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Design and Fabrication of Garlic Preheater

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Abstract – *as garlic peeling is the most time consuming process. Our company "Harshil Gutka Enterprises" which is located at Dombivali MIDC –phase 2 , required efficient heating machine,which will work in less time consuming and within less cost.*

***Key Words*: garlic, compressive air , heating purpose only**

1. INTRODUCTION

For particular requirement of heating only, we make an arrangement. I.e. heated air will pass through hollow circular pipe and sent to enclosed chamber.

In chamber there will be 2 sheets which is a part of each other having distance of 3 inches. One of them are 18 gauge net sheet having 3 mm hole diameter and other one is 20 Gauge which is plane sheet.

By these arrangement we heat garlic in large amount and at same time other lot will send for peeling purpose. Indirectly we utilise the time and productivity efficiency will get increases.

1.1 Diagrams

Fig- 1.1: actual chamber of preheater

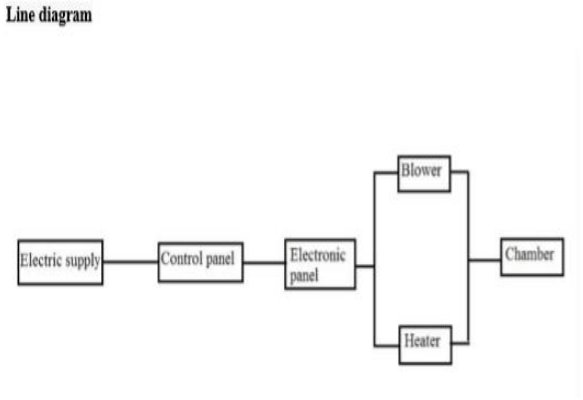


Fig-1.2: Line Diagram

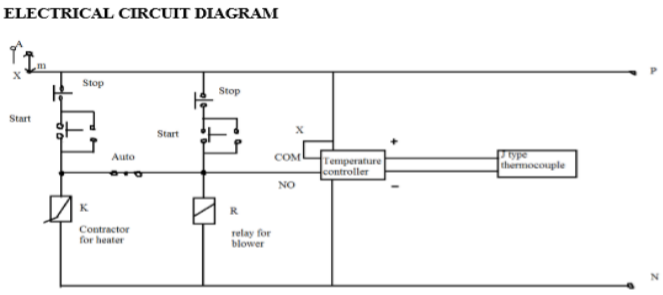
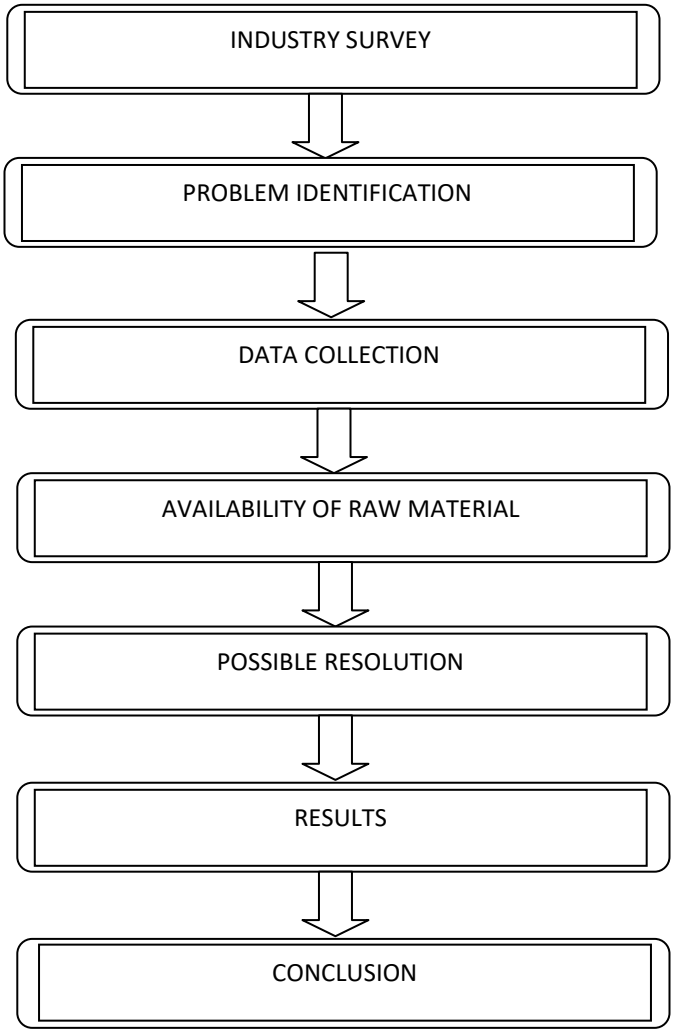


Fig-1.3: Electrical Circuit Diagram

Fig- 1.4: pipe and blower arrangement

2. METHODOLOGY



COMPANY SURVEY

HARSHIL GUTKA ENTERPRISES

OWNER: HARSHIL GUTKA

ADDRESS:

MHATRE NAGAR,

LALIT KATA,

PHASE 2,

MIDC,

DOMBIVALI (E)

Establish in 1994.

Average production per day 200-250 kg

Turn over 50 lakhs per annum.

As we said, company required only heating machine which will preheat garlic in less time up to its sustainable level.

Problem identification and definition

Company already have a machine worth Rs 1 00, 0000/- but that machine is not heating garlic properly. As per company requirement Design a Machine with maximum productivity with minimum cost and minimum space requirement as well as less time consuming.

Data collection and calculation

1. Energy consumption calculation

1 Kwh= 1 Unit
Working hour = 4
5 heat band consume 5 Kwh
Consume per day =4 x 5 =20 kWh per day
1 unit =9 Rs cost.
Cost of electricity per day = 20 x 9 =180 Rs.
Cost of electricity per month = 180 x 30 =5400 Rs.

2. Load calculation on net sheet

Net sheet dimension
Length = 3 ft. =914 mm and width = 2 ft. =609 mm. with thickness = 2mm
Area of sheet = 2 ((L x B) + (B x T) + (T x L))
A = 1.119 m^2
M.S (low carbon steel) having tensile strength
= 370 MPa =370 $x10^6$ N/m^2
$\sigma_t = F/A$
By putting all available value we get F= 414.15 x 10^6 N
So sheet can sustain up to 414.15 x 10^6 N.

In our case
Mass of garlic in one lot at a time is 50 Kg
And free fall gravitational acceleration = 9.81 m/sec^2
As we know
F=mg
So F= 50 x 9.81
F= 490.5 N.

So sheet can easily sustain 500 N as it can sustain up to 414.15 x 10^6 N.

Considering a particular section i.e. central portion of net (1ft x 1 ft.) = (0.304 m x 0.304 m)
Thickness = 2mm
Area of sheet = 2 ((L x B) + (B x T) + (T x L))
A=0.187m^2
σt = F/A
By putting all available value we get F=69.28 x 10^6 N.
In these case also it can easily sustain the load but for safety we give support to net by 2" metal strip welded To each side which will give more support.

Availability of raw material

Table -1: DIMENSION OF COMPONENT

Dimension of Component			
Sr no	Name	Dimension	No of parts
1	M.S STRIP	.75 " WIDTH 2 ft. LENGTH	4
2	M S STRIP	.75 " WIDTH 3 ft. LENGTH	4
3	SHEET WITH HOLE DIA. 58 MM	3x2 ft.	1
4	SHEET	3x2 ft.	3
5	SHEET	3x3 ft.	2
6	SQUARE PIPE	2 ft. x1 " WIDTH	6
7	SQUARE PIPE	3 ft. x 1" WIDTH	10
8	MS STRIP	2 ft. x 2 " WIDTH	4
9	SQUARE PIPE	4"x1" WIDTH	5
10	NET SHEET	2x3 ft.	1
11	NET SHEET	2x2 ft.	1
12	HEAT BAND	3" x 60 mm Dia	5
13	MS PIPE	2 ft. LENGTH x 58 mm DIA	1

3. FUTURE SCOPE

1 Useful for small scale as well as large scale industry.

2 Useful for pharmaceutical company.

4. RESULTS

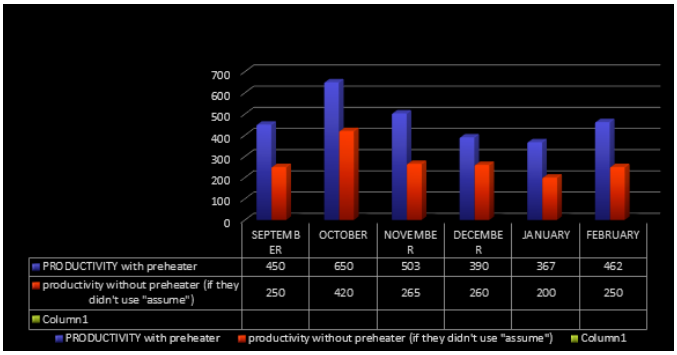
In first attempt we achieve 84 ° C by 7 head bands.

Our machine output i.e. garlic is burnt at lowest layer or near the surface of net.

After some trails we come to know garlic can be heated in the range of 60-61 ° C for efficient peeling purpose.

We again change the arrangement of heat band and we removed 2 of them heat bands.

Results achieved by this new arrangement is 61 ° C of air which is came out from pipe So our desired product is achieved.



5. CONCLUSIONS

We fulfil the industries requirement.
We increases garlic peeling productivity.
We come to know the technologies equipment and machinery for processing of garlic for peeling.
Develop machine in minimum cost.

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BIOGRAPHIES

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