

A Two Component Biogas Plant

A. An Improved Anaerobic Digester System for Biogas Plant

B. A Biogas Holder-Cum-Dispensing Unit, MORE SPECIFICALLY, Flexible Piston based Portable Biogas Holder Cum Dispenser

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Abstract— Biomethanization is a widely used household fuel generation technique in rural India. As rural area is abundance of cattle so it become very easy to get feed for biogas plant. Traditional Biogas plants 3-4 days for biomethanization to complete. The biogas digester, being present in this paper is not only cost efficient but also complete its process in 15 hours. This invention can be a benchmark in pollution free fuel generation from organic wastes not only in rural but also in urban India.

Keywords:- Biomethanization, Biogas Digester, Biogas Holder

I. AN IMPROVED ANAEROBIC DIGESTER SYSTEM FOR BIOGAS PLANT

• Field of the invention

The present invention relates to a biogas plant. More specifically, the present invention relates to a fully concealed single entry inlet-cum-outlet-cum-gas pressure indicator port valve & safety fuse based biogas generating plant treatment.

• Description of the related art

A biogas plant typically consists of digester as the main body, slurry inlet for receiving slurry of organic matter, gas holder for holding the gas, gas outlet for procuring the gas, digestate /sludge outlet for releasing the digested left-out. There are different types of biogas plants in use based on the digester system they utilize. Examples of such biogas plants include, but are not limited to, floating dome/drum digester system, fixed dome digester system, up-flow anaerobic sludge blanket (UASB) digester system.

However, existing biogas plants have expensive manufacturing costs, poor safety and sanitation issues. Secondly, the concealment is so poor that dirty odour and mosquito breeding is evident. Thirdly, there is no safety system embedded in the overall system.

The UASB system is fully exposed to the surroundings. A small scratch can burst the whole biogas plant. Further, there is no gas fuse system that can take excess biogas out in any event of excess of biogas being produced.

• Description of the invention

The present invention relates to a Fully Concealed Single Entry feeder inlet-cum- slurry outlet-cum-gas pressure indicator port valve & safety fuse based biogas generating plant treatment of suitable organic matter thereby providing best economy, quick & cheaper manufacturing costs, maximum gas utility, better hygiene, sanitation and safety.

• Drawings – Appendix-01

The self-explanatory drawings as in appendix-01 presents the invention relates to an improved anaerobic digester system as

used in a biogas plant for production of biogas in an ease to operate manner suitable for domestic as well as commercial utility.

II. A BIOGAS HOLDER-CUM-DISPENSING UNIT, MORE SPECIFICALLY, FLEXIBLE PISTON BASED PORTABLE BIOGAS HOLDER CUM DISPENSER.

• Field of Invention

This invention relates to a Biogas holder. In particular, to a flexible piston based portable biogas holder cum dispenser.

• Description of the related art

Biogas plants are known in the art. Usually almost all biogas plants produce 30% or more excess gas and such excess gas produced are lost or wasted. The present invention helps to address this problem by holding the excess gas and dispensing it with complete safety. The invention as disclosed is cheap and very useful in the context of rising LPG gas and other fuel prices. There are different types of gas pressure systems in use based on the required system they utilize. The most commonly used systems are:

Liquefied pressure system as in the case of LPG and LNG. Liquefied gas systems require heavy machinery to fill while balloons are unsafe and prone to burst due to exceeding elasticity above the volume preset. One of the main disadvantages of using a Liquefied system is that there is volume-by-volume of gas that cannot be recovered, the matter being that atmospheric pressure stabilizes the ejection of the residual gas in the container. Further it is too costly to implement a system of this sort. INVARIABLY, All the above said prior art discuss about biogas production systems with pressure relief protection system but none of them discuss a flexible low pressure biogas dispensing system for holding and delivering gas at required pressure with predictable and economic output.

Accordingly, the present invention obviates the above disadvantages by providing a novel improved flexible piston based portable biogas holder-cum-dispensing system with perfect single way entrapment and method for procuring, holding and delivering gas at required pressure and output which is predictable. The present system is effective, durable, affordable, simple to operate, efficient, environmentally friendly, substantially reliable, extremely safe and arguably the most economic.

• Description of the invention:

The object of the invention is to provide a portable biogas holder cum dispenser comprising of a waterproof box or pouch or any suitable main body frame having an air vent,

inlet valve & outlet valve fitted with non-return valves, gas relief safety fuse valve port, a flexible polymer based gas bag which acts as a Holder-cum-Dispenser and operates like a flexible piston and a gas cock control system. The gas bag is placed between two height-preset baseboards which act as gas volume controllers. A preset weight or tension spring is placed atop baseboard and the gas caught inside the gas bag builds up the pressure inside the bag placed between the two baseboards with weight and thus air is displaced from inside the main body. The outgoing gas passes out of the outlet fitted again with an outlet non-return valve so as to maintain perfect vacuum in the gas bag. Due to the synchronized gas flow in this invention, methane permeability in anaerobic bacteria can be substantially controlled. The safety valve system makes the bio gas holder substantially safe.

• Drawings – Appendix-02

The drawings shows the view of the Portable Biogas Holder-cum-Dispenser with excess gas procured inside the flexible biogas bag pressing upon the baseboards leading to release of excess pressure through the pressure relief valve;

This invention relates to a portable apparatus for holding and dispensing biogas. The flexible piston based portable apparatus comprises of a flexible biogas holder bag (2) sandwiched between boards (5, 6). The board atop (5) the biogas holder bag is laden with a preset weight / tension spring (4) and housed within a weather proof strong outer cover (1). The apparatus is configured to receive gas from biogas digester and dispense to a gas utilizing device with the help of a gas cock control system.

III. BIOGAS DIGESTER & BIOGAS HOLDER-CUM-DISPENSER

DESCRIPTION

- **Bio-Gas Bottle** – A fully concealed Organic Digester Bottle with a Single Feeder Inlet-cum- Slurry Outlet Valve with stopper and a gas valve thereby providing 100% environmental hygiene and minimal scum aggregation within the Digester.
- **Flexible Bio-Gas Holder-cum-Dispenser** – A properly sheltered flexible polymer based concealed jacket sandwiched between 2 pressure boards and attached with a 4 way connector, wherein first way is connected to the jacket, the second way is connected to inlet thru a non return arrangement, the third way connected to the outlet to be connected to the burner and the fourth way connected to pressure relief valve for excess gas release at any event the gas volume exceeds the jacket capacity.

APPENDIXX –II

1. Digester tank
2. Concealed lid
3. One way flexible feeder inlet-cum-slurry outlet valve
4. Gas vent
5. Excess pressure relief fuse
6. Digestate
7. Scum

8. Biogas
9. Decanting tap

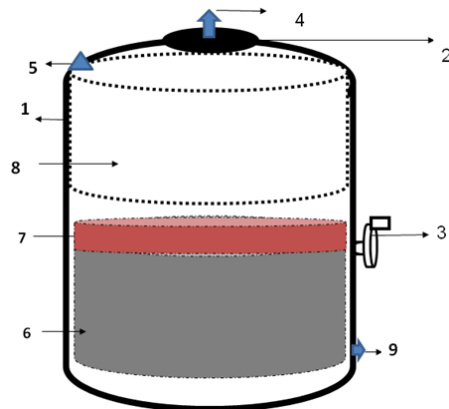


Fig. 1 diagrammatic representation of biogas digester

APPENDIXX –III

1. Concealable main body
2. Concealed flexible gas bag
3. 4-way main connector
4. Weight / tension spring[pressurizer]
5. Top mounted baseboard
6. Bottom mounted baseboard
7. Inlet hose
8. One-way inlet valve
9. Outlet hose
10. One-way outlet valve
11. Spring based pressure relief valve [prv]
12. Prv hose & relief thread
13. Air vent
14. Biogas
15. Air

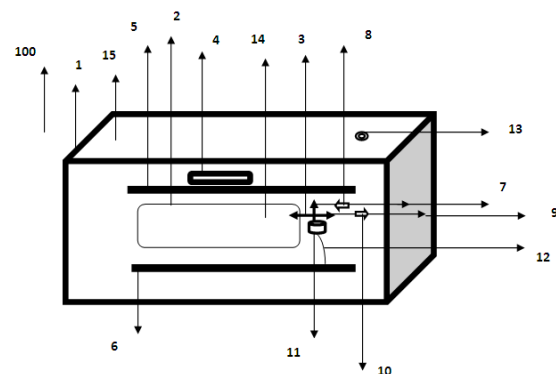


Fig. 2 Diagrammatic Representation Of Biogas Holder-Cum-Digester

IV. CONCLUSION

In this paper author is presenting an efficient biogas digester which is efficient and easily affordable. Biomethanization is completed in this work by 15-17 hours which take around 3-4 days in traditional biogas plant.

REFERENCES

- [1]. www.mnre.in