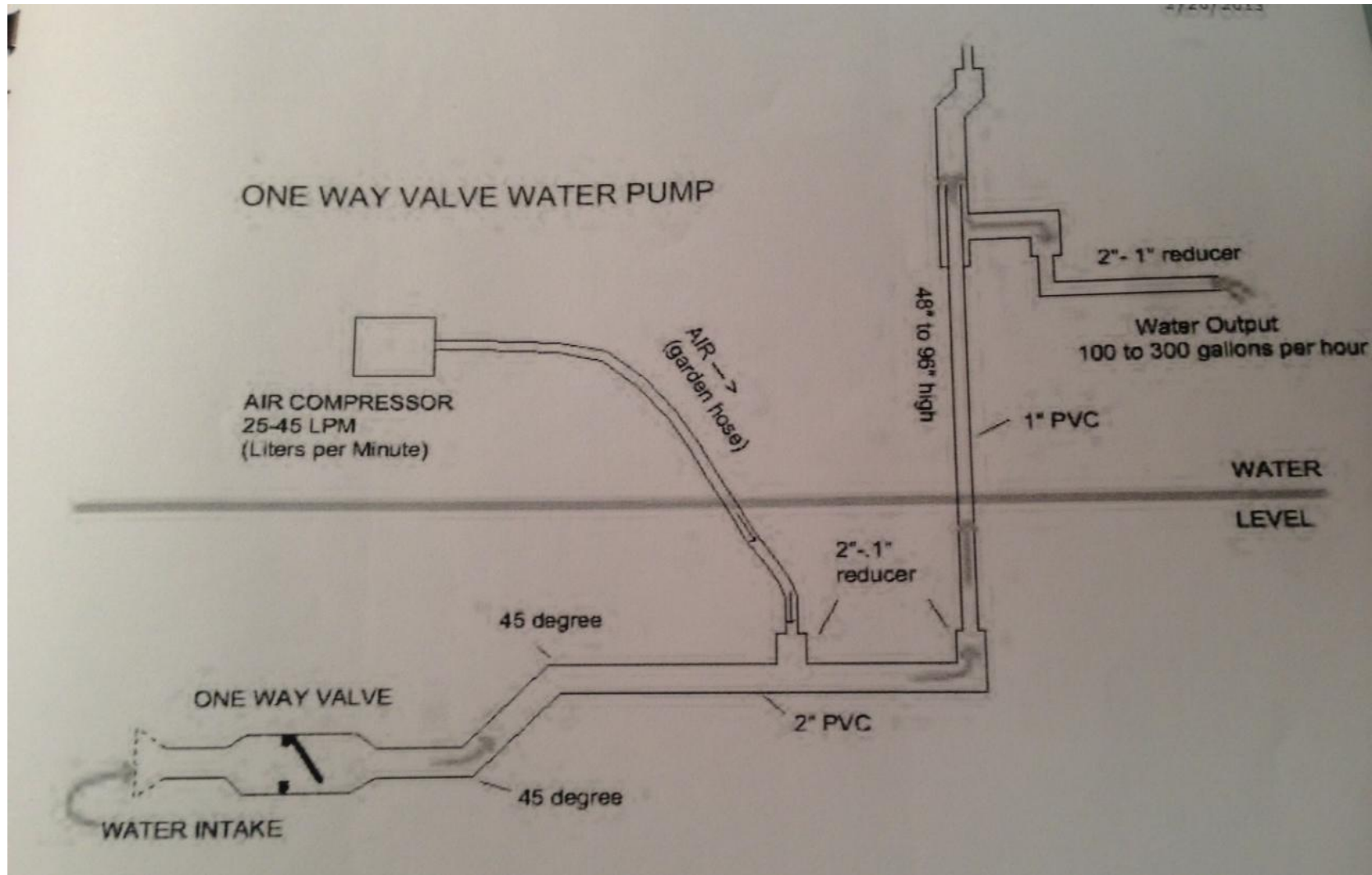


Up Over the Roof









Advantages of the Burper Pump Over Existing Art:

- Security: Air compressor indoors
- Safety: NO electricity in the fish tank
- No Ground Fault Interrupter GFI required
- Reliability: Air pumps over submersible
- Filtering the air compressor



Advantages of the Burper Pump Over Existing Art:

- Aeration: Air compressor is capable of TWO and THREE functions:
 - 1) pumping the water
 - 2) acts as a water aerator
 - 3) mixing: in some configurations lift stagnant bottom water to the surface



Advantages of the Burper Pump Over Existing Art:

- Energy savings: moving the water at higher rate
- Long life (water is not in contact with any mechanical elements)
- Pass-Thru Pumping: “stair lift”





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AquacultureHub

<http://www.aquaculturehub.org>

Aquaculture Training On-Line Learning (ATOLL)

<http://videolearning.uhatoll.com>

