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Research Article

Auto Tank Water Level Controller

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Abstract

The auto tank, water level controller is a fully automatic mechanical operating device which mainly works with the magnetic forces. The motive of this project is to work particular purpose of preventing the water recesses from wastage by automatizing the water pumping system. The water level controller is proposed and designed to regulate' water pumping process to terminate water overflows and to maintain the water level at the specified point. Its operational process was carried out with the concept of Archimedes' principle of floatation, and the primary attribute of this device are its effective low price to reach all kinds of communities, little maintains, simple construction and high durability. This device elements human supervision and prevents wastage of water resources and electricity. The design, contraction, simulation and real-time operational working have elaborated below.

Keywords: *Magnetic force, mechanical, roller switch, flotation, liver type, wastages, relay.*

1. Introduction

In this mechanical automatic water level controller, the primary function is carried out with attractional magnetism forces and the principles of flotation concepts. It has mainly designed with two main levels one is displaced, and the another one is non-displaced fixed liver, so the construction of device looks like cantilever stauncher, were like the bottom lever connected with floating balls called as movable lever and the upper lever is the central fixture in the equipment which holding the roller switch and magnet on it, hence it is a stationery supporting bar. The relative motion between the two levers controls the roller switch with magnetic attractions on dependent of floating balls this mechanical operation have to monitor the motor functions with the 12v relay which connected to the roller switch and motor terminals with the means of 12v dc power supply this moment makes the circuit to close and open at regular intervals of time.

The wastage of the water resources have assumed as if suppose water wastage is up to 10 liters per day by each house, as if even we switch off the motor immediately after hearing the sound of water overflow, even then water wastage may be 10 liters per day from each house this impacts on ground water table level and this Congress harm to environment so in order to control and protect the groundwater depletion and electricity all the water pumping systems should be autotomized.

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Calculation

Liters x days x houses = water wastage due to overflow

10 litres x 30 days x 1 houses = 300 litres water wastage

10 liters x 30 days x 1,00,00,00,000 houses = 3,00,00,00,000 liters water wastage

As the above number makes a big difference of the water wasted due to overflow from the tanks and the excess running of motors by switching off the motor immediately after hearing the overflowing sound, so this has to reduce by atomising the water pumping process.

We enabled a pragmatic method of design for the contraction of the "Auto Tank" that matches the market standards.

2. Objective

Automation the water pumping process for the overhead water tank to reduce water wastage and the workforce

3. Goals

Reduce power consumption, prevent water wastage and also to reduce human effort by automatize all the pumping systems.

4. Plan

Drawing a blueprint of the design, acquire the materials used and the prototype of the model to construct a working model. Tested with different kinds of magnets and by varying collaborated dimensions of the fixtures and string length.

5. Principle

Auto-tank works with Archimedes' principle of floatation. The principle states that an object float in a fluid, liquid and gas, when the upthrust exerted upon it by the fluid in which it floats equals the weight of the object.

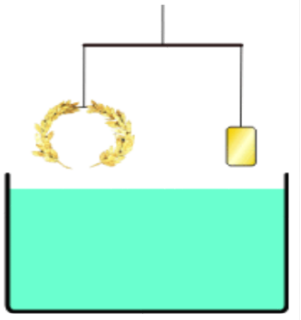

Figure 1: Archimedes' principle

We have taken this concept of floatation and developed and induced in the floating balls which are shell type stretcher have connected with each other with the help of metal stainless steel string and controlees moments of lever.

6. Materials Used

The materials used in its construction are locally available resources in any hardware outlets like, PVC pipes, PVC T and L-bends, ballcocks, roller/trigger switch, magnet holder, rubber weights, rely contractor on the switch and 12v dc adapter.

Figure 2: PVC pipes and bends

7. How This Project Is Unique From Market Available Products Which Used For the Same Application

7.1 Auto Tank Model

Totally mechanical operated which works with less electrical power supply, zero maintenance, the margin of failure is very less, long-term durability, low cost effective, no use of any circuits, sensors, and programs and also not having any spring arrangement or any spring related mechanism. It not needed any extremal production or casings and not get distracted by any natural or chemical effects like scale formation, rain, and also heavy winds even it can work with consistently (Joseph E. Shirley, *et al* , 1996)

Figure 3: Main stretcher

7.2 Market Model

Using sensors and micro-controllers may malfunction, and sometimes the pre-loaded programs may get erase or crashes, the cost of components is high. The sensors, integrated circuits, and components not last for a long time and the sensors have to replaced as they or placed in water for an extended time they stop functioning due to scale formation and for wireless devices batteries have to change time to time and needs to be insulated to protect from the atmosphere and short circuits, and they cannot be tolerable any power fluctuations. It is totally electrical operating system.

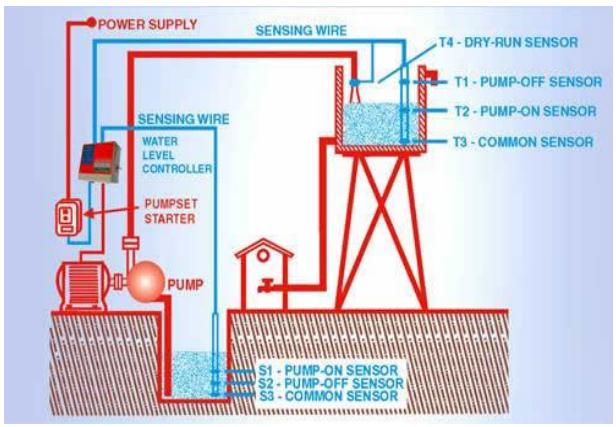

Figure 4: Electic based water level controller

8. Model Design

The working finger gives tropical principles and components used in the design.

1) Roller switch
2) Magnet holder
3) Float ball
4) Pull string
5) Weights
6) Stopper
7) PVC fittings

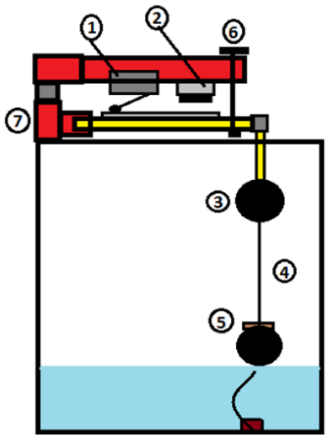

Figure 5: Auto Tank Model Design

9. Advantages

Low maintenance, low prices, fully automatic, it protects the motor from over running and reduces power consumption and also wastage of water. It saves precious person hours, high safety, reliability, increases pump lifetime and house wiring, also prevents motor hard running and water overflows without any circuits, sensors, microcontrollers and springs. The leading futures are no electrons devices placed into the water, like sensors or indicators, chances of failure is very less when compared with available market products.(Robert L , *et al* , 2003)
As it is mechanical device its physical stretcher is adamant so it works long Lastly and all the spear parts can readily evaluable in the local market.
(Bolton, *et al* ,2006)

9.1 Utility

Can be used in homes, apartments, shopping malls, offices, schools, colleges and also in factories and industries, it can installed in single or multistage buildings; it can be suitable for any type of overhead tanks with any shape. It can control any motors with which different wattages and fumes like multistage, single stage rotatory. Submergible and restricting motors. As all the construction components are fixed structure, its life factor is too long for operation (Redmond, *et al* , 2008)

10. Working

When the component is installed in the overhead tank and connected to the motor controls, then its starts working. When the water level cross the lower floating ball that means half of the reservoir is empty then immediately the metal string pulls the upper floater which contacted to the movable lever which controls roller type switch and also having metallic plate to attach with magnet which placed at upper stationary pipe and this top holder attached with magnet, roller switch and also the stopper which stops the lower liver to over travel, when the lower lever moves down the magnate gets detach and the roller switch get triggered then the circuit opens the relay hence the motor starts pumping water to the reservoir and when the tank has filled to upper floater then the bottom lever moves towards initial position which synchronizes and with attached to the magnet and also push back the roller switch to off the conduction than the circuit gets closed, and the water pumping get stops. Hence this process is entirely mechanical.

Figure 3: Working Model

Conclusion

It is an entirely mechanical device with low cost than the products in the market, we have developed this mechanism in our college and to some homes also.
The materials used for this device are PVC pipes, T-bend, L-bend and some couplings which have not reacted to any candy of atmospheric effects, this material graded according to WHO and SON specifications, as it is low cost it can reach to all the class in the society. It can develop as a small scale industry.

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Reference

International Journal of Engineering Innovation & Research, Volume 1, Issue 5, ISSN: 2277– 5668
Joseph E. Shirley and Charles R. Marschke. 'Standard Handbook of Machine Design'.2nd edition McGraw-Hill, [1996].

Frederick J.Bueche, Eugene Hecht, 'Schaum'south line series. Physics'.10th edition. McGraw-Hill.

Redmond, WA. 'Archimedes Principle' Microsoft Corporation. [2008].

Robert L. Mott. Machine Elements in Mechanical Design, [4th edition].Prentice Hall, [2003].

Bolton, Programmable Logic Controllers. (4th ed.W. (2006). North Carolina: Elsevier Newness.)

Dhobale Supriya, Kajal Reshma, Sonawane Sukanya, Padwal Tejaswi, Rane S.P. ISSN: 2277-9655

Harvestelectronics.com/harvest/c18%20at%20commands%20guide.pdf. [Accessed 21 11 2013].

D.Incorporated,"Rectifier,1N40011N4007,"[Online]. Available: www.diodes.com.[Acce 05 01 2014].

Ning an; Sch. of Mechanical Engineering, Hubei Polytechnic. University, Wuhan, China; Yu An. "A water level controller for greenhouse sump tank", Mechanic Automation and control Engineering (MACE), 2011 second International conference.