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Development of Cow Dung Log making machines Energized by Human Powered.

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Abstract—Paper aim to review on methodology used in the development of cow dung log making machine. Use of bio-mass as a renewable energy source widely increased. The cow dung logs and briquettes can be used as a bio mass. The application of cow dung log in various purposes like for manure, cooking and heating of boiler chamber. In rural India from ancient time cow dung cakes are produced by using hands. But this process is more time consuming and low production rate activity, it is necessary to use alternative source of energy for making cow dung log. Also, many researchers work on method for making log. Paper aims to compare review on available cow dung log making machine, and use of an alternative source of energy i.e. cow dung log making machine energized by Human Powered. It provides gainful employability and capability of earning to the people of rural & urban area in the interest of sustainable development.

KEYWORDS—LOG MACHINE, HUMAN POWERED, COW DUNG,, SOURCE RENEWABLE ENERGY.

I. INTRODUCTION

Being the first ever energy source to be harnessed by human is wood fuel which can be used in various forms for the purpose such as cooking, heating or drying things, making ceramics tiles and bricks and generating power. However wood has some disadvantages as well. Burning of wood produces soot, smoke and ash which cause air pollution. Additionally wood are also non-renewable resources considering that reduces space for tress due to urbanization projects. So its consumption needs to be carefully monitored and there is need to find alternative source that will no causes much pollutant but could provide same function as wood. So cow dung can be used as alternative source for fuel. India in rural area or in Goshalas, the traditional method of making cow dung log by hands which is more time consuming and low production rate activity. Cow Dung is used in agriculture such as manure, bio-fertilizers, bio-pesticide, pest repellent and as a source of energy fuel. In India as a agricultural country produces large quantity of agricultural waste every year. So use of this waste for making log or briquettes as a bio mass can be beneficial as eco-friendly solution as well as economically feasible and sustainable. For initiate burning of fuel need to supply cow dung log so that burning problem easily sort out. Also cow dung log being light in weight and equally effective and when it comes to generate heat, log emit less smoke and retain heat for long time **[1].** In general cow dung generated in cow sheds are disposed of in nearby water bodies and causes water pollution. Reusing cow dung reduces this kind of water pollution. Burning cow dung logs also generated less particulate matter, less percentage of sulphur dioxide, less carbon monoxide as compared to burning of wooden logs and overall causes less air pollution than if wooden logs were used. This machine made logs can solve the storage and transportation problem which was faced earlier case of traditional method of making logs.

II. LITERATURE SOURCE

The problem associated with handmade cow dung log was improved by using different kind of mechanism. In the field of cow dung log making machine, researcher worked on the machine powered by electric motor in the range of 0.5 to 5 Hp. The some of the contributors are:

S. Kannaki et al. (2020) made a machine operated by automatic system to increase the production rate minimize with human effort. This machine worked on mechatronic concept based on mechanical electrical and control system mechanism. Input devices used as sensor and output devices used as motor and controller. To start and actuate the motor input signal is given by controller. This machine is ease to assemble and cost efficient with minimum power requirement for operation. But for operation of machine skill person is required and in remote or rural areas where problem of electricity this machine is not affordable. [2]

Mayur Gosavi (2020), made a semi –automatic cow dung log making machine with modification in hopper shape which is conical shape. Due to conical shape mixture is easily slide down into cylinder. Other modification made is that inside hopper mixing blades are provided to overcome problem of ramming. This blade gets rotated as machine started. For the rotation of blade used sprocket and chain arrangement. Power is taken from gear box by means of Bevel and for free rotation and reduction of friction bearing is used.This is Future scope of this machine is that to meet uncertainty of electricity & power supply in rural and interior area, use of solar energy or other form of energy

independent form electricity is best ,cheap and eco-friendly solution.[3]

Musthak I. Ansari et al. (2020) developed cow dung stick manufacturing machine for produced cow dung stick with minimum human effort. Stick was made by using various types of agricultural waste and mix with cow dung. For these manufacturing used 0.5 Hp electrical motor. Mixture is poured into the hopper. A screw mechanism is provided for mixing raw material thoroughly, compresses it and extrudes it. Desired shape and size sticks are produced with help of specified size and shape of die. Moisture present inside logs are dry out by explore the sticks in sun light and sticks make hard and sturdy. As compared to coal and other fuel, this produced stick has good calorific value. Due to good calorific value, after stick burning the formation of dust and ash is minimum. This machine developed at low cost and maintains the quality of sticks. [4]

Arjunbhai Patel (2018) made innovate in machine operated by electrical power for making log from cow dung for cremation process which is environment friendly. This machine is capable of making 3 logs at a time and also produce 100/120 logs in an hour. Dual application of this machine by changing die, the machine can be used for making logs as per the requirement. A narrow cylindrical opening has provided across the length in centre of log for easy drying and efficient combustion. By using slurry from biogas which is mixed with straw and any other harvested crops residue, log is made. So it is better utilization of agro waste and it is economical application. [6]

Mansukh Bhai Prajapati (2013) developed cow dung long log making machine with minimum human intervention. This cow dung log making machine operated on electricity with 2 Hp motor and capable of making 50 to 60 logs per hour. In this mechanism a hopper is used where raw material as cow dung and straw (agricultural waste) is poured. The compression of raw material and extrusion of log is carried out by using screw mechanism. Logs of desired shape and size are made by using die as per desired shape and size. These logs are ease to handle and storage and economical for transportation. It also minimizes the wastage of material. [7]

Result of the literature review shows that no author has worked on the cow dung log making machine operated by human power. In earlier electrically operated machine, problem is faced due uncertainty of electricity and power cut. In India in rural and interior areas there is shortage of electricity. Also researcher and engineers across the world are in the search of alternative fuel with minimum consumption of natural resources. It is necessary to search alternative source of energy to operate machine, due to increasing cost of fuel, availability of electricity and problem of global warming. To meet uncertainty of energy supply and power cut, propose to design and developed the cow dung log making machine energized by human powered (HP). Also from the literature review it found that human powered used for various application. So focus on to select and develop method for power transmission form human to processing unit. For this an idea in our mind that as an alternative source peddle operated mechanism can be used for power transmission. Hence propose a cow dung log making machine energized by Human Powered. For this purpose use alternative like peddle/ handle operated mechanism by using bicycle power for input work. Based on the power required to operate the mechanism, we can select and develop the alternative method energized by human powered mechanism. And developed die for making hollow logs. As hollow logs are more helpful for easily burning of fuel. Also analyze the performance of logs by testing the properties like C. V. of Cow Dung log and ash characteristic.

III. METHODOLOGY

Main component of proposed mechanism are: Hopper (Conical shape), Drum (collect dung), Screw conveyor, Bearing, base frame, Die for hollow log and alternative mechanism for power transmission from human to processing unit. Power transmission unit will be consist of peddle, chain drive for energy stored and transmission purpose, For efficient compression of raw material will select proper screw conveyor and design a Die for making hollow log.

Hopper: this machines hopper consists of conical shape opening for pouring the mixture. so that the mixture can easily slide down into the cylinder for further process. The mixture does not stick to the surface of the conical hopper as it has low frictional resistance due to the shape. Ramming is to be done from time to time to push the mixture inside the cylinder. The ramming should be consistent so that the mixture is fed properly in the grinding unit and the log can be formed properly without breaking.

Dimension: 360 mm diameter with height 510 mm

Fig. 1 Hopper

Cylinder Drum -The drum is used to collect the cow dung from the hopper. It is also used to store the cow dung. The die is attached at the one end of the drum. The screw conveyor is placed inside the drum. It also acts as a support for the screw conveyor. The cow dung extrude from the drum should acquires a cylindrical shape, So that the circular shaped die is placed at the one end of the drum. The cow dung is made to pass through the die which is push by the screw conveyor hence it acquires the cylindrical shape.

Dimension : Outside diameter 115 mm and Inside diameter 105 mm with length 438 mm.

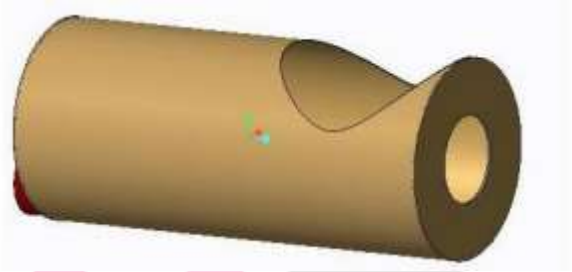

Fig. 2.Cylinder drum

SCREW CONVEYOR: The purpose of the screw Conveyor is to transfer and compress the Cow Dung and also pushes the cow dung to extrude it through the die. It consists of hollow cylindrical shaft consists of screw plates. The one end of the hollow shaft is coupled with the gearbox and the other end of the shaft is simply mounted at the end of the drum. DIMENSION: 103 MM DIAMETER WITH LENGTH 510 MM

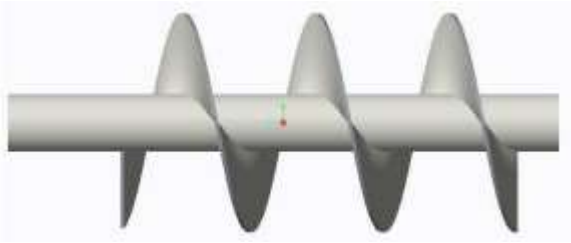

Fig. 3.Screw Conveyor

Gear Box: Worm gear with lead screw type is used to maintained a torque and speed reduction which is run by bicycle pedal mechanism. Gear ratio is 20:1 with driven gear diameter is 22 mm and driver gear is 25mm.

Power Transmission Unit: bicycle pedal mechanism is used to transmit power to gear shaft and also for rammining mechanism in hopper. Chain drive is used to for power transmission with length of 2 meter and no of teeth 44 mm an diameter is 180 mm with thickness 7mm.

Die Size: Produced circular hallow log size 40 mm outside diameter and 20 mm inside diameter with length 300 mm. and square log size 40 X 40 mm.

IV. WORKING

Cow dung almost 3 to 4 days mix with coal or wood powder as per utility will processes in human powered operated cow dung log making machine. This mixture filled in the hopper through which it is supplied to the screw extruder and energy supplied form peddle operated mechanism unit. The mixture is processes with the screw blade are transmitting to the die to make hollow log of appropriate size and shape of cow dung log. Hollow log will be produce to minimize smoke formation and burn effectively which will prevent health problem. These hollow logs can be used as a fuel for cooking food and for other purpose such as Havan (Homa), industrial activities, fuel used in boilers for producing steam, Brick Kiln.

Fig.4. Cow Dung Log Making Machine

V. RESULT AND DISCUSSION

A comparison can draw from above literature and found that available cow dung log making machine operated by electrical energy has required electrical power and skilled person for operation and maintenance. This kind of mechanism is not useful in rural or interior areas were limited supply of electricity, electrical power cut problem or no power supply. Also available machines are costly and not affordable for rural areas people. Whereas our proposed cow dung making machine energized by human powered will help to by promoting cleanliness and hygiene by eliminating solid waste from the region and also creating employment opportunities for their livelihood. Lot of awareness is being created by the central government and state government for implementation of such projects in the society and cow dung waste is been treated at minimum cost with minimum human energy consumption. This machine replaces the motorized unit which surely open an avenue to generate employment for people in rural areas. It provides gainful employability and capability of earning to the people of rural and urban area in the interest of economic development. Also, use of clean and free source of energy, reducing the dependency of electrical energy which presently obtained from conventional sources, which is costly and causing degradation of environment.

VI. CONCLUSION

As cow dung log making machine operation can take place by means of Human Powered, therefore it is bound to be commercially and economically viable in rural as well as urban areas. The cost of this Human powered operated machine should be minimum as compared to other electrically operated cow dung log making machine which can afforded to rural areas people. The machine is simple, ease of operation and maintenance. Machine energized by human powered means no need of electricity which is environmentally friendly and is justified as an original future contribution.

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