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IR Controlled Spraying Robot (Nursery)

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***Abstract* - Sprayers are mechanical gadgets that are particularly intended to splash fluids rapidly and effectively. They arrive in various distinctive assortments. In this venture we'll investigate mechanical blast sprayers. A sprayer of this sort is an awesome approach to cover vast territories, for example, gardens rapidly and effortlessly. A sprayer ordinarily comprises of a tank for conveying the fluid to be splashed, a board, an engine (19 W) for pumping out this fluid, shower spouts on a blast that consequently scatter the fluid in a descending heading over an apparent territory (say 5 or 6 feet), ball valves, a skeleton with wheels on which the sprayer is mounted, and a hose connection for splashing. The gadget is mechanically pushed from behind and as the supply to the pump is exchanged on, the fluid is showered. This sort of sprayers is regularly utilized for showering yard chemicals, for example, pesticides including herbicides, bug sprays and fungicides.**

Keywords: Sprayer, Pesticides, Herbicides, Fungicides.

I. INTRODUCTION

From time immemorial, the sun has been the prime wellspring of vitality for life on earth. The vitality was being utilized specifically for purposes like drying garments, curing rural deliver, protecting sustenance articles, and so on. Indeed, even today, the vitality we get from fuel-wood, oil, paraffin, hydroelectricity and even our nourishment begins in a roundabout way from sun. Sun oriented vitality is for all intents and purposes limitless. The aggregate vitality we get from the sun far surpasses our vitality requests. It is likely the most dependable type of vitality accessible all around and to everybody, dissimilar to different sources. With decreasing supplies of oil, gas and coal, tapping sunlight based vitality is an intelligent and fundamental strategy.

Very much kept up yards and patio nurseries can make a wonderful, practical scene around your home and give sanctuary to an assortment of untamed life. Through great social and incorporated vermin administration (IPM) hones, the outside greens cape in the urban condition can stay sound and flourishing.

Alongside appropriate plant determination and care, controlling bugs in your grass or garden is a vital piece of support. Numerous social practices supplement IPM control techniques, for example, proficient and suitable watering rehearses and sensible utilization of pesticides. Pesticide ought to be restricted where conceivable, however when essential, utilize them capably. Continuously read and take after the pesticide mark directions before applying, for example, with bug sprays or herbicides, to lessen the danger of uncovering people or non-target creatures. Take care to ensure the earth, which incorporates the best possible utilization of pesticides to avert sullying of water assets.

II. LITERATURE SURVEY

1) International Journal of Sustainable Agriculture 2 (1): 16-19, 2010, ISSN 2079-2107
Solar Sprayer - An Agriculture Implement, R. Joshua, V. Vasu and P. Vincent.

"Energy - demand" is one the major thread for our country. Finding solutions, to meet the "Energy -demand" is the great challenge for Social Scientist, Engineers, Entrepreneurs and Industrialist of our Country. According to them, Applications of Non-conventional energy is the only alternate solution for conventional energy demand. Now-a-days the Concept and Technology employing this Non-conventional energy becomes very popular for all kinds of development activities. One of the major area, which finds number applications are in Agriculture Sectors. Solar energy plays an important role in drying agriculture products and for irrigation purpose for pumping the well water in remote villages without electricity. This Technology on solar energy can be extended for spraying pesticides, Fungicides and Fertilizers etc., using Solar Sprayers. This paper deals how a 'Power Sprayer' which is already in use and works with fossil fuel can be converted into solar sprayers works without any fossil fuel.

2) The University of New South Wales, Australia t.furukawa@unsw.edu.auSeptember 9, 2005.
Autonomous Pesticide Spraying Robot for Use in a Greenhouse, Philip J. Sammons, Tomonari Furukawa and Andrew Bulgin

This paper presents an engineering solution to the current human health hazards involved in spraying potentially toxic chemicals in the confined space of a hot and steamy glasshouse.

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This is achieved by the design and construction of an autonomous mobile robot for use in pest control and disease prevention applications in commercial greenhouses. The effectiveness of this platform is shown by the platforms ability to successfully navigate itself down rows of a green house, while the pesticide spraying system efficiently covers the plants evenly with spray in the set dosages. The optimization of carbon dioxide enrichment, temperature, humidity, root moisture, fertiliser feed, pest and fungus control allow greenhouses to produce fruits, vegetables out of season and ornamental owners all year round. For example, carbon dioxide levels within a greenhouse are approximately five times the normal atmospheric levels.

3) Development and Fabrication of Smart Spray Pump
Mahesh M. Bhalerao, Azfar M. Khan, Dattu T. Unde, Amitkumar S. Yadav

In order to meet the food requirements of the growing population and rapid industrialization, modernization development of agriculture is inescapable. Mechanization that enables the conservation of inputs through the precision in the metering ensuring the better distribution, reducing the quantity needed for better response and prevention of losses or wastage of inputsapplied. Mechanization reduces unit cost of production through higher productivity and input conservation. Farmers are using the same methods and equipment for the ages. In our country farming is done by traditional way, besides that there is large development of industrial and service sector as compared to that of agriculture.

The spraying is traditionally done by labor carrying backpack type sprayer which requires more human effort. So to overcome these above problems a machine is developed which will be beneficial to the farmer for the spraying operations. India is a land of agriculture which comprises of small, marginal, medium and rich farmers. Small scale farmers are very interested in manually lever operated Knapsack sprayer because of its versatility cost and design. But this sprayer has certain limitations like it cannot maintain required pressure; it lead to problem of back pain.

4) Solar Based Pesticide Sprayer, Project Reference No. : 37S0497
Mohan badiger, Kartikeya bhat.

Sprayers are mechanical devices that are specifically designed to spray liquids quickly and easily. They come in a number of different varieties. In this project we'll take a look at solar operated mechanical sprayers. A sprayer of this type is a great way to use solar energy. Solar based pesticides sprayer pump is one of the improved version of petrol engine pesticide sprayer pump. It is vastly used in the agriculture field & also used for many purposes. This is having more advantages over petrol engine sprayer pump. It uses the solar power to run the motor. So it is a pollution free pump compared to petrol engine sprayer pump. In this charged battery can also be used for home appliances like glowing of CFL bulbs, mobile charging etc.

III. PROBLEM STATEMENT

- Design and develop an IR spraying robot.
- Also fabricate the model of the same which would be able to give same results as requirement of design concept.

IV. SYSTEM DESIGN

- The block diagram consists of Arduino Atmega 328p controller, Bluetooth module, Ultrasonic Sensor, Level Sensor, L298N Driver, DC Motor, Relay, Pump, Buzzer, LED, Battery, etc.

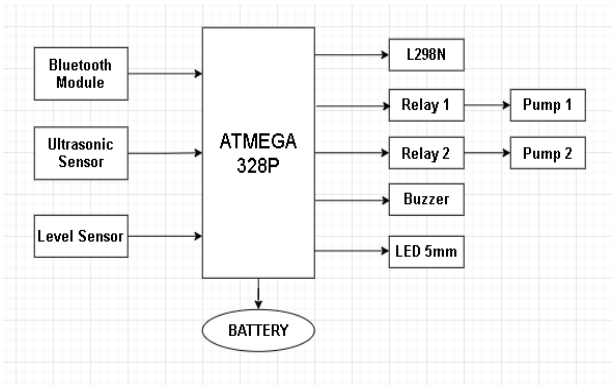

Figure 1: Block Diagram

- 12v 1.3 A Power supply is given using battery.
- Bluetooth module is used to give command to robot.
- Robot will move forward, reverse, left, right and stop using bluetooth based application. Using Bluetooth, we can start specific pump i.e. left and right.
- If ultrasonic sensor is detected it will give buzzer and led will glow.
- Level sensor is used to check the pesticide level in tank.

V. DESIGN AND CALCULATIONS

A) CAD Design

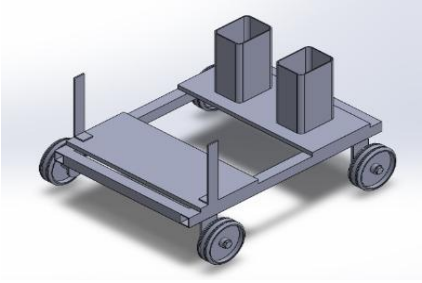

Figure 2: CAD model

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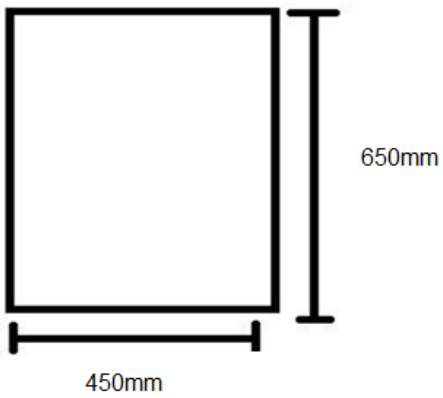
B) Calculations



Frame design for safety FOR 25*25*3 L angle mild steel channel
b = 25 mm, d= 25 mm, t = 3 mm.
Consider the maximum load on the frame to be 50 kg.
Max. Bending moment = force*perpendicular distance
= 15*9.81*325
M = 47823.75Nmm
We know,
M / I = σb / y
M = Bending moment
I = Moment of Inertia about axis of bending that is; *Ixx*
y = Distance of the layer at which the bending stress is consider
(We take always the maximum value of *y*, that is, distance of extreme fiber from N.A.)
E = Modulus of elasticity of beam material.

I = bd3 /12
= 25*25^3 / 12
I = 32552.08 mm4
σb = My / I
= 47823.75*12.5 / 32552.08
σb = 18.36 N /mm2
The allowable shear stress for material is σallow = Syt / fos
Where Syt = yield stress = 210 MPa = 210 N/mm^2
And fos is factor of safety = 2
So σallow= 210/2 = 105 MPa = 105 N/mm^2
Comparing above we get,
σb < σallow i.e 18.36 < 105 N/mm^2

VI. CONCLUSION

The robot for farming reason and Agrobot is an idea for the close to the execution and cost of the item once upgraded, will turn out to be work through in the horticultural splashing operations. We have been fruitful in building up a robot whose development is sufficient to withstand the difficulties of the field. We are certain that once this idea is displayed in a way appropriate to Indian market, it will help in cutting down the 15% methodology rate found in the Indian formers related with the agrarian splashing operation.

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