

DESIGN AND MANUFACTURING OF BRIQUETTE MAKING MACHINE

An Alternative Source of Energy

Prof . Kunal Kshirsagar¹, Shirish Bhaware², Gaurav Wadnerkar³, Rakesh Yadav⁴, Vishal Nikalje⁵

¹Department of Mechanical Engineering

²D.Y.P.COE ,Ambi, Pune, India.

Abstract — In India, millions of tons of agricultural wastes are generated which are either destroyed or burnt in loose form which cause environmental pollution. These wastes can be recycled and can provide a renewable source of energy by converting biomass waste into high density fuel briquettes with or without addition of any binder. In comparison to wood or coal the biomass briquettes have low ash content as well as low moisture level. Various technologies are used for biomass briquetting. Among those, reciprocating ram/piston press and screw press technology is used widely. Although both the technologies have their merits and demerits, the screw press briquettes are more superior than ram pressed briquettes due to their storability and combustibility. These briquettes are used in gasifiers and the end products of gasifiers are used as fuel gas in burners.

Keywords- Agricultural Waste, Briquetting, Alternate Energy, Gasifiers

I. INTRODUCTION

Biomass briquettes are a biofuel substitute to coal and charcoal. Briquettes are mostly used in the developing world, where cooking fuels are not as easily available. There has been a move to the use of briquettes in the developed world, where they are used to heat industrial boilers in order to produce electricity from steam. The briquettes are cofired with coal in order to create the heat supplied to the boiler. Large quantity of coal is used in many developing countries as the major fuel in industries and power generation. On one hand developing countries are burning raw coal with high sulfur content to fulfill their energy demands; on the other hand they have not been able to utilize a lot of agro- as well as forest- waste efficiently.



Fig.1: Biomass Briquettes

Combustion of raw coal and other biomass fuels emit harmful emissions such as Sulfur dioxide and Nitrogen oxides, which are the main causes of environmental pollution such as acid rain, global warming and climate change by Lu G. Industrial boilers, furnaces and kilns in South Asia, including Nepal also use coal as the major fuel along with fuel wood, agro/forest wastes (rice husk, saw dust, etc). Particularly, the brick kilns use a wide variety of fuels such as coal, lignite, fuel wood, agro/forest residues, rubber tires, waste plastics, etc.

Aim and Objective

With an Aim to Preserve Our Nature Now-a-days some companies are coming up with efficient and Eco friendly biomass briquetting machine with an aim to preserve our nature. Briquetting Machine India has a vision to provide effective solutions for growing demand for conservative fuels. The briquetting machine is widely used in agriculture sector and has proved to be useful in protecting the nature. Briquetting machine has provided better solution than non convention sources such as oil, gas and any other fuel. With industries growing, such machines have preferred choice to be used to make something creative from the waste material. Today, this technology has been a hit in the industrial

market and has been appreciated for its services. The need of keeping environment clean and green from devastate material has been the first choice of industries

1. The main objective of this study is to design, construct and test a briquetting machine
2. Design and construct a briquetting machine with the main feedstock being agricultural residue.
3. To determine the physical properties of the briquette.

II. DESIGN DEVELOPMENT AND WORKING

3.1 BLOCK DIAGRAM OF BRIQUETTING MACHINE

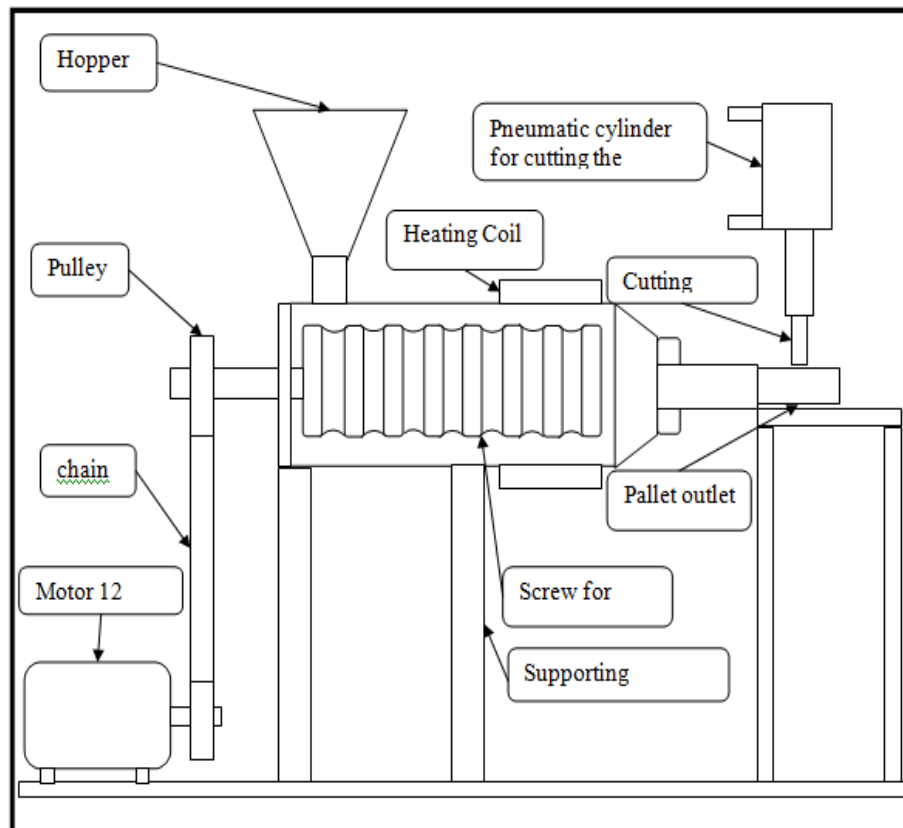


Fig.2: Block Diagram Of Briquetting Machine

CONSTRUCTION:

It consist of mainly components such as base frame electric motor, pulleys belt drives with coupling and hopper with screw compacting mechanism. electric motor is supported on support columns the power screw of compacting machine is coupled to electrical motor via pulley and power is transferred through chain drive. Above the compacting screw the hopper is provided to feed the raw material into machine .for cutting of briquetting in equal length there is provision of automatic cutting is made.

III. SPECIFICATIONS OF ALL COMPONETS

1. Motor

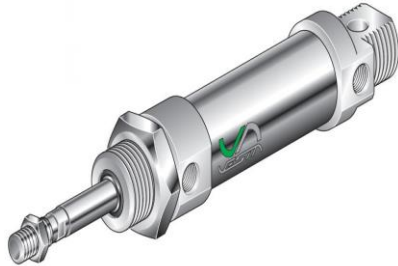


Specification Of Motor:

1. Mfg. By: Crompton Greaves Limited
2. Ref:Gf6090 Fr B56

3. Power- 180watt - 0.25hp
4. Speed - 1425rpm
5. Voltage - 160/240v0lt- 1ph
6. Frequency - 50hz
7. Ampere - 2.1A
8. Rating Amb -40⁰C

2. Pneumatic Cylinder:



Specification:

1. Cylinder - Air Cylinder.
2. Standard Type - Double Acting, Single Rod
3. Series - CM2Ø20,Ø25,Ø32,Ø40

3. Hose Pipe:



Specification:

1. Materials -polyurethane
2. Outside dia. -8mm
3. Inside dia. - 6mm
4. Thickness-2mm
5. Working pressure-@70f-175
7. Vacuum rating - 28hg
8. Temp range—40 to 160 f. -40 to 70c
9. Hardness-Shore A 98
10. Bend radius-15

4. Flow Control Valve:



Tube OD 1/4"

Specifications:

1. Inner Diameter-8mm
2. Type Of Fitting-One Touch Fitting
3. Product Name : Pneumatic Speed Controller;

4. Connector Type :6mm to 6mm
5. Medium : Air
6. Total Size(Approx) : 48 x 40 x 15mm / 1.9" x 1.6" x 0.6"(L*W*H)
- 7.External Material : Plastic & Metal;
8. Color :Black, Blue
9. Net Weight :77g

6. Buttonoperated Direction Control Valve



Specification:

1. Ordering Number :4v230c-08
2. 4V:5/2(3) way solenoid Valve
3. Series - 200 series
4. 30c - Double-Head Three position Close Centre
5. Port Size 08 - 1/4"

7. Microcontroller 800xc:



Specification:

- | | | |
|-----------------|---|---|
| Output Contact | - | DPDT (2 C/O) |
| Supply Voltage | - | 12-240V DC |
| Range | - | 1/10/sec/min/hr for both ON & OFF time |
| Operating Modes | - | Asymmetrical Cyclic ON first or OFF first |

Supply Voltage - 20 to 240V AC, 12 to 140V AC

Mounting Type - Back panel mount

Certification - CE & UL

8. Sprockets:

1. Pitch: 12.70 Mm (0.500")
2. Roller Diameter: 8.51 Mm (0.335")
3. Roller Width: 7.75 Mm (0.305")
4. Tensile: 1820 Kilos (4000 Lbs.)

9. CHAIN DRIVE:

Chain No Mm=41

Pitch Mm=12.7

Roller Dia.Mm=7.95

Roller Width Mm=6.5

Pin Dia.Mm=3.66

Link Plate Thick Mm=1.3

Ultimate Strength N=13920

10. Screw:



Specification:

1. length-200mm
2. diameter-30
3. pitch-6mm
4. no of start-1

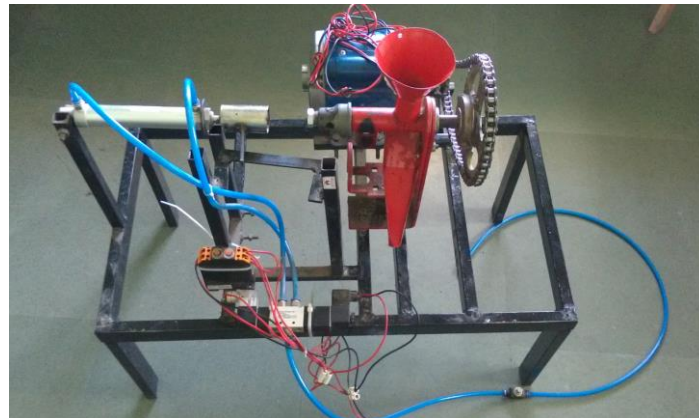
11. Battery



Specification-

Voltage-12dc
Current-5amp

Actual model



IV. ADVANTGES AND CONCLUSION

ADVANTGES

1. This is one of the alternative methods to save the consumption and dependency on fuel wood.
2. Densities fuels are easy to handle, transport and store.
3. They are uniform in size and quality.
4. The process helps to solve the residual disposal problem.
5. The process assists the reduction of fuel wood and deforestation.

CONCLUSION

The briquette machine has been designed. This machine has the capacity to produce 0.95kg/s of briquette. It can be easily fabricated with materials sourced locally. This project will provide job opportunity to the unemployed graduates, and small-scale entrepreneurs can be empowered by the government by making briquette from sawmill wastes. This will reduce unemployment rate in Nigeria and dependence on petroleum products for heating and cooking and also utilize waste generated by the sawmill industries thereby reducing open air burning and attendant environmental pollution.

REFERENCES

- [1]P.V Jadhav¹, Shashikant Dashore², Kedarnath Chaudhary³ Assoc. Professor, Department of Production Engineering, Bharati Vidyapeeth College of Engineering Pune, India¹ P.G Students, Department of mechanical Engineering, Bharati Vidyapeeth College of Engineering Pune, India², 3 Vol. 5, Issue 1, Januray 2016
- [2]Shreya Shukla¹, Savita Vyas ¹(Department of Energy Technology, Rajiv Gandhi Proud yogiki Vishwavidyalaya Bhopal, Madhya Pradesh, India IOSR Journal of Environmental Science, Toxicology and Food Technology (IOSR-JESTFT) e-ISSN: 2319-2402,p- ISSN: 2319-2399.Volume 9, Issue 11 Ver. II (Nov. 2015), PP 37-44
- [3]ShaikhAteek Ahmed, Anita Kumari, KetanMandavgane. Department of Chemical Engineering Thadomal Shahani Engineering College, Mumbai, Maharashtra, India ,Vol. 3 Issue 4 April 2014 ISSN: 2319 – 1058
- [4] Okey Francis Obi¹ and Busayo Sunday Adeboye² and Nneoma Nkem Aneke¹ ¹Agricultural and Bioresources Engineering Department, Faculty of Engineering, University of Nigeria, Nsukka, Nigeria ²Mechanical Engineering Department, Faculty of Engineering, Osun State College of Technology, EsaOke, Nigeria International Journal of Science, Environment ISSN 2278-3687 (O) and Technology, Vol. 3, No 3, 2014, 1043 – 1052
- [5] Mangesh V. Wasekar, Dr (Mrs)R.N.Baxi/ International Journal of Engineering Research and Applications (IJERA) ISSN: 2248-9622 Vol. 3, Issue 2, March -April 2013, pp.437-439