MULTIPUPOSE PUSH OPERATED SPRAYER

PROJECT REFERENCE NO.: 38S1356

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INTRODUCTION: 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. To overcome the above said problems, we made a sincere attempt to minimise human effort and scarce labour through design and development of the equipment which will be beneficial to the farmer for the spraying purposes.

OBJECTIVES:

- Decrease the operational cost by using new mechanism.
- Decrease the cost of machine.
- Decrease labour cost by advancing the spraying method.

METHODOLOGY: Our project model consists of a three wheeled body with cranking mechanism with pump crank being pushed and pulled to result in pumping, building the pressure in the tank for pesticide spraying. The wheels are fixed on the main axle and cranking is on the other axle which pushes the piston rod in and out of the cylinder pumping the air pressure into the tank. There is a tank fitted on the frame through there is a main suction tank which consists of pesticide which the sprayer is connected on the protruded rod and jet is set for the required pitch. When the handle is pushed the wheels rotate and move and simultaneously pump the air is affected.
Working Principle: When the equipment is push forward 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.

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.

Due to the motion of wheels, the chain drive mechanism operates to reciprocate the piston inside the pump cylinder. But, this results in building up of pressure which seizes the movement of wheels.

Thus, a clutch mechanism is provided to disengage the transmission from the crank to the piston.
Concept of dog clutch

When the dog clutch is not connected to any mass (flywheel) nor any torsional stiffness the dog clutch engages. When one end of the dog clutch is fixed mimicking a connection to an infinite mass (flywheel) or an infinite torsional stiffness, the dog clutch not engages.

Specifications of Machine

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Particulars</th>
<th>Details</th>
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</thead>
<tbody>
<tr>
<td>1.</td>
<td>Front wheel diameter</td>
<td>52 cm</td>
</tr>
<tr>
<td>2.</td>
<td>Chassis</td>
<td>70x30x2</td>
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<tr>
<td>3.</td>
<td>Rear wheel Diameter</td>
<td>25 cm</td>
</tr>
<tr>
<td>4.</td>
<td>Pump Stroke per rotation of wheel</td>
<td>2</td>
</tr>
<tr>
<td>5.</td>
<td>Delivery of pesticide from nozzle</td>
<td>40 ml /stroke</td>
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<tr>
<td>6.</td>
<td>Delivery of pesticide liquid per rotation</td>
<td>80-90 ml</td>
</tr>
<tr>
<td>7.</td>
<td>Capacity of Tank</td>
<td>16 Lt</td>
</tr>
<tr>
<td>8.</td>
<td>Working pressure</td>
<td>0.2-0.4 MPa</td>
</tr>
</tbody>
</table>

**CONCLUSION:** This equipment is purposely designed for the farmers having small farming land say 5-6 acre. After having trail we have found that one finds it easy to operate push type machine. The pump can deliver the liquid at sufficient pressure. It is economical therefore affordable for all kinds of farmers.

**SCOPE FOR FUTURE IMPROVEMENT:** The weight of the wheeled cart can be reduced by incorporating light weight alloy steels. Further alloy wheels with superior bearings can be
used. By providing pedals to the cart we can develop a pedal operated sprayer from the push operated sprayer.