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# FABRICATION OF MANUALLY OPERATED MULTI-PURPOSE AGRICULTURE SPRAYER

**MR. VENKATRAMAN J[1], ASLIN SANTHOSH C[2], KAMALRAJ R[3], MANIKRISHNAN K[4], MANIMARAN P[5], KIRUBAKARAN R[6]**

*[1] Assistant Professor, Department of Mechanical Engineering, Mahendra Engineering college, Namakkal, India*
*[2,3,4,5,6]Students , Department of Mechanical Engineering, Mahendra Engineering college, Namakkal , India*

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**Abstract -** *The idea of our project is making multi-purpose agriculture sprayer operate by man power. In agriculture, sprayer is a piece of equipment that sprays through sprayer is a piece of equipment that sprays through nozzles to apply herbicides, pesticides, and fertilizers on agricultural crops. In olden days, pesticides will be sprayed on plants by using blower which runs with help of fuel engine. Range of size of sprayer is based on man-portable units (typically backpacks with spray guns). In our project, we are considering the pressure flow for spraying. Hand pump is used to pressurize the fluid in the reservoir tank and through the sprayer nozzle fluid is sprayed. The system allows for more precise rate and droplet size control than conventional rate control systems and offers other advantages as well. Basically, the traditional use of spray pressure to control nozzle output is replaced by the duty cycle of a pulsing solenoid. Pressure stays fairly constant throughout the duty cycle range. Pressure can still be changed if necessary to control droplet size.*

***Key Words***: Sprayer, Pump, Crank mechanism, Sprocket and chain drive.

## 1. INTRODUCTION

The objective of spraying is to deliver an effective, uniform dose of product to a target area in a safe and timely manner. Any product not deposited the target is called "wastage".

Wastage includes drift (vapour and droplet), run-off and any off-target deposition. In high volume air blast applications studies show that 80 per cent of the product can be lost to drift and ground deposition. Wastage not only costs time and money but may reduce the effectiveness of the application and increase the risk of environmental contamination.

- Ability to change droplet size with pressure adjustments on the go without changing travel speed (depends on where you are in the duty cycle range).
- Ability to change boom section number and size without any change in plumbing
- Ability to adjust the height and angle.

### 1.1 SCOPE

The regulations in this Order concern limiting the pollution of soil, groundwater and surface water with plant protection products as a result of the filling and washing of sprayers or tractors used commercially for the application of plant protection products. Conditions that are more far-reaching than the provisions in this Order may be laid down in decisions of the finally, Environmental Protection Act.

The quality and precision of the operations are equally significant for realizing higher yields harvesting and threshing need a high degree of precision to increase the efficiency of the inputs and reduce the losses.

Thus, it only results in the shifting of the labour from one vocation to the other. As production increases with mechanization the farm operations, it creates a good scope for commercialization of agriculture.

### 1.2 USERS OF AGRICULTURE SPRAYERS

In these guidelines, the term “users” refers to people who already use a agriculture sprayers or who can benefit from using a agriculture sprayer because their ability to spraying is limited. The agriculture sprayer is very useful in the following areas.

Users include:

1. Home and garden.
2. Used for small home gardens or individual plants.
3. Most are Adjustable from stream to mist.
4. People living in different environment.

### 1.3 NEED FOR AGRICULTURE SPRAYER

1. Increase the cultivate
2. To proper even spraying of pesticides
3. To reduce the manual work
4. Reducing of timing consumption
5. Operator safety

## 2. CHALLENGES FOR USERS

Users face a range of challenges, which must be considered when developing approaches to agriculture sprayer provision. The challengers are been using this agriculture sprayer for spraying pesticides on the land by easily.

## 3. FINANCIAL BARRIERS

Some of the people in the world live in low income countries. The majority of them are poor and do not have access to basic service facilities. The government funding for the provision of agriculture components like as sprayers and another components and then the government can gives the agriculture loan for improving the agriculture.

## 4. METHODOLOGY

In our country farming is done by traditional way besides that there is large development of industrial, service sector as compared to that of agriculture. The spraying is traditionally done by the labor carrying backpack type sprayer which requires more human effort. There is generally done with the help of our project which becomes costly for farmers having small farming land. So to overcome these above problems, we tried to eliminate these problems and designed the equipment which will be beneficial to the farmer for the spraying operations.

## 5. OBJECTIVE

- Decrease the operational cost by using new mechanism.
- Work reliably under different working conditions.
- Decrease the cost of machine.
- Decrease labour cost by advancing the spraying method.
- Machine can be operated in small farming land (5 acre).
- Making such a machine which can be able to perform both the operation(spraying).

So considering these points related to spraying an attempt is made to fabricate such equipment which will able to perform the operations more efficiently and also will results in low cost.

## 6. MAJOR WORKING MECHANISM

In our project the pesticides is sprayed on the agricultural lands. In this project the all the arrangements are mounted on the trail the trail is moved by the rotating of wheel. In this arrangements there use one wheel for moving the trail. By using the crank mechanism the rotary motion of wheel is converted in to linear motion.

## 7. OPERATION METHOD

The tank is mounted on the trail the bottom of tank the inlet tube for pump is connected the pump is attached with the tank. The pump is operates by the crank mechanism this mechanism is convert rotary motion into reciprocating motion.

The pump mechanism is connected with the trailed wheel by the chain drive. There the can use the larger pulley on trailed wheel and smaller wheel on the crank mechanism.

If the trail is moved the wheel is rotates so the chain drive operates the crank mechanism with this the pump is attached due to rotary motion of crank that convert into reciprocating motion. The single slider crank mechanism, due to this arrangement the connecting rod moves upward and downward which then reciprocate the plunger of single acting plunger pump mounted at the top of storage tank.

During the upward motion of the connecting rod the pesticide is drawn into the pump and during the downward motion of connecting rod the pesticide is forced to the delivery valve, the delivery is connected to the pipe.

The delivery pipe is connected with the control valve. The controls the flow of the pesticides. If can spray light quantity of pesticides means the control valve is lightly opened so the flow rate is reduced and flow is controlled.

If they spray high quantity of pesticides means the control valve is fully opened so the valve allows the fully quality of pesticides to the sprayer and then The spraying side can be changed by rotating the spraying support beam.

The outlet of control valve is connected with the spraying nozzle the nozzle ends are connected by the fine sprayer it can sprays the pesticides in fine particles.

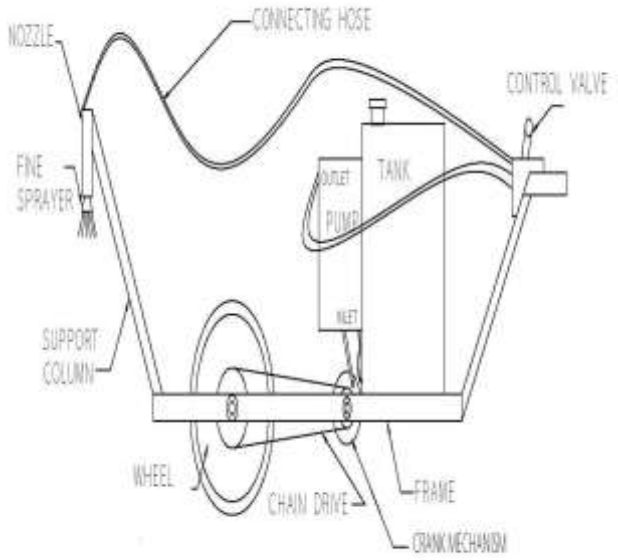
## 8. TEST CONDUCTED

### 8.1 TEST 1

The agricultural spray has been tested on 12-03-2018 at agricultural land and the performance of the agricultural spray is noted. It is noted the agricultural spray 1meter/min sparing area is $1900\times10^3 mm^2$ and then some mild vibration are observed in main wheel during spraying time. Thus the result of the test conducted was desirable and the agricultural spray properly.

**8.2 TEST 2**The agricultural spray has been tested on 15-03-2018 at agricultural land and the performance of the agricultural spray is noted. It is noted the agricultural spray 1meter/min sparing area is $2100\times10^3 mm^2$. Thus the result of the test conducted was desirable and the agricultural spray properly.

**9. LAYOUT**




**Left Side View of Project**

**10 MERITS**

Construction is simple. No need of fuel to operate. Easy to handle, Use and repair. Totally non pollutant for environment. Less maintenance

**11. CALCULATION**

Thus the sprayer is simple constriction due to this modified design its makes human safety and then continuous running and spraying is possible. There is a no vibration occurs while these sprayer is running so its makes even spray towards the crops.

Thus the agricultural sprayer has been made for evenly spraying the pesticides to the agricultural lands. The agricultural sprayer made for the crank mechanism for using operating the pump. Although fully automated trailer sprayer available in the market for spraying the pesticides. But it's cost in unreachable to common middle clean people like as. But our sprayer is made up an aim of providing the poor people a much easier and cost efficient spraying desire we did if, thus the sprayer we have made is capable of spraying by crank mechanism and it highly compact and desirably cost efficient.

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