

An Attachment for a Pesticide Sprayer

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Abstract— In this paper, the design and implementation of pesticide sprayer has been presented. The proposed system is the modified model of the hand sprayer which minimizes the difficulties of the hand type of sprayer such that it also reduces time required to spray pesticide, labor skill, cost as well as effort etc. In this sprayer, the rotary motion is converted into reciprocating motion with the help of wheel. It could also be operated in rainy and cloudy weather conditions. This system can be used for spraying pesticides, fungicides, fertilizers and paints also. The developed systems initial cost is little more as compared to conventional sprayer but the running cost of the system is all most zero in other words minimum.

Index Terms—Pesticide ; fertilizers; sprayer.

I. INTRODUCTION

A sprayer is a device used to spray a liquid. For applying pesticide and fertilizer on agricultural crops the piece of equipment is used is called as pesticide sprayer. Pesticides include herbicides which are used for destroying unwanted vegetation, insecticides for controlling a different variety of insects, fungicides used to prevent growth of mildew, disinfectants for preventing the spread of bacteria and compounds used to control mice and rats.

Pesticides are substances or organisms used to kill, incapacitate, and inhibit the growth of, pests. The pesticides are natural or synthetic chemicals. The pesticides are also regarded as a biological control.

Commercial spray operators use a wide range of pesticides, including insecticides, herbicides, fungicides, bactericides, post-harvest fruit dips, and products applied to animals. Pesticides can control environmental pests efficiently and be of significant economic benefit to primary production, when it is used appropriately. Pesticides can put human health, trade and the environment at risk, if they are misused. A herbicide is a chemical substance that will inhibit the growth of plants. Herbicides are commonly used to control the growth and spread of weeds.

In conventional methods of pesticide spraying has some drawback that is, Backspin is most important because in these type of spraying method carry lot of weight on back. Wastages of pesticide in this method lot of time are required in spraying farms. The conventional method is not suitable for working whole day. In other recent methods are also have some drawbacks such as, the farmer who has less farm as well as he is poor then how he can purchase that from the market. Hence its cost is more, also lots of pesticides are wastages as well as it is not useful for small farms.

II. NEED OF PESTICIDE SPRAYER

A pesticide is any material (natural, organic, or synthetic) used to control, prevent, and kill pests. Pesticides are a mixture to be toxic to the pests they target, whether they are insects, cause plant disease, or weeds and garden invaders. When pesticides are used properly, pesticides can protect your plants from damage. Pesticides may contribute to soil, air, or water pollution.

Using a Pesticide sprayer can save farmer's money, time as well as labour quantity, crop losses from insects and other pests.

The technique you use to spray crops is very important to get cover large area of our farm. The equipment is used it should be fit the type of equipment. With a hand-held gun, a sweeping motion over the foliage will allow the spray material to penetrate and get to the underside of the leaves.

Along with pesticide there is need pesticide sprayer is very important.

- 1) Pesticide sprayer must be less costly.
- 2) It is an instrument which is ergonomically design.
- 3) It reduces human efforts.
- 4) The instrument which is operated by single person.

Observation should be made to ensure that the sprayer is operating correctly and that sufficient coverage is obtained. Proper selection, calibration and operation of spray equipment is important in achieving optimal pest control, as well as in meeting environment and safety requirements.

Working of Pesticide Sprayer

Working of these pesticide sprayer is depend on simple mechanism i.e. conversion of rotary motion into reciprocating motion .When front wheel is going to rotates(big wheel) then these rotary motion is transfer to shaft with the help of chain and then the rod connect to other end of shaft and it performs reciprocating motion . The other end of rod is connected to piston of pump and these piston is performs reciprocating motion and hence pressure is created inside the pump. This pressure in pipes is realized with the help of control knob and we get desired pressure through nozzles and due to that pressure the pesticide from the tank is come into the pipes and sprayed on the plants and crops.



Figure 1 Pesticide Sprayer

The spraying pesticide on one farm is over then we want to go on another farm for spraying pesticide without any loss, then there is back pressure relief valve is provided. This valve also operates, when our pesticide sprayer is in motion or it may be in working as well as it reduces inside the pipe and pump also.

If we are using number of nozzle for spraying pesticide then there are chances of low pressure inside the pump and due to which low pressurized pesticide coming from the nozzle and it is not sufficient for the crops. But if we are going to increase size of tank then it possible to get maximum pressure. Also if there is less number of nozzle is their then we have to get maximum pressure and which is suitable for our crops or plants also.

A. Nozzles working

Nozzle types commonly used in low-pressure agricultural sprayers include flat-fan, flood, raindrop, hollow-cone, full cone, and others. Special features, or subtypes such as “extended range,” are available for some nozzle type. Nozzle is one of important member of sprayer .it supply the pressure which is formed in pump to the crop.

B. Manufacturing

Basically the components which are required for manufacturing that we have to collect from the market and that are crank, gear, tank, pump, wheel, chain, nozzle, nozzle pipes, knobs and remaining which is required that we have to taken from the scrap.

Initially we have to manufacture the base body of sprayer with the help of welding. After the completion of base body then crank and gear position are set and then tank is mount on the body with accurate dimensions. We are provided adjustable handle to the farmer which helps to adjust the height of handle as per requirement and also adjustable nozzle position are also provided. All manufacturing is done under the workshop.

III. CONVENTIONAL METHODS

In conventional methods of pesticide spraying have some drawback i.e. Backspin is most important because in these type of spraying method carry lot of weight on back as shown in fig(1).wastages of pesticide in these method lot of time is required in spraying farms. The conventional method is not suitable for working whole day.

In other recent methods as shown in fig(2)are also draw backs such as ,the farmer who has less farm as well as he is poor then how he can purchase that from the market. Hence its cost is more, also lots of pesticides are wastages as well as it is not useful for small farms.

design

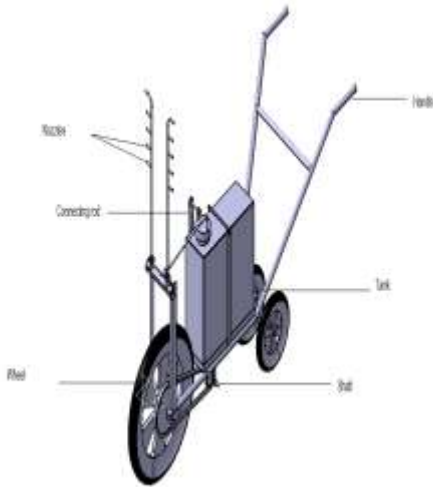


Figure 2 3D design

This design of our pesticide sprayer and that consist of wheel, nozzle pipes, tank, chain, gear, handle and all other parts for handling

Health and safety directions on pesticide labels must be read, understood and followed by operators. Employers must provide appropriate personal protective equipment to employees. For an operator to use the equipment, when transporting and storing pesticides, care must be taken to protect himself or herself, other people and the environment. Containers of pesticide concentrate must be secure while in transit and during short-term storage at mixing sites. Security may be via a locked cage or cabinet on the tray of the pesticide sprayer.

Safe transport advice

- 1) When purchasing pesticide sprayer ensure the container is in good condition and not leaking.
- 2) Fill the container only the amount of pesticide you need as this reduces the amount being transported and the subsequent risk associated with storage.
- 3) Always check sprayer maintenance to ensure they are present in good condition.
- 4) If possible, secure the pesticide in the utility tray of our sprayer.
- 5) When working near water bodies, plan to transport mixed (diluted) pesticide rather than concentrates.

- 6) If the spray tank contains dilute pesticide while the spray vehicle is travelling on public roads, display the pesticide name on the outside of the spray tank.

Storing pesticides

Pesticides should be locked in either an isolated, stand-alone building, uninhabited building, within a multipurpose building. They should be stored in a cool area, away from sunlight.

- 1) The container should be made from material to hold the pesticide safely, preferably the same material as the original container
- 2) The new container must be labeled with the name of the product and the active constituent.
- 3) Warning statements on the original label are also written on the new container.

Personal protective equipment commonly recommended for use when applying pesticides includes:

- 1) Goggles/face shield to protect the eyes
- 2) Chemical resistant gloves to protect hands
- 3) Overalls to protect legs, arms, torso and groin
- 4) Rubber or PVC boots to protect feet
- 5) Washable or chemical-resistant hat to protect head.
- 6) PVC apron for use during mixture.

Advantages

- 1) No fuel is required.
- 2) No electricity is required.
- 3) Relief from back pain.
- 4) The size of cycle is small then it can easily passes through small plants.
- 5) In less time large area is covered.
- 6) It is light in weight to handle.
- 7) Weight is up to 15kg.
- 8) It is easy to move from one place to another.

Disadvantages

- 1) In marshy areas it is not useful.

Application

- 1) All types of Vegetables.
- 2) All type of cereals.
- 3) Fruits such as watermelon and pomegranate.
- 4) Lawn, garden plants etc

CONCLUSION

This machine is introduced to help farmers to spray pesticides in his field on any type of crop diseases. All the efforts of hand pump are reduced by our "PESTISIDE SPRAYER".

REFERENCES

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