

Multi-nozzle Pesticide Sprinkler Pump operated manually

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Abstract

The core of Indian culture is farmers. More than 70% of rural households rely on farming as their main livelihood. Farmers vary from small to marginal, medium and wealthy farmers, according to their financial situation. Instead of tools created, small scale farmers always prefer a hand-operated tool. Different works like weeding, harvesting, sowing etc. are included in agriculture. Pesticide spray is a preliminary operation conducted by farmers during these activities to safeguard against insects, fungi and pesticides. Numerous techniques have now been used for the use of solar, power and chemical power to spray pesticides. Instead of these energies, we can simply use mechanical energy and use these saved energy in the suitable location. Although farmers suffer from various issues such as lower sprinkler capability, less work area, higher costs than manuals, longer duration, and using the advanced tools. The amount of products introduced in the market to overcome these constraints, but not all of the constraints can be overcome at once. We can discover a solution to all this by designing Mechanical multi-nozzle pumps for which no energy and fuel other than mechanical energy is needed. This paper is designed to produce a low-cost sprinkler pump for bad farmers in India and to decrease the effort necessary. A precise work model was developed. The nozzle pressure is comparable and the peak region is covered. The piston pump is obtained from a rotation of the wheel. The crank mechanism was used.

Keywords-multi-nozzle pump, chain/sprocket system, IC motor

INTRODUCTION

Agriculture is the Indian economy's cornerstone. Roughly 60-70% of the Indian population is farming based, and they add between 15-16% to GDP by way of a latest study. In the last 40 to 50 years, farming has been created at a greater rate. Management of the amount of illnesses in crops are among the multiple factors engaged in this growth. Modern agriculture still employs up to 80 to 85% of pesticides in crop spray which retains an eco-friendly way. In contemporary agriculture, pesticide use continues to rise. The issue with the use of standard machinery in the agricultural sector is that farmers face financial difficulties for chemical and electrically powered pumps as well as the numbers of illnesses and problems caused by these problems, which are particularly crucial for the improved contribution to India's GDP. The best way to solve these issues is through mechanical energy to use the machinery that has been created to apply the pesticide. We need to make sure our demands are definitely fulfilled when selecting a pump to

provide pesticides to plants or to spray insecticides, herbicides, or fungicides. The system should be sufficiently powerful to supply water and spray materials in the required moment. The principles of the trolley that convey its movement from the chain / sprocket system to the cylinder to pump the pesticides which are used to handle the organic fertilizer cum pesticides sprinkler[1]–[7]. Generally used low cost Knapsack sprinkler is of great disadvantage because of its heavy weight and manual pumping, such as pain and exertion on the back. Hand-operated pumping is not continuous; it produces irregular pressures inside the pumping cylinder. If pressure fluctuates in the tank, it leads an extremely desirable flow to become turbulent. When the pressure within the cylinder rises, the spray width increases, which is why pesticides are wasted. In the IC motor (Power Sprinklers), a motor is used rather than manually. The disadvantages include the IC engine, which can cause elevated vibration and cause many health issues. The back pain leads because of heavy weight. The sprinklers installed on the tractor are very costly and are not suitable for tiny areas and all crops. It is appropriate for big quantities of highlighted crops.

RESULT AND CONCLUSION

Table 1. Distances (horizontal & Vertical) and height of crop

Sr. no	Name of crop	Distance between Plants (horizontal/vertical)	Height of crop
1.	Sorghum	15 inch /3-4 inch	5.5-7 feet
2.	Pearl Millet	15 inch /3-4 inch	5.5-7 feet
3.	Sugarcane	15 inch /3-4 inch	5.5-7 feet
4.	Soybean	15 inch / 2 inch	5.5-7 feet
5.	Corn	15 inch /3 inch	5-7 feet
6.	Groundnut	15 inch / 3 inch	1.5 feet
7.	Cotton	24-36 inch /24-36 inch	2-5 feet
8.	Pigeon Pea	15 inches / 6 inches	3-4 feet

It covers twice area of spraying than manually spraying. More number of nozzle which covers maximum area of spray in minimum time at maximum rate. The suggested model has removed the problem of back pain, since there is no need to carry the tank on the backbone and shoulder. The c.f. valves can also be applied which help in reducing the change of pressure fluctuation and c.f. Valves helps to maintain pressure. Proper adjustment facility in the model with respect to crop helps to avoid wastage of pesticide. The pump can deliver the liquid at sufficient pressure where output of the nozzle in 1min is 0.3 and spray width 0.4m from calculation so that it reaches

all the foliage and spreads entirely over the spray surface. It is little heavy but efficiently working in rough conditions of farm. It is economical therefore affordable for all kind of farmers. Excessive use of pesticides reduces which result into less pollution. Imported hollow cone nozzles should be used in the field for better Performance.

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