

Ultraviolet Sanitization Machine

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Abstract - The conveyor system includes a conveyor bed mounted on a frame and an endless conveyor belt moving. The UV Sanitization System based on conveyor based system on which loading and unloading task can be easier and turntable conveyor provides the desired sanitization by revolving the grocery items once in the sanitization chamber. The enclosure also includes a UV irradiation light source interposed in the path of travel of the belt through the housing for disinfecting the surfaces of the belt and the interior of the housing as the belt passes there through.

Key Words: Ultraviolet, Sanitization, Grocery, Objective

1. INTRODUCTION

It has been noted that the covid pandemic that we are facing have changed the life of many people. Our team also observed that covid pandemic have putten extra burden on house ladies who have to disinfect every grocery items that they bring from the retail store and that too individually within the tap.

The chief goal of our project is to remove this extra effort and time consumed by the house ladies in disinfecting the grocery and household items. So for that purpose we have designed a portable Ultraviolet Sanitization machine which house ladies can use anywhere in home.

1.1 PROBLEM IDENTIFICATION

1. Existing Method

There are two challenges with the existing commercial products available in the market.

1-) Most of the designs available commercially for the disinfection of grocery items are in form of close system like a microwave oven box. This system is time consuming because of loading and unloading problem in this process you keep four objects into it and wait for its sanitization then put other four objects and this is carried out in a form of groups and while keeping the individual group one object creates shadow over the other because of which 100 percent sanitization is not achieved.

2 -) The second challenge with the existing systems is that most of the systems are designed outside India and are generally expensive and cant be considered for home use by house ladies.

Motivation and Objective

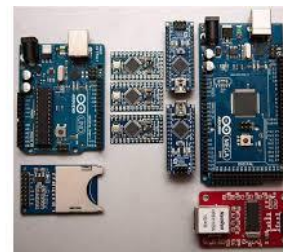
This proposed system addresses the above challenges comprehensively. The proposed system is based on turntable conveyor system in which the loading of grocery items are done at one end and unloading is done on the other end and when the grocery items enter into the chamber it gets 360 degree rotation by the turntable conveyor and hence sanitization problem because of shadow casting gets resolved.

1.2 OBJECTIVES

The major objectives of the proposed work are, Design of UV Sanitization System based on conveyor based system on which loading and unloading task can be easier and turntable conveyor provides the desired sanitization by revolving the grocery items once in the sanitization chamber. The hollow shaft is attached to the bush and the bush is attached to the sprocket and the sprocket moves with the movement of the chain and hence the whole conveyor system moves carrying the grocery items from one end to the other.

2. CONSTRUCTION OF THE COMPONANTS

1. Arduino: We have also used Arduino and program it on C language so that it provides a delay time to our conveyor and hence stops the grocery items when they enter into the sanitization chamber. Arduino is a programmable circuit with input and output port and hence is an essential element of our project.



2. Motor: - We are using Motor with required torque to move the conveyor so it can move the conveyor system. The power and torque is depending on the weight that is kept over it. The shaft of the motor is centrally mounted.



Description of motor used: -

Supply: - 12 volt DC supply

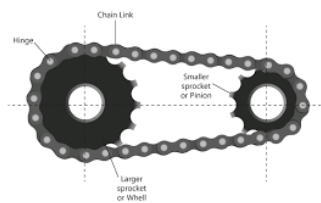
Power: - 25 kg-cm torque

Rpm: - 220

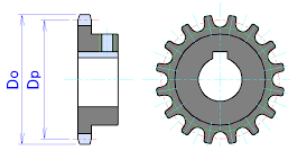
Weight: - 145gm

3. Chains driven conveyor: The Motor moves the chain driven conveyor system which in turn is attached to the sprocket gear. The chain moves the sprocket gear and hence facilitates the movement of the load which is kept over the roller of the conveyor. The chain driven conveyor is just like the pedal of bicycle which moves the sprocket gear that idea we have used in our project for easy movement of the roller and thus making the conveyor at low cost . The makes our project less costing and more effective. By changing the diameter of the bigger and smaller gear, the gear ratio can be altered.

Dimensions of chain drive:-



4. Sprocket-We are using sprocket so that chain gets mesh with the sprocket and hence facilitate the easy movement of our chain driven conveyor system. The sprocket is a mechanical element which is circular and has projection on its circular end. It helps in the transmission of motion from the motor to the roller. This idea is also taken from the bicycle chain which consist of the sprocket and chain driven conveyor system.



5. Ball Bearing: A ball bearing is a type of rolling-element bearing that uses balls to maintain the separation between the bearing races. The purpose of a ball bearing is to reduce rotational friction and support and axial loads. The main use

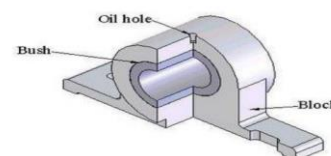
of bearing is providing easy rotation of the gear system and removing any kind of resistance that is taking place .It is an important element of our project.



6. Hollow Shaft: The purpose of using hollow shaft is to provide base to our conveyor on which load is kept and to provide movement to our system. The shaft taken is hollow so that it can rotate properly and provide easy transmission. The various members like Sprocket and chain are mounted over it. Transmission shafts are used to transmit power between the motor and the machine system. For ordinary shafts we use mild steel. For high strength we require, an alloy steel such as nickel, nickel chromium or chromium-vanadium steel.



7. Bush: The bush is the mechanical equipment used for the fitting of the sprocket. It is a hallow part in which the sprocket and three wheels is fixed. It is also part of our project and it facilitates easy movement of the hollow shaft which in turn moves the grocery items in forward direction. The bush act as an intermediately between the sprocket and the hollow shaft.



The dimension of the bush

Length of the bush-5cm

Outer diameter of the bush-3.2cm

Inner diameter of the bush-2.5cm

8. TURNTABLE: Turntable is installed in the UV Sanitization chamber which rotates the grocery items 360 degree and hence provides 100 percent sanitization to the items. The turntable resolves the problem of low disinfection taking place in close system.



9. Philips UV bulb- A Philips UV Bulb is a special type of bulb which kills the covid germs by the exposure of the surface to the UV light. But at the same time the exposure of UV light to eyes can cause blindness and exposure to skin can cause skin cancer. Hence we have taken special precaution in its installation and have insured that the light on falls on the grocery items and not comes out.



3. CONCLUSION

Designs for the UV Sanitization machine based on conveyor system was very much essential to help the house ladies in reducing the effort put by them in washing every grocery item under tap and then waiting for it to get dry. All these processes increase effort and time in the sanitization process. Our team identified this problem that occurred during the covid pandemic and tried to resolve it by making an innovative sanitization system which has both loading and unloading setup and at the same time it disinfects the groceries by providing the 360 degree rotation. The load is kept over the hollow shaft which is attached to the bush and the bush is attached to the sprocket and the sprocket moves with the movement of the chain and hence the whole conveyor system moves carrying the grocery items from one end to another.

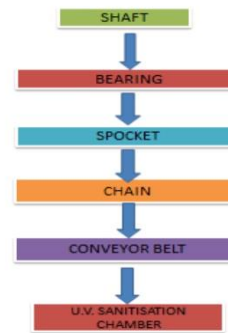


Fig: Flow chart of design of our system

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