Manufacture of Frame and Construction of Oil Drying Machines from Frying Peanut Eggs

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Abstract: The purpose of this research is to make the frame and construction of the peanut egg drying machine to get results in the form of a production machine and determine the components of the egg peanut drying machine. The method for making oil drying machines for egg nuts is by conducting a direct survey of the egg nut industry, problems arise that the oil content is still high in egg nuts which are dried manually, then carrying out the manufacturing concept. Based on the concept, then work on production machines. The results of this study are in the form of a concept for making an oil drying machine on egg nuts that utilizes centrifugal force to dry the oil, oil drying rotary tube components made of stainless steel, oil storage tube fixed with stainless steel material, shaft components with a diameter of 22mm and a length of 520mm, pulleys with a ratio of 3/6 as a rotation reducer from an electric motor 0.5 HP 1400 rpm to 500 rpm. Machine frame L profile 40 x 40 x 4 mm material st 42 and engine components designed by Feri Fernand.

Keyword: Frame, Construction, Oil Drying Machine.

INTRODUCTION

India as an agrarian country has many natural resources that its people can manage and use to improve their welfare. The welfare of the people of India can be improved through the industrial sector, especially small industries such as home industries. For this reason, it is necessary to improve facilities or equipment related to the processing of products produced in these home industries, for example in the egg-nut industry. Egg nuts use raw materials from peanuts which are one of the main commodities of natural resources for the people of India. The process of drying egg nuts still uses the conventional method, which is dried naturally by placing them in a container made of strimin wire and then airing them. The weakness of drying in this way is that the resulting peanut eggs get stale faster, the production time is long and the product produced is limited even though peanut agricultural produce is very abundant because the oil content is still high so it doesn't last long.

The following is data on the amount of peanut production in Uttar Pradesh from 2012-2013 based on data from the Central Bureau of Statistics for 2013.
Table 1. Total Production of Peanuts in Uttar Pradesh

<table>
<thead>
<tr>
<th>Commodity</th>
<th>Year</th>
<th>Land (Ku/Ha)</th>
<th>Production (Tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Peanuts</td>
<td>2012</td>
<td>14.07</td>
<td>9597.00</td>
</tr>
<tr>
<td></td>
<td>2013</td>
<td>16.98</td>
<td>9852.00</td>
</tr>
</tbody>
</table>

Based on data as in table 1, it shows that peanut production in Uttar Pradesh has increased from year to year. Peanut commodity productivity land increased by 2.91 quintals per hectare, this also had an impact on peanut production which increased by 255 tonnes. The production of peanuts is increasing every year, it is necessary to increase processing using cheap peanut raw materials but the selling price after processing is very profitable. A clear example of egg nuts as a processed product, because egg nuts use peanuts as raw material, the price per kg is Rp 22,000 after being processed into egg nuts the price is Rp 45,000 per kg.

Based on direct observation of market conditions, one of the home industry owners is in the Uttar Pradesh area. The owner buys the raw materials needed according to market prices and works from the initial process of making, frying, drying to the packaging process which can produce 8 kg and lasts only up to 2 weeks, the process takes 50 minutes for conventional drying which is ready for packaging. Based on these conditions a solution must be found in order to produce peanut eggs quickly and with low oil content so that they last longer.

Seeing this, the author is motivated to make tools or equipment that are useful in the drying process of egg nuts so that egg nuts with low oil content and a short time are produced. The use of egg peanut oil drying machine is the answer to the problem above. The production of egg nuts with a peanut oil drying machine provides many benefits compared to the conventional production of egg nuts by airing them. The use of egg peanut oil drying machine, Producing 8 kg of peanut eggs only takes 20 minutes, whereas conventionally, producing 8 kg of peanut eggs takes 50 minutes. Based on this comparison, the peanut oil drying machine is very appropriate for the amount of production of egg nuts with a low oil content and fast drying of peanut eggs. This egg peanut drying machine uses centrifugal force to dry the oil. The way it works is that the egg nuts will be rotated in the drying tube so that the oil will drain and come out through the holes in the drying tube. It is hoped that with this peanut egg drying machine, the household industry will work lighter and can increase work productivity with quality results.

**LITERATURE REVIEWS**

**Electric welding**

Electric welding is a metal joining technique by using electricity as a heat source to melt the electrode together with the workpiece as a result of an electric arc. Welding in the field of construction includes: shipping, bridges, steel frames, pipelines, pressure vessels, transportation facilities, rails and so on.

Welding is not only for the construction of construction but it can also be used for repeated welding on metal parts that have experienced wear and tear (Harsono Wiryosumarto and Toshie Okumura, 2008).

In simple terms, welding can be interpreted that welding is a process of joining two heated metals with use energy heat to melt the ingredients welded either using added materials or not.

**Electrode**

The use of welding wire (electrodes) plays an important role in electric arc welding. The core of the electrode is made up of metal which has a coating made from a mixture of chemical substances, other than as generator electrode also has a function as an additive. There are two types of classification of the electrode parts, namely the coated part (flux) and
the part of the electrode which does not have a membrane at the base which has the function of clamping the welding pliers. The flux electrode has a function as a liquid metal shield which can produce shielding gas, stabilize the arc flame, and as a source of alloying elements. When viewed from the base material to be welded, the electrodes are divided into several types, such as 1) soft steel electrodes, 2) high carbon steel electrodes, 3) alloy steel electrodes, 4) cast iron electrodes, and 5) non-ferrous metal electrodes. Coated electrodes for use in electric arc welding have different compositions of both the film and the core wire. The electric arc welding electrode has a standard core wire diameter of 1.5 mm to 7 mm with a length ranging from 350 to 450 mm. While the thickness of the electrode membrane is between 10% and 50% of the type of electrode and the type of membrane contained in the electrode. Electrode classification also has standards that have been regulated based on the AWS (American Welding Society) system and also ASTM (American Society Testing Materials). Electrodes with code E6013 has the use of welding in all positions and can use AC or DC welding currents. This type of electrode can also produce very fine welding ridges so that the slag in the weld area is easy to clean and easy to control. For each letter and number on code E6013 own meaning on respectively, namely:

\[ E \quad = \quad \text{Electrodes for electric arc welding} \]
\[ 60 \quad = \quad \text{Has a minimum tensile stress value resulting from welding} \]
\[ 1 \quad = \quad \text{Welding that can be used in all welding positions} \]
\[ 3 \quad = \quad \text{Electrodes that have shallow penetration made from potassium rutile powder coating using AC and DC currents} \]

**Welding Current**

Welding current is the magnitude of a flow of electric current generated from the welding machine. In doing welding not only the diameter electrode just which can affect the results of the weld, but can also be seen from the size of the current used when welding. The use of too low welding current will cause the flame on the electric arc hard to produce thus causing instability in the electric arc the, besides the heat generated in the electric current arc flame is not sufficient to penetrate the object being welded and the resulting ridges are uneven.

<table>
<thead>
<tr>
<th>plate thickness (mm)</th>
<th>Diameter electrode (mm)</th>
<th>Current (amperes)</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;1</td>
<td>1.5</td>
<td>20 – 30</td>
</tr>
<tr>
<td>1 - 1.5</td>
<td>2</td>
<td>36 – 60</td>
</tr>
<tr>
<td>1.5 – 2.5</td>
<td>2.5</td>
<td>60 – 100</td>
</tr>
<tr>
<td>2.5 – 4.0</td>
<td>3.5</td>
<td>90 – 120</td>
</tr>
<tr>
<td>4.0 – 6.0</td>
<td>4</td>
<td>120 – 180</td>
</tr>
<tr>
<td>6.0 – 10</td>
<td>5</td>
<td>150 – 220</td>
</tr>
<tr>
<td>10 – 16</td>
<td>6</td>
<td>200 – 300</td>
</tr>
<tr>
<td>&gt;16</td>
<td>8</td>
<td>280 – 400</td>
</tr>
</tbody>
</table>

Source: Harsono Wiryosumarto H, 2008: 34

**Camp V**

Camp V is process connection welding which is a blunt connection. This seam is widely used for joining metal/plate with seam angles of 600-800 and has seam gaps or a distance of approximately 2 mm and has a base height up to seam angles ranging from 1-2 mm. When welding seam V, a fluid barrier can also be provided along the seam which has the function of preventing liquid from accumulating at the bottom of the seam and the retaining plate can be removed if necessary. To avoid deterioration in the quality of the welding joint, pay attention to it when selecting the shape of the seam. Which should aim to reduce heat input and reduce weld metal so that the lowest price is obtained. As for the provisions for making weld seams before carrying out the initial work, it must be ensured that
the workpiece is protected from rust, oil and paint. In the welding process in order to produce good combustion, in the work of seam V, electrodes that have a small diameter or are adjusted to the size of the corner of the seam used and the thickness of the plate to be welded should be used (Anasrul Rukun 1996).

**Tool Morphology**

The morphology of the tool is the structure of the machine part based on the analysis, so it is clear that the tool to be designed is a tool that will be used to work quickly in the peanut drying process. So as to be able to optimize the results of draining peanuts in terms of time and yield. Referring to the process above, functionally this tool has the following components: Machine frame profile, Drive, Transmission system, Slicer system, Nut dispensing system.

Based on the data above, an overview of the components that will form the peanut egg drying machine that is being designed is obtained. The morphology of the selected peanut egg drying machine is as follows:

1. The frame profile was chosen for the second variant, namely the L profile (angle iron) because apart from being lighter, L profile iron is easy to assemble.
2. The main mover was chosen for the second variant, namely the electric motor.
3. The selected transmission system is the first and third variants, namely the V-belt and gears. selection of V belt to connect the rotation from the motor to the main shaft.
4. The slicing system was chosen first to make it easier to remove the beans.
5. The peanut dispensing system was chosen first because it is easy to manufacture.

<table>
<thead>
<tr>
<th>No.</th>
<th>Name Part</th>
<th>Size</th>
<th>Material</th>
<th>Information</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Motorcycle</td>
<td>-</td>
<td>0.5 HP 1400rpm</td>
<td></td>
</tr>
<tr>
<td></td>
<td>electricity</td>
<td>-</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2.</td>
<td>Bearing</td>
<td>Ø 22mm Ø 1 inch</td>
<td>1 piece</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>1 piece</td>
<td></td>
</tr>
<tr>
<td>3.</td>
<td>pulley</td>
<td>Ø 3 inches Ø 6 inches</td>
<td>Aluminum</td>
<td>1 piece</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>1 piece</td>
<td></td>
</tr>
<tr>
<td>4.</td>
<td>V-belt</td>
<td>A 36</td>
<td>-</td>
<td>Type A</td>
</tr>
<tr>
<td>5.</td>
<td>Machine frame</td>
<td>600 x 300 x 380 Mm</td>
<td>37th St σ=37kg/mm²</td>
<td>Elbow profile 40x40x4mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-</td>
<td>σ=37kg/mm²</td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>Axis</td>
<td>Ø 32mm</td>
<td>37th St</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td></td>
<td>σ=37kg/mm²</td>
<td>-</td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>case</td>
<td>560 x 280mm</td>
<td>Aluminum</td>
<td>-</td>
</tr>
<tr>
<td>8.</td>
<td>Rotary tube</td>
<td>Ø 340 x 240mm</td>
<td>Stainless Steel</td>
<td>-</td>
</tr>
<tr>
<td>9.</td>
<td>capacitor</td>
<td>-</td>
<td>-</td>
<td>220v</td>
</tr>
<tr>
<td>10.</td>
<td>Fixed tube</td>
<td>Ø 360 x 320mm</td>
<td>Stainless Steel</td>
<td>-</td>
</tr>
<tr>
<td>11.</td>
<td>L bolt</td>
<td>L6, L8</td>
<td>Stainless Steel</td>
<td>4 pieces</td>
</tr>
<tr>
<td>12.</td>
<td>Oil line</td>
<td>Ø 30mm</td>
<td>Aluminum</td>
<td>-</td>
</tr>
</tbody>
</table>

Source: http://machine.blogspot.com

**METHODS**

The concept is a planning conclusion. Where a concept is needed in an activity, event or work on a product. The concept itself aims to find out the main conclusions of an activity planning flow and the execution of a product itself. In working on a product, a manufacturing concept is needed, in particular, a general product manufacturing concept. These concepts cover a number of things, namely: Reduction in the volume of materials, Processes of changing the shape of materials, Joining and Finishing surfaces (Finishing)
The planning of this tool is carried out in various stages of planning, starting with the stages, namely: Starting from the preparation stage, Designing an oil drying machine tool with CAD, and Making an oil drying machine. The process of making this oil drying machine tool consists of several work processes: Measurement Process, Cutting Process, Drilling Process, Welding Process, Assembly Process, Finishing Process and Painting Process.

RESULTS AND DISCUSSION
Framework Analysis
The work processes carried out in the process of making this machine frame include the measuring process, the cutting process, the drilling process, the welding process and the grinding process.

The measurement process is carried out using measuring tools such as steel rulers, roll rulers and elbow rulers. The measurement process in the process of making the machine frame is carried out, among others, when checking the total length and size of the material, when going to the material cutting process, after the material cutting process and during the material assembly process.

The cutting process is carried out using automatic saws and manual saws. The drilling process is carried out to make holes in the frame.

Discussion
The engine frame as one part of the oil drying machine has an important role. The frame functions as a support for all the attached engine components. In particular, the frame functions as a seat for the oil drying machine. All of these components are attached to the machine frame through the help of fastening bolts except for the dryer which is properly connected to the frame. Therefore, the manufacture of the engine frame must be taken into account with to optimize the performance of the components installed. In this discussion will be presented about the process of making the machine frame, namely: The material used in the process of making the machine frame consists of angled steel profiles with a size of 40mm x 40mm x 4mm, with machine frame dimensions of 600 x 300 x 360. As mentioned in chapter 3 regarding the material selection process, that in the material selection process making the machine frame is assumed to be the material that has been used.

Performance Test
After the process of designing and manufacturing the egg peanut oil drying machine, the next step is to conduct a performance test. The test results of the machine will be discussed in order to find out the weaknesses and errors that occur during the machine manufacturing process so that making a similar machine will be better in the future.

Machine Use
Here's how to use the machine Egg Peanut Oil Dryer:
1. Check the condition of the machine physically.
2. Insert the plug into a 220 volt ac socket.
3. Press the button/push button, if the machine spins normally it means it's ready to use.
4. Turn off the machine again.
5. Enter the food ingredients to be processed into the machine basket.
6. Level the position of the food in the basket.
7. Press on button.
8. Condition the machine rotates 20-25 minutes (10 kg capacity).
9. Turn off the machine.
Machine maintenance
Maintenance (maintenance) can be interpreted as an activity to maintain or maintain the condition of the machine and make repairs or replacements needed so that a satisfactory production operation condition can be achieved as planned. The main purpose of the maintenance function is:
1. Maintain production quality.
2. Production capability can meet the needs according to the production plan.
3. Achieve the lowest level of maintenance costs Possible.

Work safety
The purpose of work safety in a workshop is to prevent operators and other people who work around them from any work accidents. For example fire, falling, being pinched, fatigue, being electrocuted by being hit by a hard object and there are still many work accidents which are very detrimental during work.

Drying Machine Weaknesses
After testing the function of the peanut egg drying machine, it turns out that it still has several weaknesses including:
1) The process of removing egg nuts is not smooth.
2) Tube volume is still small.
3) There are still peanuts that come out through the oil extraction funnel due to the process of entering into the tube g

CONCLUSION
1. Frame and construction of the dryer The egg-peanut oil that is designed and manufactured consists of L-shaped iron/angle iron for the frame size of 40x40x4 mm.
2. The specifications for this machine are 380 mm machine height, 600 mm machine length, 300 mm machine width.
3. The frame construction of the egg peanut oil drying machine is safe for drying the oil on the egg nuts because it is made of sturdy L-profile iron and a swivel tube of aluminum which is safe and harmless to food.
4. Peanut removal system with rotary tube removal, this facilitates the process of removing dried egg nuts.

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Source [http://wordpress.com](http://wordpress.com)