POLITEKNIK
MALAYSIA
SEBERANG PERAI

BUTTON-UP PUFF MAKER

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POLITEKNIK SEBERANG PERAI

SESI JUN 2017

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SUBMISSION OF FINAL REPORT DECLARATION

DECLARATION FROM STUDENTS (GROUP LEADER)

PLEASES TICK (/)

- [/] We have made all the necessary amendments based on comments and suggestions given by the supervisor and panel.
- [/] Format for report writing is in accordance with the format guidelines.
- [/] We have the approval of the report from the supervisor.
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Finally, we also wish to express our sincere appreciation to my colleagues and the people involved directly and indirectly in providing support and encouragement for this project. Finally, we hope this project produced beneficial to us and to the Polytechnic's students in the future.

ABSTRACT

Button-Up Puff Maker was created to help those small-time business vendors and also those housewives that makes curry puff during teatime for her family. With the help of this project, said person can save a lot of time, as in a push of a button 12 curry puff is ready to be fried.

It is really hard to mole each and every curry puff you make. Why make life harder? With this everyone is happy. We as a team got the inspiration to carry out this project based on a curry puff vendor in front of our campus. It got us thinking; why not create something that can help those business vendors out? Thus Button-Up Puff Maker was born. This project works as easy as its name. Just push the button and your curry puff is ready to be fried. The prototype or our project consist of 12 curry puff mold screwed to a base which is connected to a reversible 12V DC motor and a plug.

ABSTRAK

Button-Up Puff Maker telah diwujudkan untuk membantu peniaga kecil dan juga suri rumah yang membuat karipap semasa minum petang untuk keluarganya. Dengan projek ini, ianya dapat menjimatkan masa, mudah dan juga cepat kerana dengan hanya menekan butang "*on*" 12 karipap siap untuk digoreng dan dinikmati.

Sungguh sukar untuk membentuk karipap untuk menyeragamkan saiznya. Mengapa menyulitkan kerja anda? Dengan projek ini, maka semuanya menjadi mudah dan cepat. Kami sebagai satu pasukan mendapat inspirasi untuk melaksanakan projek ini berdasarkan peniaga karipap di hadapan kampus kami. Ia membuatkan kita berfikir, mengapa tidak mencipta sesuatu yang boleh membantu peniaga itu melakukan kerjanya dengan efektif? Oleh itu, Button-Up Puff Maker dihasilkan. Projek ini berfungsi semudah namanya. Hanya perlu menekan butang hijau dan menolak togel yang terdapat di sudut tangan kanan kita maka karipap sedia untuk digoreng. Prototaip atau projek kami terdiri daripada 12 bekas karipap yang diskrukan ke pangkalan yang disambungkan kepada motor 12V DC yang boleh diterbalikkan.

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CHAPTER 1

INTRODUCTION

1.0 INTRODUCTION

As we all know, "*karipap*" is a favourite of Malaysians and it is often a joke. The average "*kuih-muih*" deals with problems related to earning income quickly. There are some ideas that can be used to facilitate the sale of puff. Thus, the emergence of franchises that produce frozen curry that can be instantly fried once removed from the refrigerator. However, such ways are ineffective for buyers and fans of curly heat but after time.

According to the study we have done, opposite Seberang Perai Polytechnic, there is a shop selling on-the-spot curry. Small shops that use massive workforce to meet the needs of customers are not very strategic. Most buyers are residents and students from Seberang Perai Polytechnic. They argue that the production of hot-rolled curry is taking a little while. They argue that if there is a kind of product that can help produce the curry more easily and quickly it will benefit both the seller and the customers.

Therefore, we are discussing with our supervisor on how to facilitate the curator's traders. We talked about producing a product that could help make the puff easier and faster.

1.1 PROBLEM BACKGROUND

As we know, doing the mold for a curry puff is by far the hardest thing in making a delicious curry puff. It takes quite some time in doing such molds. That said, curry puff is still one of the snack or pastry that is eaten by all citizen of Malaysia. These snacks are eaten mostly during the morning for breakfast, during the evening for teatime or even for dessert. Among the curry puff vendor in Malaysia, most are sold by "*makcik*" in small stalls. And this "*makcik*" usually used manual way to mold the curry puff before frying it. This current way takes a lot of time on molding one curry puff.

By using the current method, it isn't guarantee that all the curry puff will be in the same shape and size. Some of them might be in irregular shape. Even though there is an easier way to do the mold, there is still a problem on the quantity off curry puff that can be done in one go. Usually "*makcik*" at the local vendor will have a few people to help her out in making the curry puff. In this case, we took "*Karipap*" Dinosaur stall as an example. For example, in "*Karipap*" Dinosaur, they have four workers to do their curry puff. One person to roll the dough, another person to place the filling, the third person to roll and make the mold, and the last person is to fry it. The job of the third person is the most crucial as he have to make a beautiful mold so that it can extract customer. Besides this people must have steady hand. To get this steady hand, they have to have many years of experience. Therefore, the new comers will for sure struggle at first.

1.1.1 PROBLEM STATEMENT

A statement that clearly spill out the gap in knowledge or unsolved problem. Problem statement is a concise description of the issues that need to be addressed by a problem-solving team and should be presented to them (or created by them) before they try to solve the problem. When bringing together a team to achieve a particular purpose provide them with a problem statement.

Why are we creating a way to make the mold of the curry puff? It is because, in the process of making a curry puff, making the mold is the hardest part. The current way used by the local vendor takes a lot of time to mold one curry puff. The current way affects the business as it takes quite some time to mold one curry puff and fry it. Below is a few problems that we found in the current way:

The current way that is currently been used by the local vendors, consume a lot of energy. This is because a person has to fold the dough and make the mold for each and every curry puff.

i. The conventional way, only one curry puff can be done by a person.
ii. The current way, takes some time in molding the curry puff. As a person has to fold and mold each curry puff.

1.2 OBJECTIVE

The objective of this project is to produce instant curry puff maker which meet the criteria below:

i. Button-Up Puff Maker can make 12 curry puffs in one go compare to the conventional way where only one curry puff can be molded.
ii. Button-Up Puff Maker saves time as been stated earlier that in one go 12 curry puff can be shaped and molded. This way saves time as the conventional way only can shape and mold one curry puff
iii. Button-Up Puff Maker reduces a man's energy

1.3 SCOPE OF PROJECT

Scope of project is an important element to make sure the project can be finish like how the schedule runs. Otherwise, scope of project has to be followed to prevent the project out from the objective. The scopes of our project are:

i. Button-Up Puff Maker is mainly for IKS (small industries). As this will help the business to grow
ii. Button-Up Puff Maker can also be used in household. As this project can be used during festive season
iii. Button-Up Puff Maker can shape and mold 12 curry puffs at one time
iv. Button-Up Puff Maker is a semi-automatic machine

1.4 DEFINITON OF TERMS

The terms that can describe our project in this study are:

a) Button-Up

- By pressing a button, the project works. By flicking up of down the toggle switch the motor moves.

b) Puff

- Puff is short of curry puff. As that is our project goal which is to make as much curry puff then the current way.

c) Maker

- This defines that our project can make 12 curry puffs in just a single push of a button. It is as simple as its name is.

CHAPTER 2

LITERITURE REVIEW

2.0 INTRODUCTION

Before starting this project, we have made observations and studies on all aspects involved. There are various aspects that need to be addressed so that the product produced has high capability while saving cost as most of the produced "*karipap*" only meet the requirements and requirements for the abundance of curry produce. With that, we focus on the suitability of the materials that will be used to produce our projects.

Among the things highlighted was the selection of project form, the selection of each material and component, and their respective advantages and disadvantages. Below, we've told you a little bit of the results that you get from the study.

2.1 ANALYZE THE EXISTING PROJECT/STUDY/DESIGN

For this chapter, researcher describes the literature review and the researches that have been made for this project. The study was conducted on several types of existing project. Furthermore, there is a study of the materials used in this project. By doing a research

for existing projects, there is are differences in every project that has been made. Although, there are differences in the way of functional improvement, many of which have similar uses.

i. Curry puff mold

- A small clam shaped gadget is a curry puff mold. It is used to shape small curry puffs or samosa. This mold is easy to use and will produce uniformly shaped curry puffs time after time.
- To use, roll and cut out a round pastry approximately the size of the mold, and place this in the center of the mold. Next, fill the pastry with curry puff filling. Clamp the mold together to seal the two edges together.

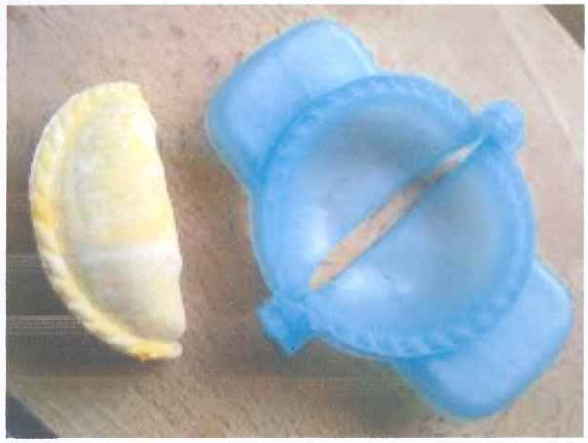

Figure 2.0 – Puff and mold (1)

Figure 2.1 – Puff and mold (2)

ii. Molding it manually

- In this way, the cooks have to mold each and every curry puff manually by rolling the dough, stuffing the inside and last but not least folding it and molding each and every one neatly. To get an excellent curry puff, the cook has to have a pair of steady hands.

Figure 2.2 – Molding manually

Figure 2.3 – Dough

2.2 MATERIALS

i. Wood

Wood is a porous and fibrous structural tissue found in the stems and roots of trees and other woody plants. It is an organic material, a natural composite of cellulose fibres that are strong in tension and embedded in a matrix of lignin that resists compression. Wood is sometimes defined as only the secondary xylem in the stems of trees, or it is defined more broadly to include the same type of tissue elsewhere such as in the roots of trees or shrubs [citation needed] In a living tree it performs a support function, enabling woody plants to grow large or to stand up by themselves. It also conveys water and nutrients between the leaves, other growing tissues, and the roots. Wood may also refer to other plant materials with comparable properties, and to material engineered from wood, or wood chips or fibre.

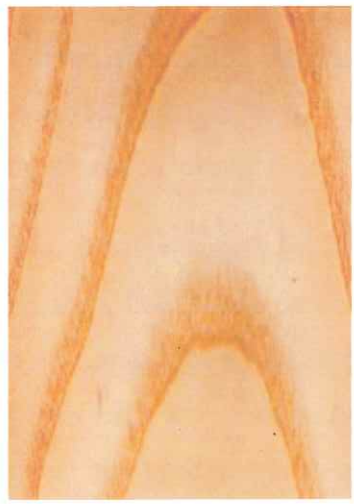

Figure 2.4 - Wood

Wood has been used for thousands of years for fuel, as a construction material, for making tools and weapons, furniture and paper, and as a feedstock for the production of purified cellulose and its derivatives, such as cellophane and cellulose acetate. In species which show a distinct difference between heartwood and sapwood the natural colour of heartwood is usually darker than that of the sapwood, and very frequently the contrast is

conspicuous (see section of yew log above). This is produced by deposits in the heartwood of chemical substances, so that a dramatic colour variation does not imply a significant difference in the mechanical properties of heartwood and sapwood, although there may be a marked biochemical difference between the two.

Age, diameter, height, radial (trunk) growth, geographical location, site and growing conditions, civil cultural treatment, and seed source all to some degree influence wood density. Variation is to be expected. Within an individual tree, the variation in wood density is often as great as or even greater than that between different trees. Variation of specific gravity within the bole of a tree can occur in either the horizontal or vertical direction. It is common to classify wood as either softwood or hardwood.

ii. Rolling (Metalworking)

On metalworking, rolling is a metal forming process in which metal stock is passed through one or more pairs of rolls to reduce the thickness and to make the thickness uniform. The concept is similar to the rolling of dough. Rolling is classified according to the temperature of the metal rolled. If the temperature of the metal is above its recrystallization temperature, then the process is known as hot rolling.

If the temperature of the metal is below its recrystallization temperature, the process is known as cold rolling. In terms of usage, hot rolling processes more tonnage than any other manufacturing process, and cold rolling processes the most tonnage out of all cold working processes. Roll stands holding pairs of rolls are grouped together into rolling mills that can quickly process metal, typically steel, into products such as structural steel (I-beams, angle stock, channel stock, and so on), bar stock, and rails. Most steel mills have rolling mill divisions that convert the semi-finished casting products into finished products.

Roll forming, roll bending or plate rolling is a continuous bending operation in which a long strip of metal (typically coiled steel) is passed through consecutive sets of rolls, or stands, each performing only an incremental part of the bend, until the desired cross-section profile is obtained. Roll forming is ideal for producing parts with long lengths or in large quantities. There are 3 main processes: 4 rollers, 3 rollers and 2 rollers, each of which has as different advantages according to the desired specifications of the output plate.

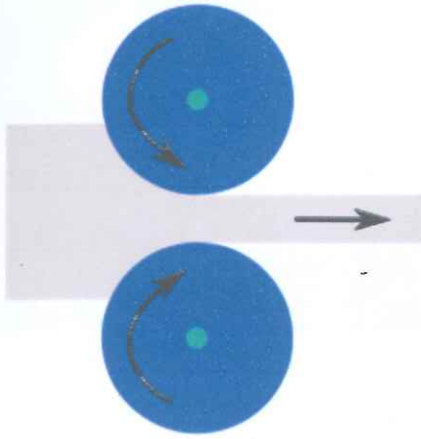

Figure 2.5 - Rolling processes

Flat rolling is the most basic form of rolling with the starting and ending material having a rectangular cross-section. The material is fed in between two rollers, called working rolls that rotate in opposite directions. The gap between the two rolls is less than the thickness of the starting material, which causes it to deform. The decrease in material thickness causes the material to elongate. The friction at the interface between the material and the rolls causes the material to be pushed through.

Ring rolling is a specialized type of hot rolling that increases the diameter of a ring. The starting material is a thick-walled ring. This work piece is placed between two rolls, an inner idler roll and a driven roll, which presses the ring from the outside. As the rolling occurs the wall thickness decreases as the diameter increases. The rolls may be shaped to form various cross-sectional shapes. The resulting grain structure is circumferential, which gives better mechanical properties. Controlled rolling is a type of thermo mechanical processing which integrates controlled deformation and heat treating. The heat which brings the work piece above the recrystallization temperature is also used to perform the heat treatments so that any subsequent heat treating is unnecessary.

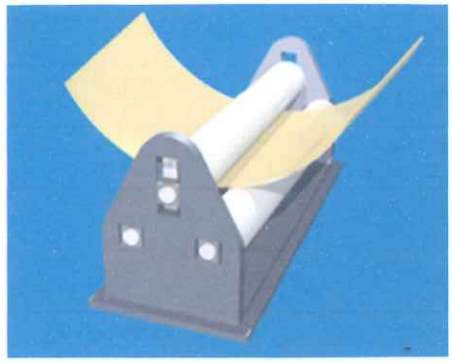

Figure 2.6 - Ring rolling

Forge rolling is a longitudinal rolling process to reduce the cross-sectional area of heated bars or billets by leading them between two contrary rotating roll segments. The process is mainly used to provide optimized material distribution for subsequent die forging processes. Owing to this a better material utilization, lower process forces and better surface quality of parts can be achieved in die forging processes. Characteristics of forge rolling:

- High productivity and high material utilization
- Good surface quality of forge-rolled work pieces
- Extended tool life-time
- Small tools and low tool costs
- Improved mechanical properties due to optimized grain flow compared to exclusively die forged work pieces.

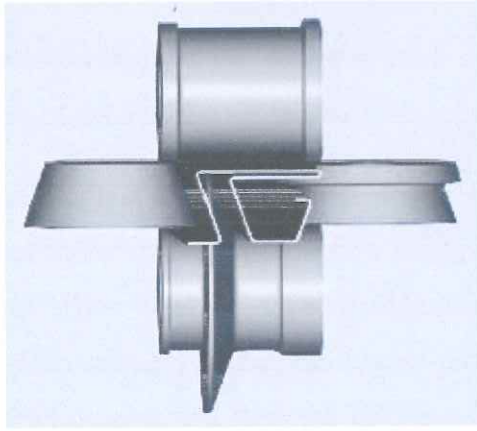

Figure 2.7 - Forge rolling

In a flat metal work piece, the flatness is a descriptive attribute characterizing the extent of the geometric deviation from a reference plane. The deviation from complete flatness is the direct result of the work piece relaxation after hot or cold rolling, due to the internal stress pattern caused by the non-uniform transversal compressive action of the rolls and the uneven geometrical properties of the entry material. The transverse distribution of differential strain/elongation-induced stress with respect to the material's average applied stress is commonly referenced to as shape.

Due to the strict relationship between shape and flatness, these terms can be used in an interchangeable manner. In the case of metal strips and sheets, the flatness reflects the differential fibre elongation across the width of the work piece. This property must be subject to an accurate feedback-based control to guarantee the mach inability of the metal sheets in the final transformation processes. Some technological details about the feedback control of flatness are given in.

iii. Steel

Steel is an alloy of iron and other elements, primarily carbon. Because of its high tensile strength and low cost, it is a major component in buildings, infrastructure, tools, ships, automobiles, machines, appliances, and weapons.

Steel base metal is iron, which is able to take on two crystalline forms (allotropic forms), body centred cubic (BCC) and face centred cubic (FCC), depending on its temperature. It is the interaction of those allotropes with the alloying elements, primarily carbon, that gives steel and cast iron their range of unique properties. In the body-centred cubic arrangement, there is an iron atom in the centre of each cube, and in the face-centred cubic, there is one at the centre of each of the six faces of the cube.

Steel was produced in bloomer furnaces for thousands of years, but its large-scale, industrial use only began after more efficient production methods were devised in the 17th century, with the production of blister steel and then crucible steel. With the invention of the Bessemer process in the mid-19th century, a new era of mass-produced steel began. This was followed by the Siemens-Martin process and then the Gilchrist-Thomas process that refined the quality of steel. With their introductions, mild steel replaced wrought iron.

Figure 2.8 – Heating process of steel

The carbon in typical steel alloys may contribute up to 2.14% of its weight. Varying the amount of carbon and many other alloying elements, as well as controlling their chemical and physical makeup in the final steel (either as solute elements, or as precipitated phases), slows the movement of those dislocations that make pure iron ductile, and thus controls and enhances its qualities. These qualities include such things as the hardness, quenching behaviour, need for annealing, tempering behaviour, yield strength, and tensile strength of the resulting steel. The increase in steel's strength compared to pure iron is only possible by reducing iron's ductility.

iv. Framework

Aluminum is a good conductor of electricity. It is lightweight and strong. Also, a good conductor of heat created. Can be hammered into a sheet, drawn into wire and extruded into bars with a variety of cross sections. It is a good corrosion resistant. Aluminum is used in many ways. Most of it is used in high-voltage cables.

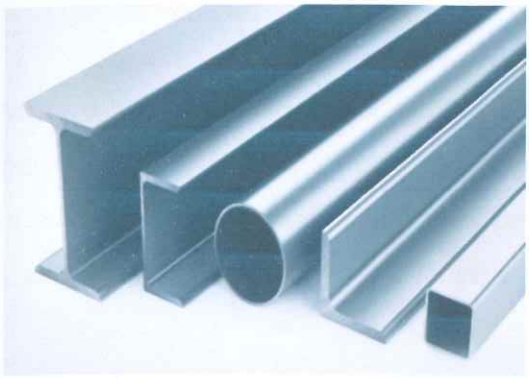

Figure 2.9 - Aluminum

v. Iron Steel

Iron is a natural element which has a silvery sheen in its pure state, is relatively soft, and its symbol is Fe (lat. Ferrum). Due to its chemical reactivity, it can be found mainly in the mineral admixtures with other elements. It is estimated that its share in the Earth's crust is about 6.2%, which ranks it in fourth place, just behind the oxygen (O), silicon (Si) and aluminum (Al). It is good conductor of electricity and heat. It also has ferromagnetic properties, which means that it can take the magnetic properties when exposed to the source of magnetism. Exposed to air and moisture it corrodes easily. Therefor it belongs to the group of basic metals.

Figure 2.10 - Iron

vi. Stainless Steel

Stainless steel metal is a versatile material offering corrosion resistance, strength, good pricing, and a wide range of shapes. Stainless steel is generally formable and wieldable, making it a popular choice in both structural and design applications. There are choices in shapes, finish and specialty alloys, available in cut-to-size lengths.

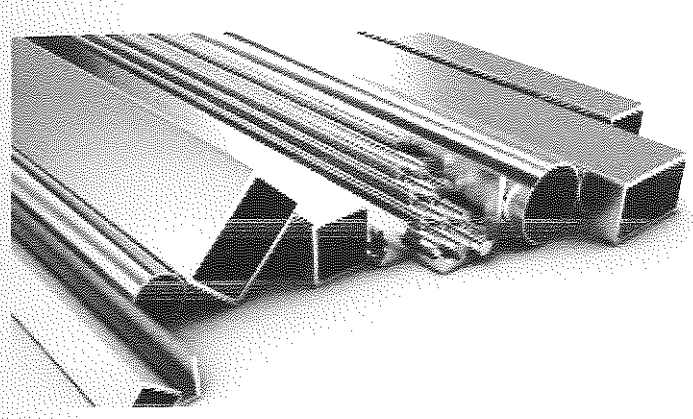

Figure 2.11 - Stainless steel

vii. Moulding

Moulding is the process of manufacturing by shaping liquid or pliable raw material using a rigid frame called a mould or matrix. This it may have been made using a pattern or model of the final object.

A mould or mould is a hollowed-out block that is filled with a liquid or pliable material such as plastic, glass, metal, or ceramic raw material. The liquid hardens or sets inside the mould, adopting its shape. A mould is the counterpart to a cast. The very common bi-valve moulding process uses two moulds, one for each half of the object. Piece-moulding uses a number of different moulds creating a section of complicated object. This is generally only used for larger and more valuable objects.

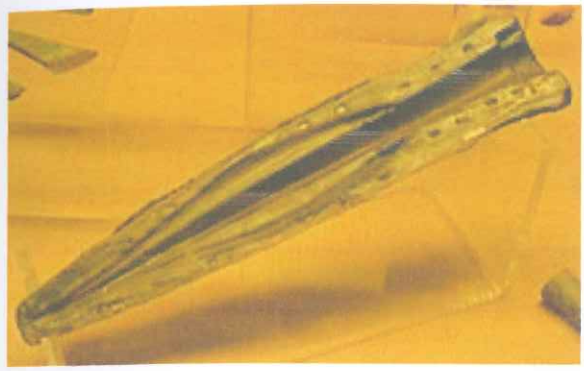

Figure 2.12 - Moulding

The manufacturer who makes moulds is called the mould maker. A release agent is typically used to make removal of the hardened/set substance from the mould easier. Typical uses for moulded plastics include moulded furniture, moulded household goods, moulded cases, and structural materials.

viii. Plastic molding

The underlying concept of plastic moulding is placing liquid polymer into a hollow mould so that the polymer can take its shape, often with various ranges of pressure and heat required. There are different plastic moulding techniques available to accomplish this including rotational moulding, injection moulding, blow moulding, and compression moulding to name just a few. Each technique has its benefits and is best suited for the creation of specific items.

Figure 2.13 – Plastic moulding

ix. Injection moulding

Injection moulding BrE or Injection moulding AmE, is a manufacturing process for producing parts by injecting material into a mould. Injection moulding can be performed with a host of materials mainly including metals, (for which the process is called die-casting), glasses, elastomers, confections, and most commonly thermoplastic and thermosetting polymers. Material for the part is fed into a heated barrel, mixed, and forced into a mould cavity, where it cools and hardens to the configuration of the cavity. After a product is designed, usually by an industrial designer or an engineer, moulds are made by a mould-maker (or toolmaker) from metal, usually either steel or aluminium, and precision-machined to form the features of the desired part. Injection moulding is widely used for manufacturing a variety of parts, from the smallest components to entire body panels of cars. Advances in 3D printing technology, using photopolymers which do not melt during the injection moulding of some lower temperature thermoplastics, can be used for some simple injection moulds.

Figure 2.14 - Injection moulding

Injection moulding is used to create many things such as wire spools, packaging, bottle caps, automotive parts and components, pocket combs, some musical instruments (and parts of them), one-piece chairs and small tables, storage containers, mechanical parts (including gears), and most other plastic products available today. Injection moulding is the most common modern method of manufacturing plastic parts; it is ideal for producing high volumes of the same object.

x. Wire

A wire is a single, usually cylindrical, flexible strand or rod of metal. Wires are used to bear mechanical loads or electricity and telecommunications signals. Wire is commonly formed by drawing the metal through a hole in a die or draw plate. Wire gauges come in various standard sizes, as expressed in terms of a gauge number. The term wire is also used more loosely to refer to a bundle of such strands, as in "multistranded wire", which is more correctly termed a wire rope in mechanics, or a cable in electricity.

Wire comes in solid core, stranded, or braided forms. Although usually circular in cross-section, wire can be made in square, hexagonal, flattened rectangular or other cross-sections, either for decorative purposes, or for technical purposes such as high-efficiency voice coils in loudspeakers. Edge-wound coil springs, such as the Slinky toy, are made of special flattened wire. Wire is usually drawn of cylindrical form; but it may be made of any desired section by varying the outline of the holes in the draw-plate through which it is passed in the process of manufacture. The draw-plate or die is a piece of hard cast-iron or hard steel, or for fine work it may be a diamond or a ruby. The object of utilising precious

stones is to enable the dies to be used for a considerable period without losing their size, and so producing wire of incorrect diameter. Diamond dies must be rebooted when they have lost their original diameter of hole, but metal dies are brought down to size again by hammering up the hole and then drifting it out to correct diameter with a punch.

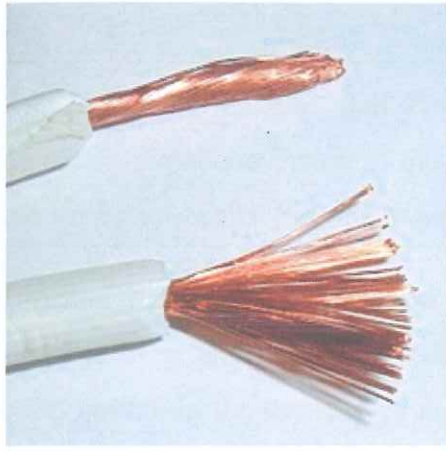

Figure 2.15 - Wires

Wire was drawn in England from the medieval period. The wire was used to make wool cards and pins, manufactured goods whose import was prohibited by Edward IV in 1463. The first wire mill in Great Britain was established at Tin tern in about 1568 by the founders of the Company of Mineral and Battery Works, who had a monopoly on this. Apart from their second wire mill at nearby there were no other wire mills before the second half of the 17th century. Despite the existence of mills, the drawing of wire down to fine sizes continued to be done manually.

2.3 COMPONENTS

i. Motor

- Electric motor

An electric motor is an electrical machine that converts electrical energy into mechanical energy. The reverse of this is the conversion of mechanical energy into electrical energy and is done by an electric generator, which has much in common with a motor.

Most electric motors operate through the interaction between an electric motor's magnetic field and winding currents to generate force. In certain applications, such as in regenerative braking with traction motors in the transportation industry, electric motors can also be used in reverse as generators to convert mechanical energy into electric power.

Found in applications as diverse as industrial fans, blowers and pumps, machine tools, household appliances, power tools, and disk drives, electric motors can be powered by direct current (DC) sources, such as from batteries, motor vehicles or rectifiers, or by alternating current (AC) sources, such as from the power grid, inverters or generators. Small motors may be found in electric watches. General-purpose motors with highly standardized dimensions and characteristics provide convenient mechanical power for industrial use. The largest of electric motors are used for ship propulsion, pipeline compression and pumped-storage applications with ratings reaching 100 megawatts. Electric motors may be classified by electric power source type, internal construction, application, type of motion output, and so on.