

# Review on Adjustable Multipurpose Sprinkler

Rohan Gholap<sup>1</sup>, Mohan Suryawanshi<sup>2</sup>, Abhishek Patil<sup>3</sup>, Nagesh Khandare<sup>4</sup>

Students, Department of Mechanical Engineering<sup>1,2,3,4</sup>

K. K. Wagh Institute of Engineering Education and Research, Nashik, India<sup>1</sup>

NDMVP KBT College of Engineering, Nashik, India<sup>2</sup>

Guru Gobind Singh College of Engineering And Research Centre, Nashik, India<sup>3,4</sup>

**Abstract:** *Sprinklers are most important equipment for irrigation. In latest sprinkler there is simple installation of sprinkler. Only one sprinkler is use for plantation and its rotate 360°. So what happen again and again that area is sprinkled with water so the wastage of water is more it is a disadvantage for farmers. The purpose of installation of project is to reduce the wastage of water. Now a day's farmers are facing problem because of pesticides. We neglect the interference of human during operation. Water as well as pesticides can be spray with the help of this sprinkler. Sprinkler system is very old method from many years ago and having long history since many years and their method of sprinkler system are changed in this decade. So the main focus of this project is to minimize cost of system, safety of farmers, less water more crops benefit) for farmers.*

**Keywords:** Adjustable sprinkler, cost minimization, Farmer's Safety

## I. INTRODUCTION

Our project is based on agriculture "Adjustable Multipurpose Sprinkler". India is more focused on the agriculture with reference to census 2011 there are 118.9 million farmers across the country or 24.6% of the total manpower of over 481 million. The population of country is increasing day by day for which more production for fulfilling those needs our agriculture sector is unable due to use of traditional farming methods, lack of automation, land degradation, lack of knowledge and unavailability of sufficient water. Our project adjustable multipurpose sprinkler will reduce loss of water during plantation. There are many diseases which is very dangerous to the farmers this sprinkler does not required any human contact during the pesticides spray. This adjustable multipurpose sprinkler is very useful for agriculture field.

### 1.1 Problem Statement

In agriculture field there are so many processes to spray the pesticides as well as water. In that bamboo method, pump method, are used. In this all processes there is always a person is required the operation of that machine or equipment. In that case there are much more chances of happening an accident with that person like harmful side effects of chemical pesticides, scene problems, health problems and in some cases person occurs death due to unsafe condition in these all processes. Some modern techniques are also available in market such as drone irrigation but these methods are difficult to operate by the farmers as that requires skill operator. Therefore there is a need to find out a device or equipment which fulfill this requirement of farmers. Therefore we are introducing over project to fulfill these all needs of farmers.

### 1.2 Scope

After using this sprinkler system it will help farmer for easy and simple plantation of crops, flower etc. Also the process of plantation by using our system will become less hectic and will reduce dependency of farmer on increasing and decreasing supply of labor. Also the process will be economical.

## II. LITERATURE REVIEW

### 1. Review paper

Research paper on Design and operation of sprinkler systems, authorized by Derrel L. Martin, Dennis C. Kincaid, William M. Lyle. Sprinkler systems have revolutionized the development of irrigated agriculture. Efficient water

application with sprinkler irrigation involves the design and operation of pumps, pipes, and sprinkler devices to match soil, crop, and resource conditions. Thus, sprinkler systems can be designed and operated for efficient irrigation for a wide array of conditions. Sprinkler irrigation systems generally consist of a pump used to lift and pressurize water, a main line piping system to convey water from the pump to the lateral pipelines used to transport water across the irrigated field, and sprinkler devices to apply the water within the field.

## 2. Review paper

Research paper on Review of residential sprinkler systems, authorized by Daniel Madrzykowski and Russell P. Fleming. Automatic sprinkler systems have been successfully used to protect industrial and commercial buildings and their occupants for more than 100 years. Historically the place which has offered the least amount of fire protection to occupants was and still is their own home. This was brought to light in 1973 by the Report of the National Commission on Fire Prevention and Control, America Burning. The development of a residential sprinkler standard with the main focus on life safety required a multi-faceted approach. Fire incident data had to be collected and analyzed to understand the nature of the residential fire safety problem. In addition, technical challenges had to be overcome to develop an effective, practical and economically acceptable design for a residential sprinkler system.



## III. CONSTRUCTION

It consists of various stationary and moving components. It has following component.

### A. Motor

Motor is placed at the top of the bottom plate. It is fixed with 4 panels at four sides. At the motor shaft the small pinion is placed. Watt- 90, RPM-1350



### B. Dimmer:-

Dimmer circuit is connected to motor and it will change the rotation clockwise to anticlockwise direction and the speed is control with the help of fan regulator.

**C. Gears:-**

Two gears are used, one gear is pinion and other is spur gear. The pinion is mounted on motor shaft and other is mounted on pipe, the arrangement is that both the gear will be mesh together at slow rpm.



**D. PVC pipe**

The centre rod as well as arm is of PVC material. For connecting the arm to the centre pipe the T-pipe is place at centre so at both the side water and pesticides will be spray.



**E. Rack & Pinion**

The rack and pinion arrangement is used for arm extending process. At both the side the arrangement of rack and pinion is placed so it will cover maximum area. Rubber material is used for rack and Acrylic material is used for pinion.



**F. Nozzle:-**

Nozzles are used for spraying the water and pesticides in downward direction. The nozzles are placed on the expandable arm with 3 holes in it and one and one at the end, same for other side. These are three in one nozzles



**G. Square bar:-**

Length 30cm mild steel hollow structural section (MS) is a type of metal profile with a hollow tubular cross section. The reason to use the square bar is to support the whole structure of project. This bar is the most necessary as it is holding all the components.



**H. Bearing**

A bearing is a machine element that constrains relative motion to only the desired motion, and reduces friction between moving parts. Rotary bearings hold rotating components such as shafts or axles within mechanical systems, and transfer axial and radial loads from the source of the load to the structure supporting it. The purpose of using the bearing is to rotate the sprinklers arm with the help of motor power.



**I. Mild Steel Bottom Plate**

The reason to use the mild steel bottom plate is for mounting all the components of our project. It is a base of our project. The weight of this base is up to 12kg because it should handle all the components and the motor. It is the foundation of our project. While keeping in the farm during operation the sprinklers should not be move or fall because of the air so we have taken maximum weight of the base.



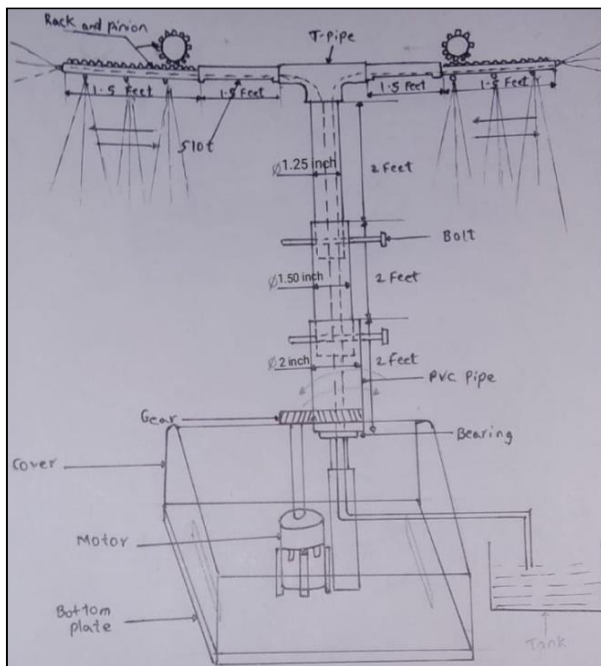
**J. Bolt**

A bolt is a form of threaded fastener with an external male thread. Bolts are closely related to, and often confused with, screws. The reason for using bolt is for height adjustment of the sprinklers and to hold the pipe.



**IV. WORKING**

Our project “Adjustable Multipurpose Sprinkler” is based on agriculture field. It has no interference of human between the processes. The motor is placed on bottom plate. On the shaft of motor pinion is mounted. On the side of the motor there will be another spur gear attached to the pipe where the pinion and spur gear will mesh together. The height of the sprinkler will be adjustable. We have take 3 size of different diameter of PVC pipe so they will go inside each other and will adjust with the help of bolt. The height of sprinkler will increase or decrease as per our requirements. At the centre of rod T-pipe is fixed, and at the both side the PVC pipe is fixed at the certain length. The arm will expand at the certain length with the help of rack and pinion arrangement. The rubber material is used for pinion and acrylic material is used for pinion. The nozzles are placed on expandable rod and at the end of rod. The slot is cut on fixed pipe because when the extending rod will come back that much area will cover and will again get forward. Water as well as pesticides will be spray. It will increase the safety of farmers. It is beneficial for farmers.



**V. ADVANTAGES**

1. Low cost
2. Easy to operate
3. Less pesticides are required compared to conventional method
4. Easy for maintenance
5. Less amount of equipment
6. Easy to understand
7. Affordable and easy to set up
8. No skilled workers are required
9. More efficiently
10. Pesticides distribution will always equal
11. No human interference
12. Benefit for farmers

**VI. FUTURE IMPROVEMENT**

1. We can increase the length of arm so it will cover maximum area.
2. We can remote control the expanding arm so it will easy for farmer

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