

Automatic Water Tank Cleaner Machine

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ABSTRACT

Aim of this project is to develop a mechanical system for cleaning domestic cylindrical water tank. The mechanical system includes two main mechanisms which are rack and pinion gear mechanism and reciprocating four bar linkage mechanism. The rack and pinion arrangement is used to move whole mechanical system up and down for cleaning the cylindrical tank. The rack is fixed on the motor and the four-bar mechanism is attached to the motor shaft. PVC brushes are attached to the ends of the four-bar linkage. Four bar linkage is made in such a way that it can be adjusted according to inside diameter of the tank. When the motor is started the linkage rotates and with the help of brushes, cleaning of wall and base of tank takes place. The purpose of this project is to reduce the human efforts and to avoid the chemical influence on health of person entering the tank for cleaning.

I. INTRODUCTION

In recent studies it has been found that no automation based machine used in cleaning of overhead tank. This is because of the irregular shape and various heights of the tank locations. With previous survey made an attempt to make a machine by automation process for cleaning tank. An alternate solution has made a plan to solve this problem. In India, the usage of sintex tanks by the people is approximately 71%. After studies made the information that have faced a lot of difficulties like continuous work in the dirty places, irregular payment and other various reasons. Continuous work and irregular payment may also be the major reason for this attempt. So came to a conclusion that cleaning the overhead tank using automation process can be useful to solve all these problems. In this case, machine has the capability to

clean the tank easily and quickly. Designing of our machine is based on the survey report conducted.

II. METHODS AND MATERIAL

Manual scrubbing in which wall and floor of tank are scrubbed to remove dirt, sediments, fungus and stains, but this method is more tedious and time consuming. The water tank can also be cleaned by using chemicals to remove the dirt and sediments. The chemicals used may affect the human health. Pressurized water can be sprayed on the walls of the tank which will remove the dirt from the tank surface. These methods are time consuming and require more efforts for cleaning. To find such an approach, there is need of studying the existing approaches and algorithms that had already been used for automatic overhead water tank cleaning system.

This motivates us for the literature review. The organization of this paper is as follows. In Section 2, systematic presentation of the literature review is done; which involves the list of the related approaches along with the summary of the related work that is more relevant to developed approach. Section 2 concludes with our findings from the literature review and motivation behind identified problems. Section 3 focuses on the formulation of the identified problems. Section 4 is dedicated to the proposed approach. Section 5 emphasizes on the experimental results. Section 6 addresses the conclusions along with the future work.

2.1 Necessity of Cleaning:-

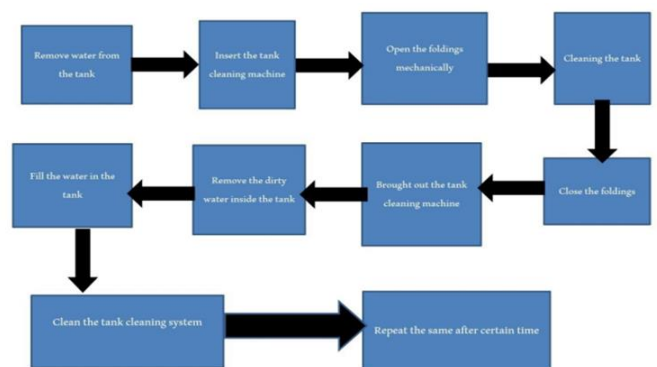
Water Tank Every day we use the tank water for brushing and bathing, for cleaning and moping, for washing clothes and in other household chores. With the passage of time, sediments scale and algae get deposited on the walls, ceiling and floor of the water tank. This deposition contaminates the water and makes is unfit for use. With time algae and bacteria grow and breed in this water infect it and could make us fall sick eventually. Hence water tank cleaning is very important.

III. PROBLEM FORMULATION

This section presents the formulation of the identified problem, which based representation of an overhead water tank cleaning system. All the reviews on theoretic approaches involve the same common terminologies. The problem of cleaning the water tank by the conventional can be formulated as: All methods of cleaning water tank as discussed above are time consuming and require more human efforts. So the alternate method is required for cleaning purpose which will overcome the drawbacks of all other methods. Therefore, we are developing water tank cleaning equipment which requires less time and human efforts for cleaning.

IV. PROPOSED APPROACH

This section is subdivided into 5 sub-sections wherein the report presents the detailed working of automatic overhead water tank cleaning system that is incorporated in our work along with our approach. Sub-section A includes the information about the main components used in the project. The material and methods is mentioned in Sub-Section B. Working of system is explained in SubSection C with the aid of flowchart. Our proposed approach is introduced in Sub-Section D. Sub-section E provides detailed working of the proposed approach.



Working flowchart.

Firstly, whole water is removed from the tank. Detergent is then sprayed on the inner wall of the tank for easy removal of dirt. The whole system is inserted in retracted position into the tank. The four bar linkage is then adjusted according to the tank diameter in such a way that brush at end of the shaft touches the bottom of tank. Now the motor is switched ON. The four bar linkage starts rotating along with the shaft. This causes scrubbing of inner wall of tank by the brush attached to the ends of linkage. For cleaning upper portion of the tank the whole mechanism is reciprocated along the guide ways with the help of handle connected to the rack and pinion arrangement. In this way the tank gets cleaned within minimum time.

V. CONCLUSION

The water tank cleaner was used to clean the water tanks by using rotating brushes. This method was more effective and safe than the conventional methods. This method is capable to clean water tanks within less time and human efforts. Advanced model for tank cleaning system is cleaning the tanks thus making the operation user friendly. The working prototype is promising both in terms of imparting cleanliness and avoiding excess manpower. The future scope of the project is to extend it with auto feeding mechanism by which the manpower involved in feeding gets removed. Through the help of the auto feed mechanism it is easy to clean the tanks without excess man power. The project can be even extended to increase the cleanliness of the tank by insulating the frame and other components using stainless steel.

VI. FUTURE SCOPE

1. This system is user friendly and time saving also the cost is less hence it can be used in the future water tank cleaning purpose.
2. In future the advance system may also be invited like the vacuum cleaner type system that can clean the tank without removing the water from the tank.
3. 1.3The system could be more compact and light weighted and more user-friendly and efficient by improvement in the design and using some other advance equipment.

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