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Monowheel Operated Pesticide Spraying Machine

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ABSTRACT

Everyone know that India has known for an agricultural based country approximately 75 % of population of India dependent on farming directly and indirectly and we know that our farmer using the same old methods and equipment. E.g. seed sowing, spraying, weeding etc. There is need for development of effective spraying. In the world of specialization of mechanization, it is essential to introduce new machine and techniques for the improvement and advancement of living standard of human being. A reciprocating pump is a mechanical device which converts mechanical energy into hydraulic energy and transfers same to the liquid through the pipe line thereby increasing the energy of the flowing liquid. Hence we introduced this new pesticide spraying machine for the ease of farmers. It reduces the human efforts and it is easy to handle.

Keywords: We are introducing monowheel operated pesticide spraying machine in order to reduce human efforts and muscular back pain of human beings.

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I. INTRODUCTION

Insects are largely responsible for the crop destruction. Insecticides or pesticides, a man made or natural preparation are used to kill insects or otherwise control their reproduction. These herbicides, pesticides, and fertilizers are applied to agricultural crops with the help of a special device known as a "Sprayer," sprayer provides optimum performance with minimum efforts. The invention of a sprayer, pesticides, fertilizers, bring revolution in the agriculture or horticulture sector especially by the invention of sprayers, enable farmers to obtain maximum agricultural output. They are used for garden spraying, weed and pest control, liquid fertilizing and plant leaf polishing. There are many advantage of using sprayers such as easy to operate, maintain and handle, it facilitates uniform spread of the chemicals, capable of throwing chemicals at the desired level, precision made nozzle tip for adjustable stream and capable of throwing foggy spray, light or heavy spray, depending on requirement. Agriculture sector is facing problems with capacity issues, shrinking revenues, and labour shortages and increasing consumer demands. The prevalence of traditional agriculture equipment intensifies

these issues. In addition, most formers are desperately seeking different ways to improve the equipment quality while reducing the direct overhead costs (labour) and capital. Thus, a significant opportunity rests with understanding the impact of a pesticide sprayer in an agriculture field. A pesticide sprayer has to be portable and with an increased tank capacity as well as should result in cost reduction, labour and spraying time. In order to reduce these problems, there are number of sprayer introduced in the market but these devices do not meet the above problems or demands of the farmers. The conventional sprayer having the difficulties such as it needs lot of effort to push the liver up and down in order to create the pressure to spray. Another difficulty of petrol sprayer is to need to purchase the fuel which increases the running cost of the sprayer. In order to overcome these difficulties, I have proposed a wheel driven sprayer, it is a portable device and no need of any fuel to operate, which is easy to move and sprays the pesticide by moving the wheel. The mechanism involved in this sprayer is reciprocating pump, and nozzles which were connected at the front end of the spraying equipment.

Parts Used In The Machine That We manufactured:

- ❖ Bicycle parts
- ❖ Wheel
- ❖ Sprockets
- ❖ Chain
- ❖ Knapsack sprayer
- ❖ MS Frame
- ❖ Nozzle bar
- ❖ Shaft
- ❖ Crank Mechanism

Wheel

A bicycle wheel is a wheel, most commonly a wire wheel, designed for a bicycle. A pair is often called a wheel set, especially in the context of ready built "off the shelf" performance-oriented wheels.



Sprocket

A sprocket or sprocket-wheel is a profiled wheel with teeth, cogs, or even sprockets that mesh with a chain, track or other perforated or indented material. The name 'sprocket' applies generally to any wheel upon which radial projections engage a chain passing over it. It is distinguished from a gear in that sprockets are never meshed together directly, and differs from a pulley in that sprockets have teeth and pulleys are smooth.



Sprockets are used in bicycles, motorcycles, cars, tracked vehicles, and other machinery either to transmit rotary motion between two shafts where gears are unsuitable or to impart linear motion to a track, tape etc.

Perhaps the most common form of sprocket may be found in the bicycle, in which the pedal shaft carries a large sprocket-wheel, which drives a chain, which, in turn, drives a small sprocket on the axle of the rear wheel. Early automobiles were also largely driven by sprocket and chain mechanism, a practice largely copied from bicycles.

Chain

A bicycle chain is a roller chain that transmission power from the pedals to the drive-wheel of a bicycle, thus propelling it. Most bicycle chains are made from plain carbon or alloy steel, but some are nickel-plated to prevent rust, or simply for aesthetics.



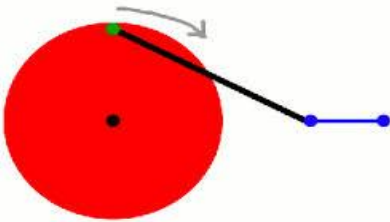
Bearing



The roller contact consist of four part inner and outer faces a rolling element like ball, roller or needle and cage with hold the rolling element together and space them evenly around periphery.

Crank mechanism

Crank mechanism. A linear motion, back and forth, is transferred to a circular motion or vice versa.



A rod is connected to a rotational crank, by moving the rod a circular motion is created. Alternatively, turning the rotational crank creates a linear motion.

Shaft

A drive shaft, driveshaft, driving shaft, propeller shaft (prop shaft), or Cardan shaft is a mechanical component for transmitting torque and rotation, usually used to connect other components of a drive train that cannot be connected directly because of distance or the need to allow for relative movement between them.



As torque carriers, drive shafts are subject to torsion and shear stress, equivalent to the difference between the input torque and the load. They must therefore be strong enough to bear the stress, whilst avoiding too much additional weight as that would in turn increase their inertia. To allow for variations in the alignment and distance between the driving and driven components, drive shafts frequently incorporate one or more universal joints, jaw couplings, or rag joints, and sometimes a splined joint, or prismatic joint.

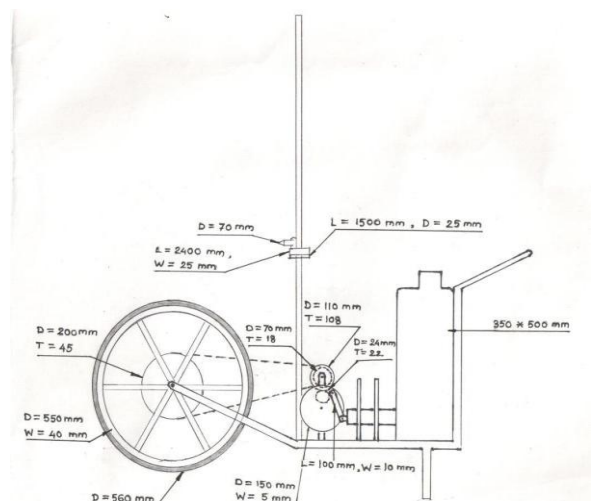
NOZZLE

The spray angle does not hold for long spray distances. As illustrated in the figure below, the spray angle tends to collapse or diverge as you move away from the orifice.

Theoretical coverage of spray patterns at various distances from the nozzle orifice is listed below. These values assume that the spray angle remains constant throughout the entire spray distance. The tabulated spray angles listed are approximate spray coverage using water. Spray distance varies with spray angle. Liquids more viscous than water form smaller spray angles, or solid streams, depending upon nozzle capacity, spray pressure, and viscosity. Liquids with surface tensions lower than water produce wider spray angles than those listed for water.



II. BLOCK DIAGRAM



III. CONCLUSION

This project is an effort to fulfill the entire requirement discussed earlier. The wheel operated reciprocating pump is strictly designed taking into consideration all the mechanical term that are related to design of pump. The reciprocating

pump is mounted on trolley and that's why they can be transported easily. All the things are aimed towards the less effort required to operate the pump. The pump is a light duty component capable of spraying high pressure liquid through nozzle. It reduces man power for operation. Maximum quantity of liquid can be carried (up to 20 lit. depending on tank size) and also can be utilized. Develop about 80 to 90 psi. pressure. It can spray on tall trees with adjustable nozzle.

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