iJRASET
International Journal For Research in Applied Science and Engineering Technology

# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

**Volume:** 9 **Issue:** VII **Month of publication:** July 2021

**DOI:** https://doi.org/10.22214/ijraset.2021.36320

www.ijraset.com

Call: 08813907089 | E-mail ID: ijraset@gmail.com

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
*ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429*
*Volume 9 Issue VII July 2021- Available at www.ijraset.com*

# Design and Assembly of Multipurpose Gizmo

Desai Krushna. M[1], Jadhav Sourabh. M[2], Thorat Vishwesh. S[3], Nikam Pruthviraj. C[4], Gawade H. P[5]
[1, 2, 3, 4]*UG Student, Nanasaheb Mahadik College of Engineering Peth, Maharashtra, India*
[5]*Professor, Dept. of Mechanical Engineering, Nanasaheb Mahadik College of Engineering Peth, Maharashtra, India*

***Abstract:*** ***Nowadays in every sector around the word from agriculture to automobile, building sector, communication sector are widely using different types of Robots. today we use various spraying technologies involving electrical energy, chemical energy and fuels. this fact makes us know that how large content of energy is getting used at such a places. This research paper prepared by studying previously published research paper on design of multipurpose machines. This paper reviewed the previous spraying machines The method used in this design is the most optimal component selection. The result of this study is a multipurpose organic machine (Gizmo) prototype with a capacity of 10 litter /h . able to spraying liquid up to 1200 sq. fit. to 1500 sq. fit, and can be operated easily by the user using mobile. With the help of solar energy.***
***Keywords: Robot, Design, Solar panel, Spraying, Multipurpose gizmo, etc.***

## I. INTRODUCTION

In the current generation most of the countries do not have sufficient skilled man power especially in agricultural sector and it affects the growth of developing countries. The main requirement of Automation is to reduce man power in our country; the buzzword in all industrial firms generally involves electrical, electronic component as well as mechanical part. Automation saves a lot of tedious manual work and speeds up the production processes. So it is a time to automate the sector to overcome this problem. In India there are 71% people dependent on agriculture. Fertilizer spraying has been an important agricultural commodity for the growth of crops. In this model fertilizer spraying process is automated to reduce the human effort and increase the yield. The spraying is automatically done by using lithium battery and solar panel. Fertilizer and pesticide spraying is important and activity for any farmer, and for large scale this activity is so lengthy also it needs more workers. So agriculture machines were developed to reduce the human efforts. In manual method of fertilizer and pesticide spraying, we have get results such as high time consuming, less spaying efficiencies and back pain for the farmer. Hence for achieving best performance from a fertilizer spraying machine &also which can be used as automatic sanitizer spraying machine used in current covid pandemic., the above limits should be optimized. Thus we need to make proper design of the machine and also selection of the components is also required on the machine to suit the needs of spraying .

## II. THEORY

### *A. Problems And Definations*

As we can see today, the major problem faced by the farmers is shortage of labor's and also the time required for spreading the Fertilizers (muck) is more. So in order to have solution to it, it was proposed to manufacture a Fertilizer Spreader attachment which is easily detachable to tractor trolley and less expensive than other machines available in markets. So, the farmers can work more easily and functionally.

### *B. Literature Survey*

1) *Blackmore, S. (2007):* This study discusses about the Agro Technology. Agro Technology is the process of implementing the innovative ideas and implementing that in agriculture field .To development of a better mechanical device which is easily available to the small farmers at low cost and also multipurpose .This work focuses to improve efficiency.
2) *Clarence E. Hood:* This work explains about the Multipurpose crop horticulture tractor concept. This tractor combines certain clearance and convertible implementation of the features which are required for the field production operations. This tractor equipped for the field functions such as tillage, planting, cultivation, spraying , harvesting, material handling and irrigating missions , incorporating use of a vertically movable lift with horizontally adjustable life arms.
3) *P Vijay:* This study discusses about the multipurpose seed Sower cum plougher. This design explains us about the use of technology in field of agriculture to improve the efficiency of crop produced. To improve efficiency we have to find new ways in field of agriculture.
4) *Agung Sucipto:* This work works on the designation and build out of the multipurpose organic chopper. This device can be used by using locally available materials. The method used in this build out is the most excellent part pick, strength analysis using analysis software, fabrication and testing of prototypes. The prototype with a capacity of 600kg/h, capable to chop waste to size between 1 to 50 mm and easily operated.

5) *M. Kamaraj:* This work explains ,now a days farmers has to spend unnecessarily more money on the machines that ease them to reduce labour cost and make more profit. Plenty of machines are available in the market for various field works. But this is very unjust to small famers as the machines prices are exorbitant to them. To increase productivity, profit and good quality work introduction of multipurpose agriculture machine is very essential

*C. Present Theory And Practices*

1) *In Current Pandemic Situation:* Viruses such as COVID-19 are transferrable through touch and contact. There are WHO guidelines to clean or sanitize hands regularly to reduce the risk of infection. Dispensing of sanitizer from bottle and storage would require manual intervention. The entire document should be in Times New Roman or Times font. Type 3 fonts must not be used. Other font types may be used if needed for special purposes.

Multipurpose gizmo should satisfy following objectives:

*a)* Automatic sanitizer systems is very useful resource in the fight against corona virus.
*b)* This contact less dispensing system helps to sanitize hands without getting in contact with the sanitizing surfaces and will help to reduce spread through cross contamination
*c)* It help conserve the amount of sanitizer used and stem infectious disease transmission.
*d)* To build a device which will reduce human efforts.

2) *In Agriculture:* Now a days, the major problem faced by farmers of labours and also time required for agricultural works. The current agricultural devices are expensive. The contemporary methods of agriculture having too much inaccuracy, time consuming, difficult to maintain and less efficient.

Multipurpose gizmo should satisfy following objectives:

*a)* To make a device which is suitable economically for farming: taking in to consideration he cost factor this device is suitable for small scale as well as big scale industries.
*b)* Taking safety as prime consideration: This device is safer in all respects.
*c)* To build a device which require very less force.
*d)* To build A Device Which Will Reduce Human Efforts.
*e)* To develop the abilities such as working in groups, sharing responsibilities, initiative

*D. Methodology*

Firstly , we created conceptual AutoCAD design of recognized problem. Then we fabricated Steel frame which is made up of steel rods. Steel rods are connected to each other by welding to form frame. After fabricating frame we fixed Solar panel on the top of the frame as an energy generating device. We can operate this device with the help of Bluetooth control. Bluetooth range is up to 7-8 m. With the help of 10 mm diameter pipe we can move fertilizer or sanitizer. Spraying range of the device is up to 1.5-2 m.

*E. Future scope*

1) Introduction of grass cutter place on base of frame .
2) Using Bluetooth control machine can be made automatic.
3) Water dripping unit could be included in Fertilizer and sanitizer spraying .

## III.CONCEPTUAL DESIGN

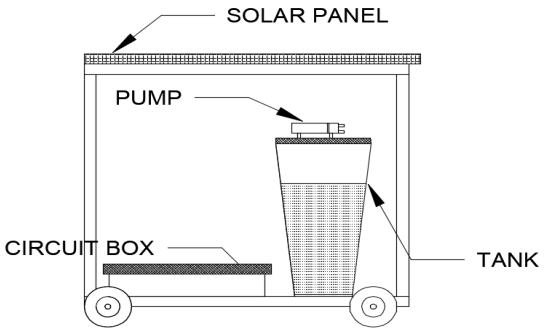



Fig. 1 . Conceptual design of GIZMO

## IV. CALCULATIONS

1) *To find velocity of Gizmo*

- Speed of project

RPM of wheel = 30 rpm

So to calculate rpm of wheel we have to find RPM of gizmo wheel first. We are using gizmo wheel of 11 cm Diameter =D=11 cm =0.11m

for one revolution distance covered in 1 min by the wheel =rpm x π x D

=30 x 3.14 x 0.11

= 9.42 m/min

Distance covered in 1 hr

= 9.42 x 60

= 565.2 m/hr

= 0.56 Km/hr.

- Pump Specification

Volts = 12 v

Amp = 3A

Pressure = 110psi

Flow = 4.5 Lpm

Power requirement

P = V x I

= 12 x 3 = 36 Watt

- Power of battery (12 V , 8Ah )

Battery power = 12 v

P = V x I

= 12 x 8 = 96 Watt.

- Duration of pump that can run on Battery ( without motor )

= 96/36

=2.66 hr

- Solar specification

= 20 Watt (12 V)

- Time required to charge battery

= 96/20

= 4.8 hrs

2) *Selection of Tank*

Pump capacity = 4.5 lpm

Hence we are selecting 5 litters tank for 1 min demo purpose

3) *Selection of spray Nozzle*

We are selecting 0.2 mm diameter hole nozzle as they are giving bass result above 90 psi and pump giving 110 psi

4) *Dimensions of Gizmo*

Height = 43 cm

Width = 37 cm

Length = 55 cm

- Velocity of Gizmo = 9.42 m/min
- Distance covered in 1 hr = 0.56 Km/hr.
- Duration of pump that can run on Battery ( without motor ) =2.66 hr
- Time required to charge battery = 4.8 hrs

## V. ACTUAL PROJECT


## VI. RESULT

*A.* Velocity of Gizmo = 9.42 m/min
*B.* Distance covered in 1 hr = 0.56 Km/hr.
*C.* Duration of pump that can run on Battery ( without motor ) =2.66 hr
*D.* Time required to charge battery = 4.8 hr
*E.* This gizmo can spray sanitizer or chemicals upto 10 to 12 feet .
*F.* In direct sunlight it will charge in 1.5 to 2 hours

## VII. CONCLUSIONS

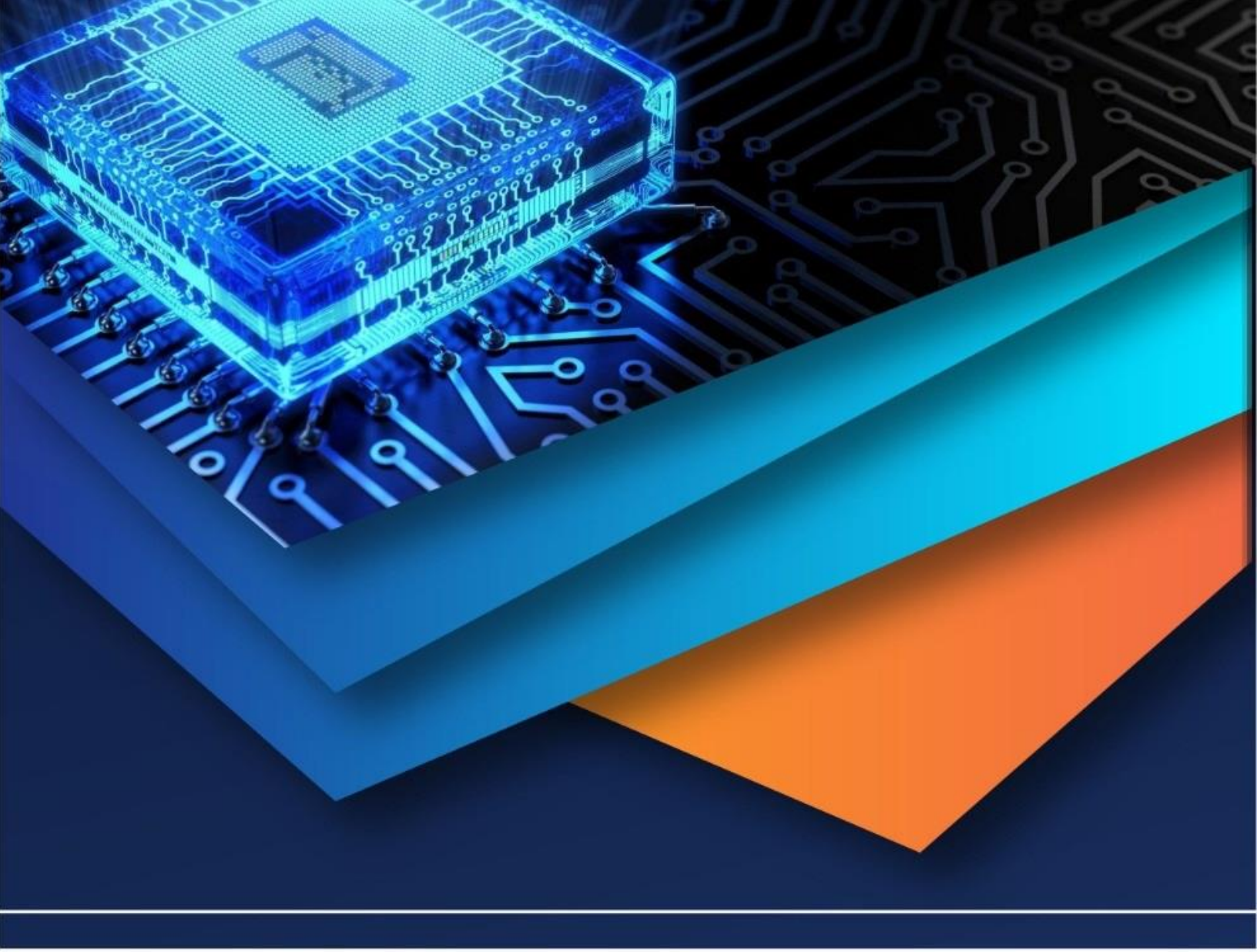
*A.* The multipurpose gizmo can be used to sanitize the room during current situation like COVID pandemic.
*B.* Only one person can sanitize Rooms , Hall , hospitals , Classrooms ,etc. With the help of this Gizmo cause the design of this Gizmo is full proof.
*C.* This gizmo can be used to sanitize 4-5 rooms in one hour approximately.
*D.* We can sanitize 7-8 rooms when device is fully charged .
*E.* This device is also useful in some agricultural field work.
*F.* The multipurpose gizmo reduces the farmer efforts, time and also it is very easy to handle.
*G.* This Gizmo is not only used in fertilizer spraying but also for water speeding to plant in a nursery.
*H.* Gizmo can cover more than half acre per day.

## VIII. ACKNOWLEDGMENT

We would like to express our deep and sincere gratitude to our Guide Mr. H.P.Gawade Department of Mechanical Engineering, for guiding us to accomplish this Research Paper work. It was our privilege and pleasure to work under his able guidance. We are indeed grateful to him for providing helpful suggestion, from time to time. Due to his constant encouragement and inspiration we are able to present this research paper work. We express our deep gratitude to Prof. D.D.Patil , Head of Mechanical Engineering Department, for his valuable guidance and constant encouragement.

## REFERENCES

[1] Blackmore, S. (2007). A systems view of agricultural robotics. Precision Agriculture conference, Wageningen Academic Publishers, the Netherlands. pp. 23-31.
[2] Proposed W MULTIPURPOSE AGRICULTURAL TRACTOR : Clarence E. Hood, Jr.; Robert E. Williamson, both of Clemson, S.C.; Yekutiel Alper, Bagan, Israel
[3] P.Vijay, K.V.N.Rakesh, B.Varun, “Design of a Multi-Purpose Seed Sower Cum Plougher”, ISSN 2250-2459, ISO 9001:2008 Certified Journal, Volume , Issue , April 2013.
[4] Agung Sucipto, Andryan Kurnia, Agus Halim, Agustinus Purna Irawan, Design and fabrication of multipurpose organic chopper machine, in: IOP Conference Series: Materials Science and Engineering. IOP Publishing, 2020, vol. 725, no. 1,p. 012021.
[5] M. Kamaraj, Akshay Kumar Chhabria, Kartick Kumar, Nishant Kumar, Design and Fabrication of Multi-Purpose Farming Tools Equipped, Int. J. Innov. Res. Adv.Eng. (IJIRAE) 4 (5) (May 2017) ISSN: 2349-2163.
[6] M.V.Achutha Sharath Chandra. N, Nataraj.G.K



10.22214/IJRASET

45.98

IMPACT FACTOR: 7.129

IMPACT FACTOR: 7.429

# INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY