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Multipurpose Weeder with Pesticide Sprayer

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Abstract: *In order to meet the food requirements of the growing population and rapid industrialization, modernization of agriculture is inescapable. Mechanization enables the conservation of inputs through precision in metering ensuring better distribution, reducing quantity needed for better response and prevention of losses or wastage of inputs applied. 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. The weeding is the generally done with the help of Bulls which becomes costly for farmers having small farming land. So to overcome these above two problems a machine is developed which will be beneficial to the farmer for the spraying and weeding operations.*

Keywords: Weeding, Spraying, Mechanization

I. INTRODUCTION

India is a land of agriculture which comprises of small marginal and rich farmers weed plant is one of the growing concern for farmers as it directly impacts the productivity and economy

As the pets and insects nowadays have been growing up in abundance throughout the vegetation and also having developed their immunity towards the surrounding environment so it becomes compulsory for the farmers across the globe to spray pesticide and insecticides to protect their crops

India is set to be an agriculture based country approximately 75% of population of India is dependent on farming directly or indirectly our farmers are using same technique for the ages of pesticide spraying and weeding etc

There is need for development of effective spraying and weeding machine for increasing the productivity and economy for farmer so a machine is developed which is beneficial to a farmer to perform both weeding and spraying operation in a single unit

II. LITERATURE REVIEW

A literature review on mechanised multipurpose weeder and pesticide sprayer revealed that agricultural tools in India need to be upgraded with modern techniques. Some examples of that are cycle weeder, automated weeder, sprayer, power tiller, mechanisation of weeder.

For mechanisation of weeder principle of motion of trolley which transmits rotatory motion from chain and sprocket arrangement and reciprocating piston into the cylinder for pumping the pesticide, if the sensors is used in the machine some times it may cause damage to the plants when the plants was falsely regarded as weed. Thus manually-operated weeders are better suited for small scale agricultural lands that ensure maximum removal of weed with less and less damage to the plant.

III. METHODOLOGY

When the equipment is push/pull by using handles, front wheel rotates and the gear is mounted at the axle of wheel is start to rotate and its rotation is then transferred to the pinion through the chain drive.

The rotary motion of the pinion is converted into the reciprocating motion by the single slider crank mechanism, due to this arrangement the connecting rod moves upward and downward which then reciprocate the piston of single acting reciprocating pump mounted at the top of storage tank.

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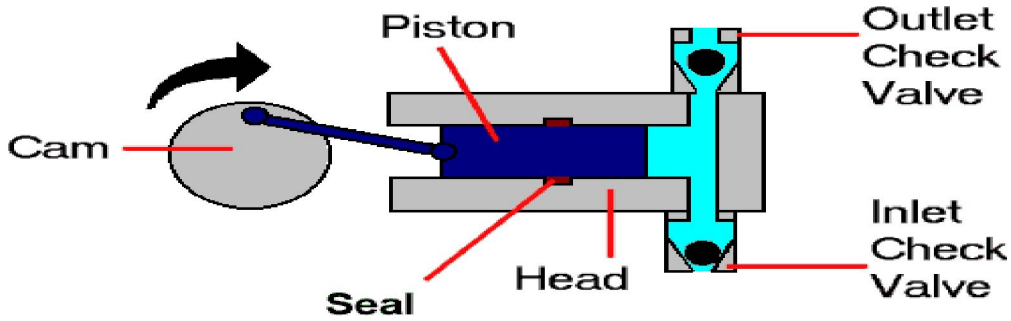
During the upward motion of the connecting rod the pesticide is drawn into the pump and during the downward motion of connecting rod the pesticide is forced to the delivery valve, the delivery is connected to the pipe carrying the number of nozzles

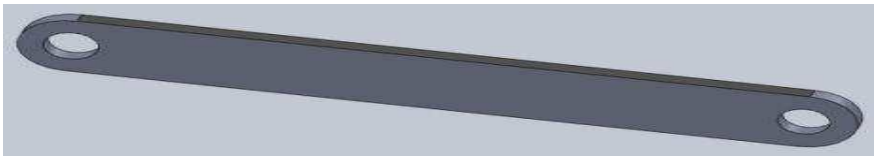
IV. COMPONENTS

Handle for controlling

Reciprocating pump -These types of pump operate by using a reciprocating piston. The liquid enters a pumping chamber via an inlet valve and is pushed out via an outlet valve by the action of the piston or diaphragm. Reciprocating pumps are generally very efficient and are suitable for very high heads at low flows. This type of pump is self priming as it can draw liquid from a level below the suction flange even if the suction pipe is not evacuated. The pump delivers reliable discharge flows



Connecting link



Nozzles –The nozzle is a critical part of any sprayer. Nozzles perform three functions
Regulate flow
Atomize the mixture into droplets

Weeder plate

Weeding is the process of eliminating the competition of unwanted plants to the regular crops so that crops can be grown profitably. Management of weeds is an important component of production techniques as elimination of weeds is expensive and hard to achieve. Weeds are uprooted by the teeth of the weeder and buried in the mud by push and pull operations of the weeder.

Wheel

A wheel is a circular component that is intended to rotate on an axial bearing. The wheel is one of the main components of the wheel and axle which is one of the six simple machines. Wheels, in conjunction with axles, allow heavy objects to be moved easily facilitating movement or transportation while supporting a load.

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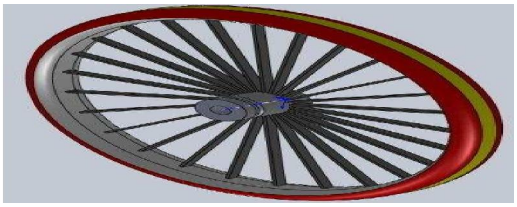
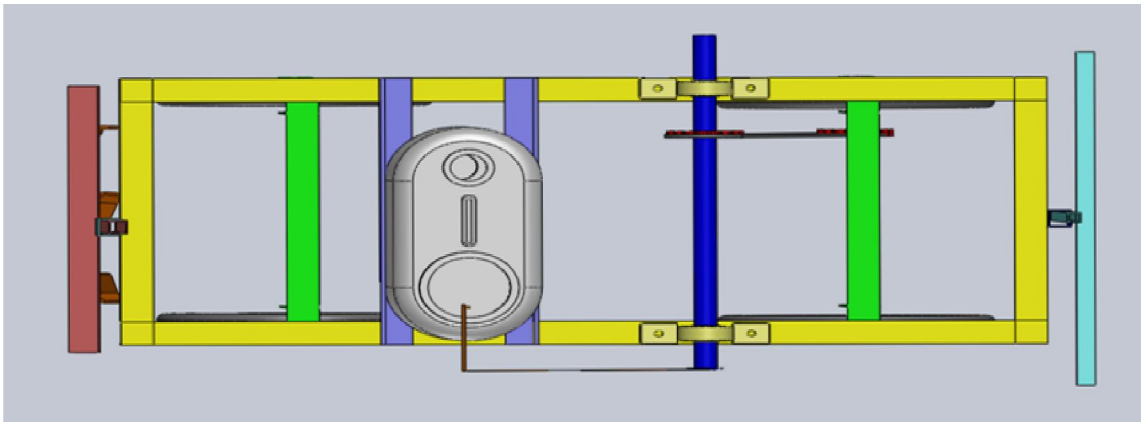
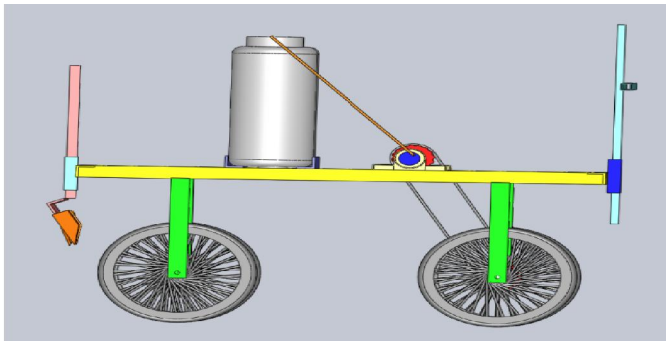
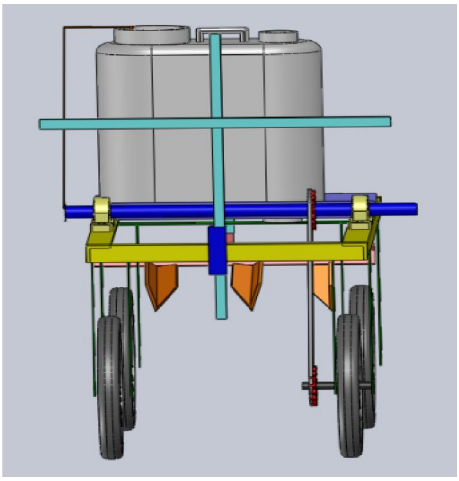


V. CAD MODELS







VI. RESULTS AND DISCUSSIONS

Adoption of new working methodology

Pull type of methodology is used which is more practical approach when weeder is used along with pesticide/herbicide sprayer

Frame work with better ergonomic features

Using handle which is more suited to perform pulling action comfortably which also comes with the height adjustable slots according to average height of an individual

Reduction in overall working time

With use of weeding in sync sprayer reduce the time consumption performing both the steps separately , also with the use of multiple nozzle setup larger area is covered during spraying action

Improved working efficiency

By reducing the nozzle height and installing adjustable nozzle setup percentage plant damage is improved, and with selection of precise blade draft weeding efficiency is improved

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VII. CONCLUSION

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