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Design and Manufacture Prototype of Jaggery Plant

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Abstract –Indian agriculture is well known for its good quality. But sometimes due to older methods the farmers have to face losses due to less productivity large production cost. In this project the only motto is to reduce production cost and increase the production rate using various advanced methods of engineering. Sugarcane is an important cash crop for sugar and allied industry related to its by-products and agro based industries. Out of many by-products, jaggery occupies an important place. Jaggery making and marketing in India continues to be the larger agricultural based occupation in spite of the phenomenal increase in the production and consumption of white sugar. In India, jaggery manufacturing is considered as big cottage industry under unorganized sector.

Key Words: Boiler, Separator, Evaporator, Hydraulic pump, gear pump, flow control valve, heating tube, blower.

1. INTRODUCTION

In this project, we are working on a jaggery, new process for jaggery making. Jaggery and sugar are made from sugarcane but sugar is produced on large scale where jaggery , the scale at which it produced is almost 20-25% of sugar that is mainly sugar has a long shelf life.

As the chemicals used in the production of sugar are in a large quantity. Sugar can be stored in a large scale for a long time but jaggary cannot be stored in a large scale for a long time. As the chemicals used in the jaggery production are small quantity. Hence it has nutritious values. But the demand of jaggery is not that much satisfied by the producers as they are using conventional (traditional) method to manufacture jaggery and its byproducts.

The proposed project will increase yield of jaggery production and reduce the pollution, the amount of fuel used in the production also reduce, and also the number of workers will reduced.

1.1 HISTORY

From many decades structure of traditional jaggery plant is still same. It contains 2-3 big size pans which are used to boil juice (sugarcane). External heat is supplied to pans by furnaces. It is batch process. It is traditional process. And zero maintenance. It does been happening from almost 200years there is not much change in jaggery process.

Fig1: Heating and separation of impurities

Fig2: Extraction of syrup

Fig3: Mould making

1.2 PROBLEM STATEMENT

Installation cost of this process is high. For this process man power required is more. The Structure of furnace is old. Due to this process pollution is occurred which is harmful for nature. In this process energy consumption is more. And production rate is very low.

2. MODEL DEVELOPMENT

In this project, we are converting batch process into continuous process by replacing whole system by water tube boiler. Now system is semiautomatic.

In this system the juice is passed in two steps. First step is from inlet to impurity separator via tubes. Second step is after separating impurities the juice is passed to the outlet via heating tubes.

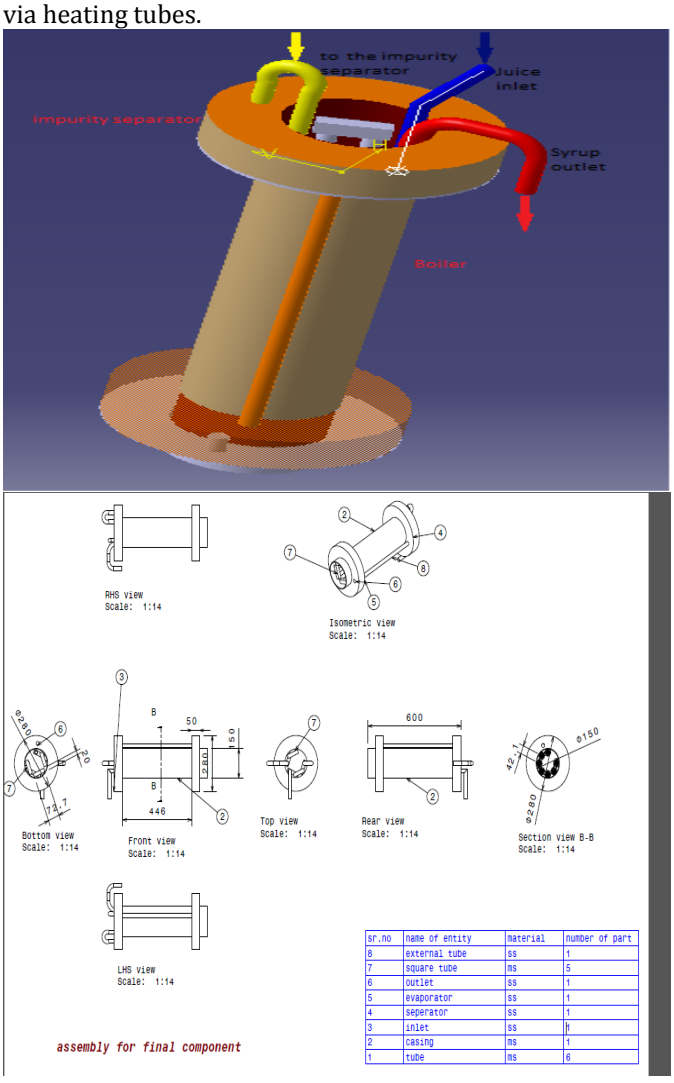

Fig4: MODEL OF PLANT

Table -1: Equipment Table

SR NO.	Name of part	Material	Working
1	Boiler	Mild steel	Used to heat tube
2	Tubes	Stainless steel	Passing the juice from inlet
3	Separator	Stainless steel	To remove impurities
4	Helical gear pump	Specified	For extraction of syrup from outlet
5	Hydraulic pump	Specified	To lift the juice
6	Flow control valve	Specified	To control flow of the juice

2.1. SIMULATION STUDIES AND MODEL SUGGESTIONS

In the given prototype we are using boiler which is made up of mild steel. When we are using boiler in large scale industry it can be replaced by ceramics or bricks construction.

In the given prototype, we using net separator. In industry it can be replace by centrifugal separator.

We can use plc controller for automatic package of jaggery instead of manual packaging.

3. CONCLUSIONS

After visiting various industries and after studying the output of the prototype of the given model we can conclude that the

1) The amount of fuel required is less in the given process.
2) Production rate is increased.
3) Number of labors required is less.
4) Pollution due to incomplete burning of fuel due to old method also reduced.
5)

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