

FABRICATION OF MECHANICAL PEST SPRAYER

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ABSTRACT:

The main aim of our project is fabrication of mechanical pest sprayer we have design a model running without any fuel and also easy to operate for a user. In this model we find that we have simply used a sprocket mounted on rear shaft which will actuate piston inside cylinder in the tank. Also the assembly consists of 4wheels out of which two are mounted on front shaft and two are mounted as guide wheel at rear end. A sprocket is mounted on front side exactly at the end of shaft. By pushing the trolley, sprocket rotates in its direction so it actuates the piston inside the cylinder, due to this the compression takes place inside the tank. So it leads to spray pesticides (or) water inside the tank. In our project, spraying is done by using sprocket mechanism. This pest sprayer requires less man work for spraying as comparing to regular methods.

INTRODUCTION:

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 labour carrying backpack type sprayer which requires more human effort. So to overcome these above two problems a machine is developed which will be beneficial to the farmer for the spraying operation.

India is set to be an agricultural based country approximately 75% of population of India is dependent on farming directly or indirectly. Our farmers are using the same methods and equipment for the ages. e.g., seed sowing, spraying, weeding etc. There is need for development of effective spraying machine for increasing the productivity of the crops.

METHODOLGY

Indian farmers use conventional method, there is large scope for development in agricultural sector. The spraying is traditionally done by backpack sprayer with labour which requires more human effort, it cover small area, time consuming and low storage capacity. Therefore to overcome above problems, we have design and develop the flexible equipment which will be beneficial to the medium and small scale farmer for spraying operations.

COMPONENTS:

1. Frame
2. Tank
3. Nozzles
4. Sprocket
5. Chain
6. Eccentric disk
7. Bearing

Frame:

Frame acts as a chassis and carries the sprayer load and the wheels are aligned to the frame with the help of two footstep bearings at the front and guiding wheels are attached to the rear end of the frame.

The material used for frame is mild steel (MS) of hollow rods of square dimension 2 x 2 cm.

Mild steel has more strength and it can bear heavy loads upto 100kgs, the cost of the MS hollow square rods is very less compared to other materials.

The specific dimensions of the frame are

Length – 1 meter

Width - 0.55 meter

Height – 0.94 meter

Knapsack sprayer:

Knapsack Sprayers are conventional and most popular equipment used worldwide. They are ideal for spraying insecticides, pesticides, fungicides, herbicides etc. in field areas to protect the crop from pest attack. These Sprayers have multiple applications and are widely used in agriculture, horticulture, sericulture, plantations, forestry, gardens etc.

CAPACITY: 16 L

PRESSURE: 1-3 bar

NET WEIGHT (kg): 2.3

G.W (kg): 2.5

SIZE: 36*18*51.3 cm

Nozzles:

A wide variety of spraying equipment is used to apply agrochemicals. Proper application of chemicals ensures crop and application safety, optimum efficiency and cost effectiveness. For these reasons, calibration and maintenance of spray equipment are essential. Over application of chemicals is costly and may result in crop injury or carryover. Under application may result in poor control.

nozzle	pressure	flow	Spray angle	Spray width (m)	Liters/hectare @km/h			
	Bar	L/min			2	3	4	5
DT0.5	1	0.23	80	0.84	81	54	41	33
	2	0.32	80	0.84	115	77	58	46
	3	0.39	80	0.84	141	94	71	56
DT0.75	1	0.34	95	1.09	94	63	47	38
	2	0.48	95	1.09	133	89	66	53
	3	0.59	95	1.09	163	109	81	65
DT1.0	1	0.46	105	1.30	105	70	52	42
	2	0.64	105	1.30	148	99	74	59
	3	0.79	105	1.30	182	121	91	73
DT1.5	1	0.68	105	1.30	157	105	79	63
	2	0.97	105	1.30	223	148	111	89
	3	1.18	105	1.30	273	182	136	109

Sprocket:

A sprocket is a profiled wheel with teeth that mesh with a chain, track or other perforated or indented material.

Sprocket applies generally to any wheel upon which radial projections engage a chain passing over it. It is distinguished from a gear in the sprockets never meshed together directly.

Distance maintained between larger and smaller sprocket is = 50 cm

Number of teeth on small sprocket=18

Number of teeth on larger sprocket=44

Chain:

A chain is a serial assembly of connected pieces, called links, typically made with an overall character similar to that of a rope in that it is flexible and curved in compression but linear, rigid and load bearing in tension.

Eccentric disk:

In mechanical engineering, an eccentric is a circular disk (eccentric sheave) solidly fixed to a rotating axle with its centre offset from that of the axle (hence the word "eccentric", out of the centre).

According to the stroke length of the piston the eccentric hole is drilled, from the centre point of the disc.

Diameter of the disc- 10cm.

Thickness- 0.3cm.

The eccentric hole is drilled 2cm from centre of the disc.

The total stroke length is 4cm.

Bearing :

Bearing is a machine element that reduces friction between moving parts and it provides for free linear movement of the moving parts or free rotation around a fixed axis .

Foot step bearing is being used.

Wheels alignment:

The distance maintained between two main wheels is = 80 cm

Distance in between guiding wheels = 59 cm

Diameter of main wheel=25cm

Diameter of guiding wheel=12.5cm

Working principle:

In this model we find that we have simply used a sprocket mounted on rear shaft which will actuate piston inside cylinder in the tank. Also the assembly consists of 4wheels out of which two are mounted on front shaft and two are mounted as guide wheel at rear end. A sprocket is mounted on front side exactly at the end of shaft. By pushing the trolley, sprocket rotates in its direction so it actuates the piston inside the cylinder, due to this the compression takes place inside the tank. So it leads to spray pesticides (or) water inside the tank. By our project, spraying is done using sprocket mechanism. This project requires less man work for spraying.



CONCLUSION:

Operated mechanical pest sprayer machine is going to serve spraying in terms of reduction in work and reduce in using energy. Thus our tool provide a good spraying on pest killing technique.

Work speed is improved when compare to back pack spraying technique and it can also be used to spray for multi type of crops as well as other broad applications.

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