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A Novel Design for Sewerage Cleaning System by MCU Interfacing

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Abstract: *The aim of this project is to create a much efficient and faster way of cleaning our sewage sumps and drainage system. This paper deals with the innovation aspect that can be done in the available system, which uses the hydraulic system powered with battery and using lever system for controlling and cleaning purpose. Here we suggest using microcontroller interfacing with hydraulics of the heavy vehicle which is currently employed in drainage cleaning system for better control and higher efficiency. The prior objective is to use the available technology and develop the efficient system.*

Keywords: *MCU, Digester, TPAD, RAS , SRT, PSI BACT, Micro gas-turbine, Hydraulic system, Anaerobic digestion, Biogas, Sewage, HRT, Pock lain, Surveillance portable camera,*

I. INTRODUCTION /PRIOR POINTS TO BE NOTED

Reduce the risk of human resource loss in the field of sanitation (Municipal Corporation –with reference to our system).

Innovating and empowering the use of available technologies.

Cost efficient and simple to manufacture and introducing in the market.

Improve the standards of the sanity department

Exploitation of HRD in a finest way

Basically, this uses a micro turbine, an IC development board, sewage gas producer (slurry digester) and a simple interfacing system with the hydraulics (also can be interfaced with the traditional pulley system)

As there is a acute increase in deaths due to exposure to poisonous gases down under the drainage system(mostly underground).there is a need to reduce this rate so a better system in cleaning of sumps is required than the existing one.

Moreover, efficiency is of the prior importance so as to reduce the time utility and better system control over the available system. Statistically every nation of the world is running faster towards achieving their goals and chasing their dreams that it has made sanitation and hygienicity is taken for granted. In this situation efficient system requirement is a must. Looking at this paper, will give a new dimension of innovation

II. WORK PLAN

The work plan is drafted as per the guidance given; some of noteworthy are which includes, viz,

- A. Preparation of bill of materials
- B. Design of microprocessor unit
- C. Design of interfacing techniques
- D. Testing the prototype model
- E. Connecting the controller unit to the heavy vehicle
- F. Locating correct spot to the unit

III. PROJECT DETAILS

As per the work plan the detailed explanation of the design can be give as below. Basically the operation of this system is based on cyclic procedure, i.e, the fuel gas generated from the digester (gas chamber) is let into the gas turbine and the power generated is send to power the microcontroller system and the hydraulic control system and as directed by the operator to clean a particular area and the waste collected is dumped back into the digester and thus the cycle is repeated for clearing another area.

Technically, replacing the traditional system which uses levers and pulleys by small (push button) switches and hydraulic system.

From the archives, relating to digester process for power production and waste recycling there are several conclusive references available on such is that the present invention relates to improvements in the treatment of sewage and sewage sludge and more

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particularly in such treatment wherein anaerobic digestion is employed as a primary factor in effecting the decomposition of the organic materials present in sewage or sewage sludge. Such organic materials may be derived from domestic wastes or from industrial wastes. The process of anaerobic digestion of sewage or sewage sludge as commercially practiced has been, up to the time of the instant invention, a time consuming process, usually taking thirty days or more to effect a satisfactory decomposition of sewage and sewage sludge. The digestion facilities necessary to handle the sewage of a community of any size has accordingly been extensive and much research has been done in recent years to reduce the period necessary for the anaerobic digestion of sewage and sewage sludge, and thereby reduce the size of apparatus necessary to effect digestion.(paper¹).

Much thought and research have been expended on reducing the customary time by vigorous agitation of the digestion tank contents on the one hand, and, on the other, by concentrating the fresh solids prior to introducing them to the digestion space. This latter thought, based upon the theory that the sludge moisture takes up digestion space and reduces the ratio of water to sludge solids before digestion, will likewise reduce the space and time required for stabilization of the digestion process. (paper²)

On reference to micro gas turbines, the invention relates to a micro gas turbine with a compressor and a turbine, the rotors of which are arranged on a common drive shaft.

(paper³)Recent research on interfacing networks have yielded specified useful results pertaining to this paper, one of such is given below, the implementation of a multipurpose electronic board (card), which will host a controller and will act as an advanced interface design, between a user and a system. The last one is a hydraulic positioning system, which consists of a double acting hydraulic actuator operated by a hydraulic servo valve and an appropriate oil pump

(paper⁴)These are some references on which this proposed system is routed upon. Hereby the flow diagrams according to the WORK PLAN are given below

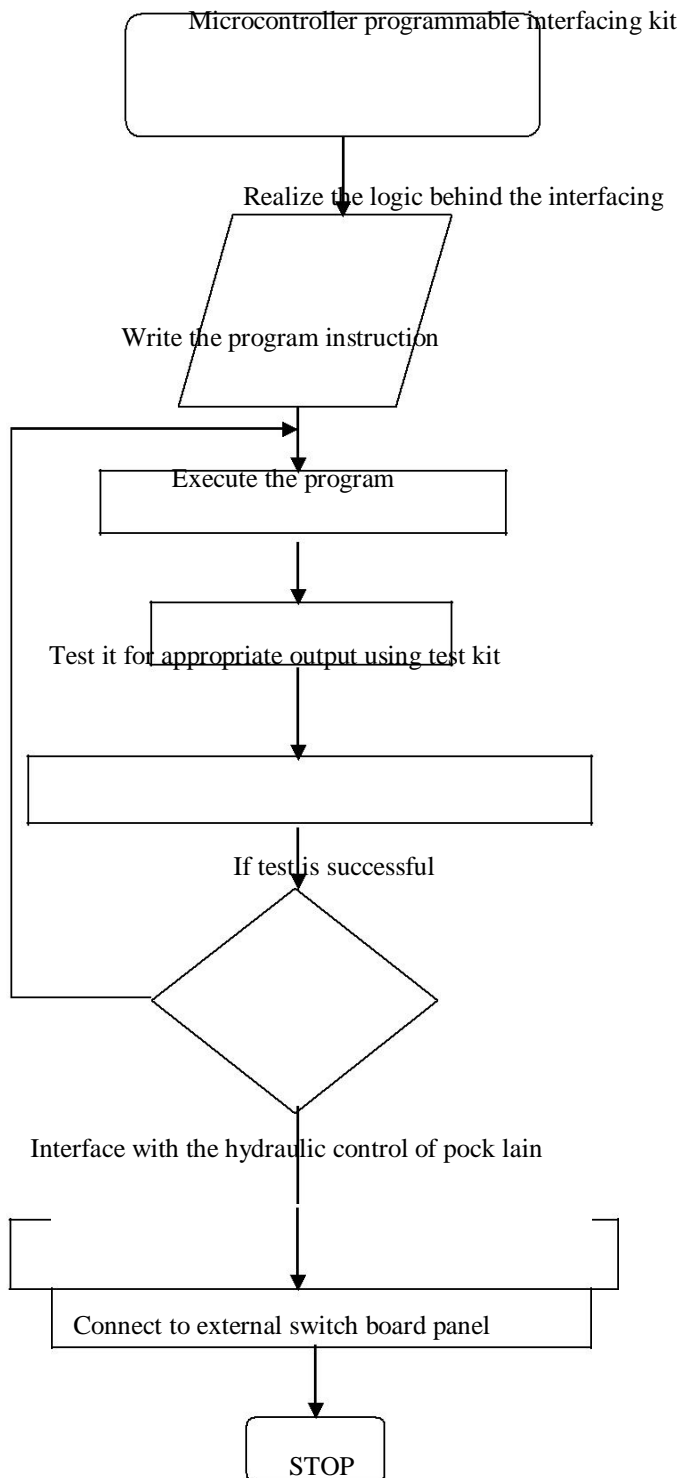
IV. FLOW CHART: (ACCORDING TO WORK PLAN)

The below drawn flow diagrams are outline for the description of the system which is designed on the basis of interfacing systems with microcontroller. These are the cyclic progresses which are witnessed on each instance between successive operations of cleaning process;

This flow chart is majorly comprised of 4 sections, namely,
MCU, Digester, Micro-gas turbine and cleaning operation;

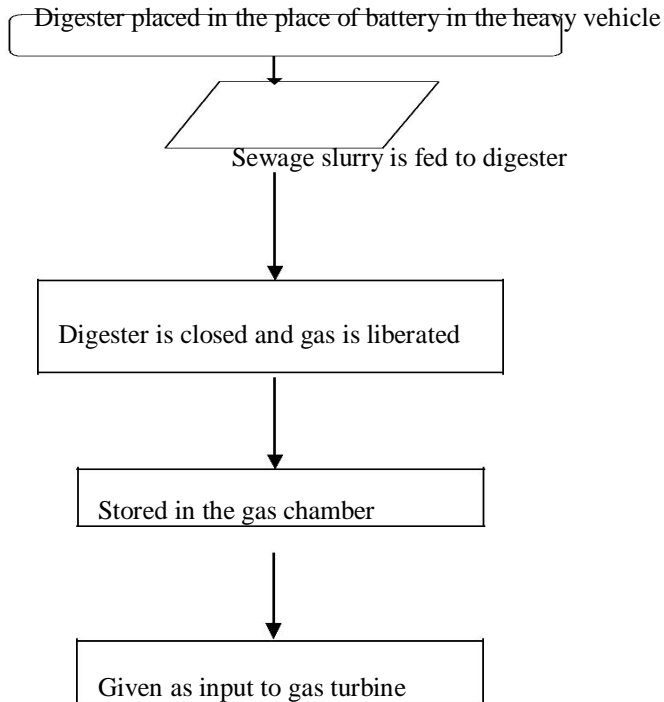
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A. Microcontroller Block

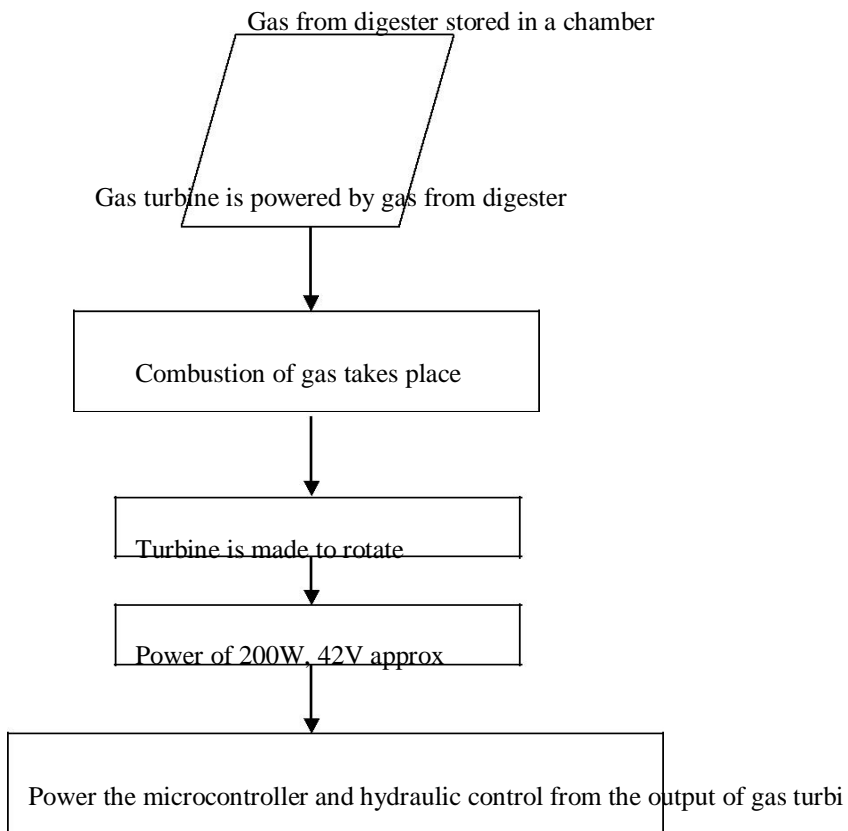


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B. Digester Block

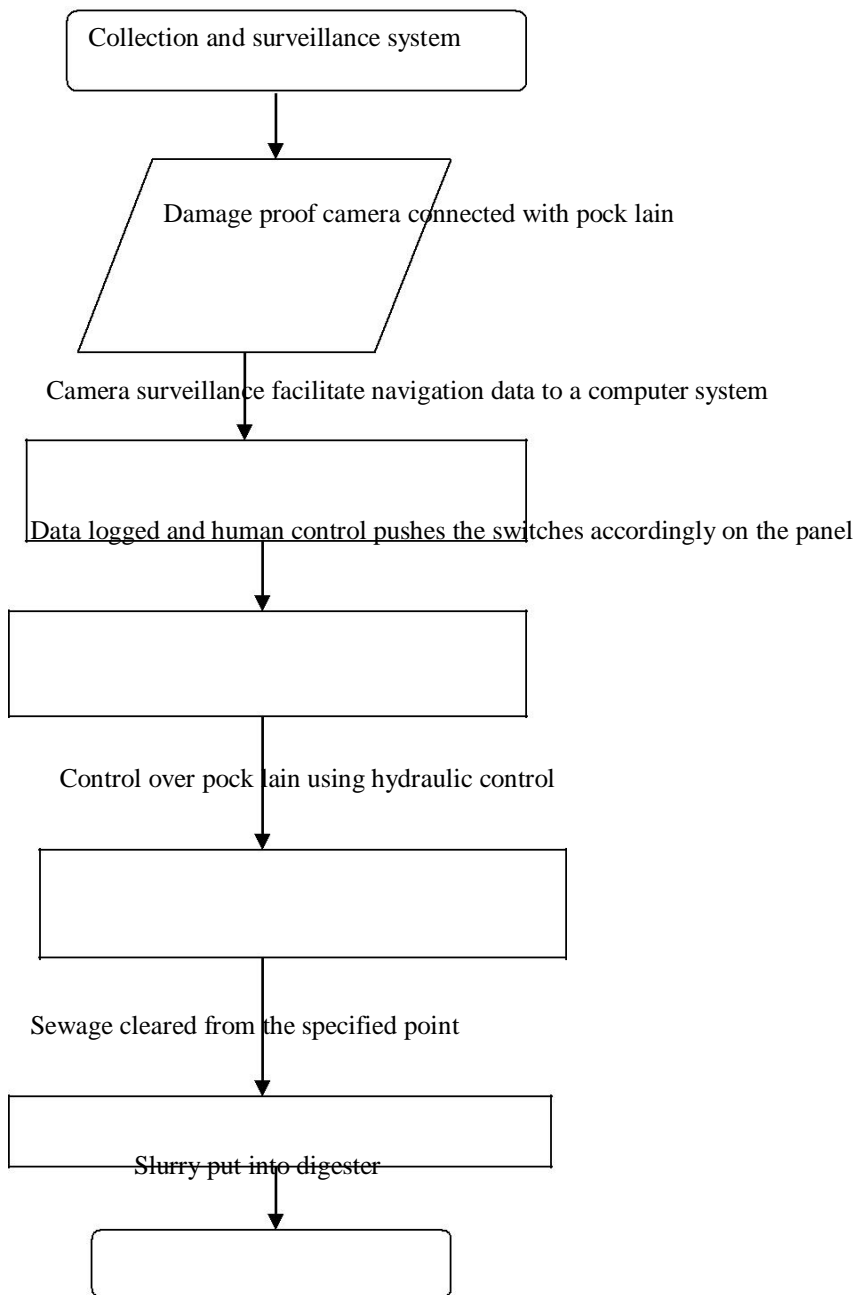


C. Gas Turbine Block



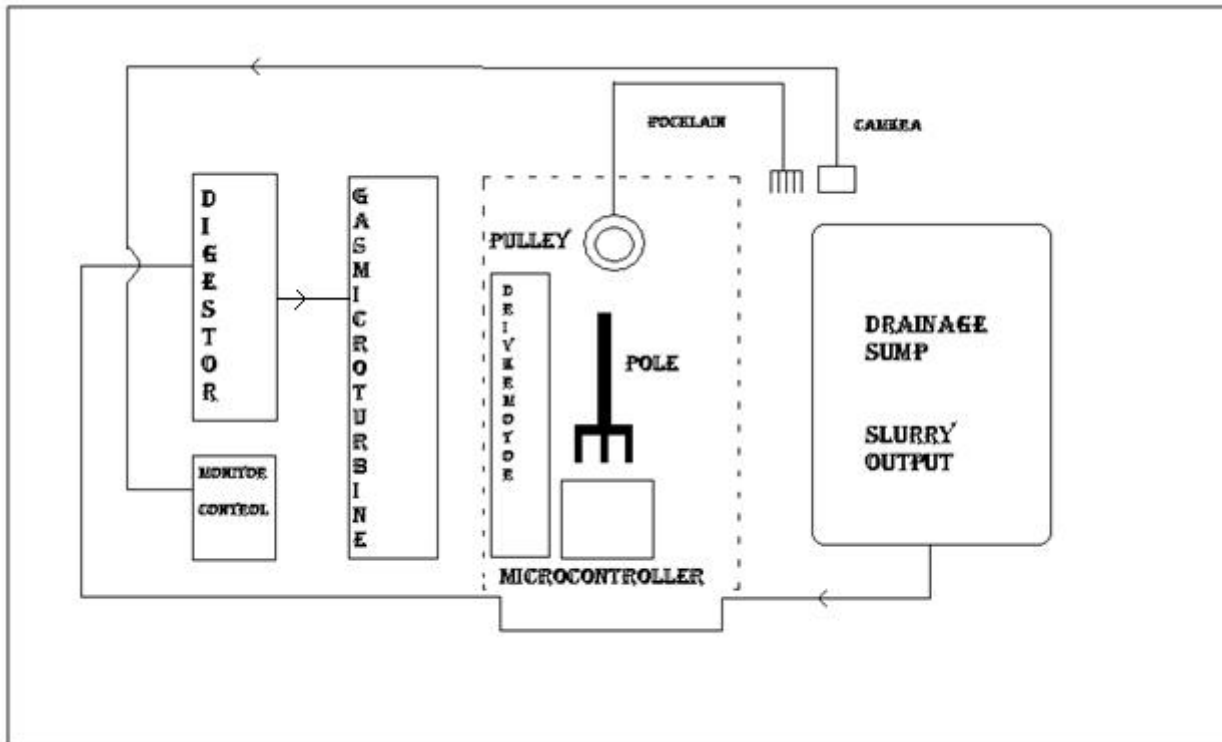
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D. Cleaning Operation Block



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V. PROJECT BLOCK



On analyzing the schematic diagram, the output slurry is fed to a digester and sewer gas produced from digester is given as input to run the turbine thus producing a power output; this output power is given to the microcontroller and driver motor thus the hydraulic-pock lain interaction is facilitated and the movement of pock lain is controlled by human control (through system monitor)

VI. CONCLUSION

On a conclusive note this proposed system is an innovation of the present available system which employs levers and hydraulic mechanism. Instead it is proposed for the use of microcontroller (micro computer) interfacing (with mechanical system) and control for efficient scope of understanding the system. Enroute leads to the development sewage waste management system and can be used for other necessary applications.

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