Fabrication of the Portrait of Osagyefo Dr Kwame Nkrumah using Aluminium Welding, Chasing and Repoussé Techniques

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BY

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This thesis submitted to the Department of Industrial Art, Kwame Nkrumah University of Science and Technology, in partial fulfilment of the requirements for the degree of

MASTER OF FINE ART

(JEWELLERY AND METALSMITHING)

Faculty of Art, College of Art and Built Environment

July, 2016

DECLARATION

I hereby declare that this submission is my own work towards the M.F.A and that, to the best of my knowledge it contains no materials previously published by any other person nor material which has been accepted for the award of any degree of the University, except where a due acknowledgement has been made in the text.

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ABSTRACT

Aluminium welding is not usually practised by artists in the fabrication of photorealistic portraits. The commonest technique that is used by artists in Ghana is the clay and cement model which can further be used to create a cast resin or metal. The researcher investigated the most used material and technique for creating realistic busts. The pros and cons of materials and technique was analysed in comparison to aluminium forming and welding.

The penultimate aim of this exercise was the production of a portrait of Ghana's first president and freedom activist Osagyefo Dr Kwame Nkrumah. This portrait was made entirely of shaped and formed aluminium, joined by using the aluminium welding technique. The whole metal bust was formed by embossing, chasing and repoussé. The study discovered the usefulness of laser cutting machine and the urgent need for such equipment at the Metals Section for cutting intricate designs and large scale designs which cannot be cut using the jewellers' saw frame. The successful execution of this project, has established the fact that aluminium welding technique can also be used to produce representation of a figure aside the usual materials such as clay and cement used by local artist.

ACKNOWLEDGEMENT

Glory be to the Almighty God who has given me life, wisdom, knowledge and understanding which empowered me to succeed in executing this project. I thank Him for his steadfast love that never ceases.

I am forever grateful to my supervisor, Mr Isaac K. Agyei whose directions, contributions and support made this project a success. I express my warmest gratitude to my late mother

Felicia Acheampong and also my wife Mrs Akua Pomaa Oteng for her motivation and support which enabled me to complete this project. I would also like to extend my deepest gratitude to Dr Mrs P. A. Fening and Mr Charles Adu-Boachie for their infallible wisdom and advice.

I also want to thank Mr K. K. Yeboah for his profound contributions and support, Mr S. K. D. Ofori, Mr Emmanuel Essel, Mr A. N. Armah, Mr Ofori A. Amankwa, Mr. Livingston Amoako and Mr Cyrus Y. Amoah for their diverse help. I deeply appreciate the help of Mr Cyril E. Adala, Mr Samuel B. Kissi and the staff and students of the Metal Product Design Section, Department of Industrial Art.

I cannot end without acknowledging Mr Mohammed Shaibu for his pervading contributions and help. To all those who supported me in different ways, I say a big _Thank you‘ to them all and may the Almighty God bless them beyond measure. Amen.

TABLE OF CONTENTS

KNUST

TABLE OF FIGURES

KNUST

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Koerner (1993), states that portraiture or portrait making can either be a private or public art. This utterly depends on its purpose which can be either funerary or monumental. In antiquated Mediterranean developments, similar to those of Egypt, Greece and Rome, and Byzantium, likeness was principally an open artistic expression or a sort of funerary workmanship for divine beings, Emperors, Kings, and Popes. Portraits were executed as model in bronze, marble or other stone, or as board sketches or painting frescoes. Although private works of art - regularly for imperial families - were authorised amid the Sumerian, Egyptian, and Greek time, most old portraits were open craftsmanship, intended to improve open zones and mirror the ethics and religious estimations of the day.

However, the enthusiasm of picture is not simply verifiable; it is likewise ethnographical. The figures of Assyria and Babylon, of Susa and Persepolis, record racial attributes, and empower us to follow the source, and now and again to track the movements, of people groups and tribes. Funerary landmarks and picture busts were the most well-known ways in which individuals were recognised in sculpture. Once in a while the two were consolidated: a bust was put on a funerary landmark, or a duplicate of a bust on a congregation landmark was shown in the family house. Presently, artist produce these portraits to commemorate distinguished figures such the first president of Ghana Osagyefo Dr Kwame Nkrumah, persons of the Big Six etc. others now produce busts for decorative purposes.

Artists in Ghana who produce sculptural busts or portraits are mostly limited to materials such as clay, P.O.P., cement and metal cast. These materials may have defects and are also affected by environmental conditions over time.

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1.2 Statement of the Problem

Picture in artistic work can be sculpture, painting or any type of photography and additionally other representation of a man, in which the face is the principal or essential core interest. As a rule, a photograph is particularly made with a specific end goal to depict the character and unique qualities of the subject. Sculptural portrait is an entrancing masterpiece which speaks to the resemblance of the individual or figure.

Welders in Ghana are constrained in term of what they can create. They mostly produce iron gates, burglar-proof and security locks. There is the need to diversify their scope of work to produce portraits and thereby broaden the spectrum of processes and allow for experimentation and diversification.

In furtherance of this diversification, the researcher aims at producing a portrait that will last a lifetime using aluminium and the aluminium welding technique.

1.3 Objectives

1. To assess available portrait-making techniques such as modelling and casting in comparison to welding.
2. To experiment and explore the welding technique in conjunction with forming

realistic portraiture.

3. To design and fabricate Osagyefo Dr Kwame Nkrumah's bust using aluminium welding technique.

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1.4 Research questions

1. Can aluminium welding technique be combined with metal forming techniques in the creation of portraits?
2. To what extent can welding and metal forming techniques be combined to produce a realistic portrait of Osagyefo Dr Kwame Nkrumah?

1.5 Importance of the study

1. The study will introduce a new approach into portraiture which can also serve as an alternative for metal artists in the field of portraiture. The welding technique will be employed in the fabrication of the portrait of Osagyefo Dr Kwame Nkrumah by building on or joining pieces of metal sheet which will be welded section by section to form the complete in-the-round form.

1.6 Research Methodology

The research methods that were employed in the research are descriptive research and studio-based research. The descriptive research has to do with the documentation of the research processes and experiments whereas studio-based aspect had to do with the fabrication of the project.

1.7 Delimitation

This study is limited to only aluminium as material and the aluminium welding technique in fabricating the portrait of Osagyefo Dr Kwame Nkrumah.

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1.8 Limitation

There were some difficulties and limitations which militated against the progress of work. It was very difficult getting a realistic clay model of Osagyefo Dr Kwame Nkrumah due to the researcher‘s inexperience in the field of clay modelling. However, the researcher sought help from the sculpture section of KNUST, Painting and Sculpture Department. A model and a mould were created before the actual fabrication and this necessitated the spending of time and money.

The cutting of some of the shapes of the bust components was difficult due to their sizes and intricacy. The guillotine and the jewellers‘ saw frame were not able to cut these shapes with ease. The use of these traditional tools and equipment did not facilitate the effective cutting of the parts making it very difficult and time consuming as compared to a laser metal cutting machine which can cut shapes in metal within seconds if such equipment were available.

The acetylene generator which the section had was old and out of use for so many years. The researcher had to go to Kumasi Magazine, Suame, to have it repaired from time to time during the welding exercise.

1.9 Definition of Terms

Repoussé: A metalworking method in which a pliant metal is ornamented or formed by pounding from the converse side to make an outline in low relief.

Chasing: Chasing is the inverse procedure to repoussé. Metalwork procedure used to characterize or refine the types of a surface outline and to convey them to the relief required.

Model: Physical duplicate of an item.

Mould: empty structure or grid for giving a specific shape to something in a molten or plastic state.

Portrait: A painting, drawing, photograph, or engraving of a person, especially one depicting only the face or head and shoulders.

1.10 Organization of the Rest of the Text

The following is how the rest of the text was organized.

- Chapter Two: this chapter constitutes a thorough review of selected related literature on welding techniques, portrait making techniques and material used in portrait making.
- Chapter Three: this chapter contains the materials and methods that were employed in the execution of the project. It also gives a step-by-step account of the materials that were used in the project as well as exploring the welding technique.

- Chapter Four: entails the discussion of results and appreciation.
- Chapter Five: concludes with the summary of findings and recommendations.

CHAPTER TWO

REVIEW OF SELECTED RELATED LITERATURE

2.0 Overview

The review of selected related literature was conducted under the following topics:

- Sculpture
- Portrait
- Bust
- Welding
- Aluminium welding technique
- Mosaic
- Osagyefo Dr Kwame Nkrumah

2.1 Sculpture

According to Visual-arts-cork.com, sculpture can be defined as the Art of creating three (3) or two (2) dimensional forms which can either be In-the round or relief with a wide range of materials such as stone, wood, clay, wax etc. It involves the process of casting, modelling, carving, construction and assemblage. However, in some books, sculpture is defined as the art of making forms or ornamenting surfaces by carving stones or wood, by modelling in clay etc. The term sculpture originated from the Latin word **"SCULPTURA"**

which means to cut or to remove of stone. It is as of now utilised in a more extensive and a more comprehensive sense to include the plenitude of materials and techniques. The work of a sculptor comprises volumes or masses, planes, contours, light and dark areas and textures. Sculpture can be described basically as the shaping of a media into three (3) or two (2) dimensional form by the method of modelling, carving, casting, assemblage or construction.

Spilsbury and Spilsbury (2008), define sculpture as simply a work of art. It is mostly identified as a solid shape, not flat like a painting. Sculptures can be either huge or tiny. They are often composed of strong materials, such as metal, stone or wood. They are however not limited to these materials but they can be made from a broad range of materials.

Konopka (2003), states that, sculpture can consistently be considered as the most customary and the most innovatory of the visual expressions. It is among the most seasoned and most focused types of representation of workmanship. In the present day period, that branch of compelling artwork which is related to the generation of figures that can be in the round or in relief, either via cutting, by developing some plastic substance, or by building a mould with the end goal of metal throwing. Casting is referred to as sculpture. Basically, a model is a masterful medium which is considered a means by which the craftsman conveys what needs be both candidly and mentally to onlookers, initially, it is the workmanship or procedure of cutting or imprinting a hard material in order to create designs, or figures either in relief, in intaglio, or in the round.

Konopka continues that, historically, sculpture has been characterised against, and earnestly contrary to, painting, generally in light of the fact that sculpture breaks the impediment of the canvas and grasps the conceivable outcomes of the third dimension. Sculpture according to him, is to be recognized from painting as the plastic workmanship that offers inclination to the material sensations as against visual sensations, and as a fine art that, gives fulfilment in the touching and treatment of objects, that to be sure, is the main path in which we can have direct vibe of the three-dimensional space of an item. Characteristic for figures three-dimensionality is mass and volume which are both realities of structure that cannot be caught in painting. Sculpture does not extend a virtual space, opening a window into tremendousness as a scene painting does; it consumes up room, moves and involves a site, obtruding on it or evolving it. Basically, design just possesses genuine, substantial space. Truth be told, it is conceivable to consider a model as the masterful exemplification of space. We would need to figure out how to perceive that things themselves are places and do not simply have a place with a spot, and that model is in this way the epitome of spots.

According to Rogers (2016), sculpture is a creative structure in which either hard or plastic materials are processed into three-dimensional art objects. The designs of the figure might be displayed in unattached objects, in reliefs on surfaces, or in situations running from tableaux to settings that wrap the onlooker. An awesome assortment of media might be utilised, including wood, dirt, elastic, stone, fabric, glass, metal, mortar, wax, and at times irregular "discovered" items. These materials might be sewn, cut, gathered, demonstrated, welded, cast, fashioned, formed, or generally moulded and consolidated.

2.1.1 Forms of Sculpture

The forms of sculpture revolves round compositions of solids, textures and contours to represent three-dimensionality. Materials for sculpture production come in two categories:

Hard and relatively permanent materials

They are either carved directly or beaten into final form. Examples: stone, wood, metal, Ivory, Bone calabashes etc. (Boateng, n.d.)

Soft and malleable material

There are transitory materials that may be easily altered, shaped or destroyed. Examples; clay, (plastic earth) cement, papier mache, plasticine, wax etc (Rogers, 2016).

Sculpture is however categorised into relief and in the round.

2.1.2 Relief

Tolles (2006), states that, relief figures alludes to model that ventures in varying degrees from a two-dimensional foundation. Relief sculpture has a recognized history going back more than 20,000 years in Eastern and Western societies. Alto-relievo which is additionally termed as high relief approaches three dimensions while bas-relief, which is likewise termed as low relief, now and again is more unified to two-dimensional representation. A portion of the finest case of relief model, 'the Parthenon frieze for the Athenian Akropolis (449–432 B.C.) or Lorenzo Ghiberti's Gates of Paradise (1426–52 B.C.) for the Baptistery of Florence', were done together with building programs. Europe and America were the regions where the figure was polished in the nineteenth-century.

The relief was done to fill the need of funerary markers furthermore as auxiliary boards on the bases of outside memorial figures. These models were typically done on community structures. Reliefs were particularly considered as a free fine art. Craftsmen once in a while execute reliefs on a residential scale for private supporters. Help pictures and perfect subjects (drawn from mythology, the Bible, writing, or history) were considered as alluring options set up of in-the-round models or statues.

Tolles continues that, relief figure was initially acquainted with the United States by Italian stone carvers taking a shot at the enhancement of national government structures amid the principal quarter of the nineteenth century. Presentation to this fine art kept amid the following quite a few years as American stone workers showed up in Italy, a text style of masterful convention and the essential wellspring of reasonable marble and work. Thomas Crawford, William Henry Rinehart, Edward Sheffield Bartholomew, and other American craftsmen manufactured their notorieties by creating glorified in-theround statues for worldwide customers while executing portrait busts for unfaltering wage. These specialists displayed reliefs less as often as possible, concentrating mostly on perfect subjects. Traditional past was not by any means the only motivation whereupon they manufactured their craft. Additionally to Neoclassical stone workers, particularly Antonio Canova and Bertel Thorvaldsen, whose freshly treated reliefs delighted in extraordinary regard in both Europe and the United States sculptural works as shown in (Fig. 2.2).

Fig. 2.1: Relief sculpture

Roman sarcophagus relief depicting one of the Labours of Hercules, marble, mid-2nd century ce; in the Honolulu Academy of Arts.

Source: http://www.britannica.com/art/relief-sculpture

2.1.2.1 Types of Relief

According to Cutler (2015), "Relief" simply means a sculpture is on a flat surface and not "in the round." It is impossible to walk around a relief because it doesn't have a back.

Cutler categorizes relief as high relief and low relief and further explains it as follows;

High relief

The high relief implies that the structures are cut in a deeper manner and elements in the composition are able to cast solid shadows.

Low relief

Low relief is smoother, compliment and shows less complexity of lit and shadowed areas relating to the design being modelled or carved.

Cutler continues to elaborate that in relief sculpture, regions of high relief have a tendency to be in the frontal area where the imperative subtle elements are. Areas of low relief are out of sight where points of interest would not be as fresh or clear. Relief figure according to him can be cut (stone or wood) or displayed (earth and cast bronze).

In-The-Round

According to Sporre (2013), "Full-round sculptural works investigate full threedimensionality and are expected to be seen from any edge." When making a detached model, stone carvers need to consider a wide range of elements. An example is that while making a three dimensional full-round model, the craftsman must consider where to adjust the mass so that the figure does not tip over. He puts it this way: "Detached and three-dimensional model powers stone carvers to worry about the items of common sense of designing and gravity. They can't, for instance, make a work with incredible mass at the top unless they can figure out how to keep the statue from falling over." A typical of in-the-round sculptures is the statue of liberty as shown in (Fig. 2.3).

Fig. 2.2: Statue of liberty

Source: https://en.wikipedia.org/wiki/Statue_of_Liberty#/media/File:Statue_of_Liberty_7.jpg

2.1.3 Methods of Sculpture

Modelling

According to Hanson (2009), modelling implies the working up of delicate material to into a figure. Clay and wax are well known modelling materials. A stone carver persistently removes bits of material to make the essential structure of a carving. Utilizing bare hands or devices, the stone worker then shapes the material until the model is done.

Carving

Hanson explains carving as the process of removing material to make a figure. The stone carver starts with a strong block of hard material. He or she utilizes tools to remove odds and ends until the sought structure is accomplished. Stone and wood are regular carved materials.

Casting

Hanson again opines that casting is the technique for shaping fluid materials into strong figures. Liquid or molten metal, cement and mortar are materials usually utilised for casting. To start with, the craftsman makes a mould of the figure. The craftsman then empties the liquid into the mould empties the liquid into the mould. The liquid fills the mould and occupies of the empty space. It is allowed to cool and turn into a solid. The mould is then removed to uncover the figure.

Assemblage / Construction

Esaak (2014), has this to say with regards to assemblage and development in craftsmanship. "Assemblage" is generally described by him as a type of art work which involves the arrangement of predominantly "discovered" articles that are organized in a deliberate to compose an art manner piece. These articles range from anything that is natural to man-made. Some of such items are scraps of wood, old shoes, stones, prepared bean jars and even a disposed of child buggy or any of the other articles that can likewise meet all requirements for incorporation in an assemblage. These items are picked in light of what gets the artist / craftsman's attention, and is fit and proper in the arrangement in order to make an assembled entirety. He further explains that, the vital thing to think about that when that gathering is not quite the same as for montage which is "assumed" to be two-dimensional, and it is regularly aimed at three-dimensionality (even though both are comparably mixed in nature and composition). Be that as it may, there is a truly almost negligible difference between a massive, multi-layered collage and an assemblage done in shallow relief. In this extensive, grey area amongst assemblage-and collage, the most

secure course is to believe the artist. An example of the sculpture depicting construction and assemblage as shown in (Fig. 2.4).

Fig. 2.3: Construction and Assemblage

Source: http://mail.visitmendocino.com/?q=assemblage-construction-piece-art-exhibit

2.1.3.1 Methods of modelling

1. Building by coils – A method of modelling in clay is building by coils. Clay is prepared and kneaded as well as rolled on a flat board in order to create round thin strips. This round strips are coiled and arranged bit by bit until the desired height or design is acquired. This leaves the work hollow with the advantage is not scooping. Which means the whole work would be built using the coils hence avoiding the scooping process.

2. Solid – The solid method is done by building a thick clay structure which conforms to the intended design. When the clay is leather hard, the solid clay is cut into pieces and scooping is done. After scooping the pieces are joined with the help of slip. This is done in order to facilitate even shrinkage and also to make the work light weight.

3. Slab method – the clay is rolled into slab and used in building the form. This method is also devoid of the scooping process since the work was also built using the slabs of clay.

The slab method involves designs which is made up of flat surfaces and forms.

2.1.4 Modelling Materials

Clay, Cement, Papier mache, Sawdust, Wax, Plaster of Paris, Plasticine etc

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Clay

According to the Oxford English Dictionary, clay is a fine-grained rock which is normally crushed and pulverized in order to make it plastic and leather hard by drying or applying heat by the process of firing. Clay is considered as an end product of weathering of rocks. It is normally from a kind of rock called feldspar, silica and Alumina. In other words it is composed of Alumina and silica in water.

Jakab (2006), attests that clay is a kind of mud that can be manipulated when in the wet state. Clay is composed from the smallest grains of mineral from worn rocks. The crystals in clay give it the ability to be able to hold water. Plastic clay is said to be very moist, which means it can be easily manipulated. When subjected to high temperatures, clay tends to become hard and impermeable. The main types of useful clays are formed from the mineral aluminium silicate and is called kaolinites. Terracotta, adobe, and china clay are many different types of kaolinite clay used by artists in sculpting. Clay varies from white, grey, red, yellow, blue, or black depending on the composition of minerals in it.

Each type of clay is attributed to different characteristics.

2.2 Portrait

Gilbert (2011) defines a portrait as a photo of a man or a portrayal of the outward reality of the individual. It is not restricted to any media in this way it could be a photo, a model, a portrayal, yet a picture is far beyond that since the idea behind it knows no limit. GershNesic (2014) concurs that portraits are masterpieces that portray the representation of people or creatures that are living or dead. An after death representation which is a picture rendered after the demise of the subject can be accomplished by either imitating another representation or taking after directions of the individual who commissions the work. More often than not, a representation records the subject's components. Picture is a term that may basically be defined as a vertically situated rectangle, generally on a level plane it might be said to be arranged in the landscape order (Gersh-Nesic, 2014).

2.2.1 Bust Portrait

Robb (2008) characterises a representation bust as "a sculpted similarity in which the head and upper part of the body are detached". While "resemblance" can allude to different understandings, the reducing of the lower body, its sudden extraction, is the most essential element of the portrait bust. He further elaborated on the representation bust as a sculptural configuration by delineating in wide terms its move since Roman times. The possibility of portrait bust has its roots from a solid relationship with the possibility of individual subjectivity and Neo-Classical sentimentality. The idea of portrait bust spins round what Malcolm Baker alludes to as the "classicising" bust: which fundamentally depicts the bust as a complex component got from Classical model. The bust nature or shape is generally connected with Roman development, which surfaced amid the principal century BC6.

While got from an assortment of sources, including Greek representation mould, the bust thought changed emotional alluding to the body as a strong presentation of the Roman thought of essential character. The Greeks considered the full figure as the perfect structure for representation and utilised the body as a key method for passing on their implication in their way to deal with sculptural portraits. This mirrored the romanticised way of the Greek idea of character. This is fundamentally the one in which the head and body were considered as a resolute part of the creation of the portrait bust. Old Greeks, personality was viewed as destined, the individual's part was dictated by the heavenly level-headed request. In antiquated Greece, the part was constantly optional to the entire as investigated. He further states that "it is absurd to expect us to represent the beauty of the eye in a way which does not make it look like an eye at all, and the same is true of other parts of the body; you should look like an eye at all, the same is true of other parts of the body; you should look rather to see whether we have the whole beautiful by giving each part its due". The old Greeks additionally made the remembrance of an individual a "virtue" that couldn't just be shown by a full figure model. The significance of building up solidarity over all regions of human movement required that character be seen as a natural entirety. In portrait making the fulfilment of the figure was basic to its capacity as either dedicatory or tasteful.

Robb (2008) opined that, the facial attributes of a person identifies each individual as what the Romans strongly believes in. The head is considered by the Romans as a site of individual refinement, this takes into account the bust area to remain set up for the entire body. The head serve as the synecdoche of the figure, numerous specialists bothered the naturalism and subjectivity that came to overpower the late Hellenistic art. The poor treatment given to portraiture resemblance have impact of portraying reality on the object. It is likewise realised that the picture bust just happens in Greek times under Roman impact

tends to markdown the impact of Greek point of reference. Be that as it may, it is huge that the truncated type of the bust develops in parallel to the possibility of an individualized subject isolated from the world that encompasses him. The picture bust is an agent of the general thought of objectivity, the new theory that originate from this movement in balanced quality.

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2.2.1.1 Forms of portrait

Most of the portraits in the round had originally one of three forms:

(1) Portrait statues, either carved in one piece or with the head carved in a separate piece and set into the torso;

(2) Herms

(3) Busts

A fourth possibility, that of reclining figures on the lids of sarcophagi, cannot be ruled out, though there is no evidence to suggest specifically that any of our heads comes from such a figure. In Roman times the majority of full-length statues had the heads carved separately from the bodies.

A poorer grade of marble could be used for the perfunctorily carved draped torso; only the head demanded a more expensive material.

2.3 History of portrait sculpture

Roman portraiture which has been gathered in The Metropolitan Museum of Art encompasses the full extent of the subject, from the season of the Roman Republic to the rule of Constantine the Great. The gathering of Roman portraits includes an assortment of media, in particular figure and coins, not overlooking jewels, glass, and painting. The assorted qualities of material traverse the different purposes, both open and private, for which the Romans romanticised their representations on. Roman likeness is additionally particular when contrasted with that of other old societies because of the amount of existing illustrations (Gersh-Nesic, 2014).

Gersh-Nesic (2014) explaines that with the utilisations and re-employments of private picture figure was most firmly joined by funerary occasions. Works of art, for example, funerary sacrificial tables and tomb structures were beautified with representation reliefs of the dead individual alongside brief references taking note of their family or benefactors, and picture busts related cinerary urns that were kept in the specialties of vast, public tombs which were termed as columbaria. The funerary thought for representation model was built up in the custom of the showcase of wax envisions, which were wax picture veils, in burial service functions of the popular and famous to commend their recognized family. These veils, representations of well-known predecessors who had held prestigious office, were gladly kept in the family lararium, or family hallowed place, alongside picture busts which were made of bronze, marble, or terracotta. In showing these representations so noticeably in general society circle, highborn families could praise their history of open administration while remembering their relatives.

Open model in the Republic included representation statues of political authorities or military rulers which were raised by the request of their companions in the Senate a dedicatory engraving, which was alluded to as a cursus honorum, itemized the subject's distinctions and life accomplishments, and also his ancestry and outstanding progenitors.

The representation figures were regularly raised to respect a prestigious military accomplishment, typically identified with an official triumph, or to commend some renowned political accomplishment (Gersh-Nesic, 2014).

The express specify of the subject's family history mirrors the considerable impact that family history had on a Roman's political vocation. The Romans trusted that family was the best marker of a man's capacity, thus if by chance that you were the relative of awesome military administrators, then you, as well, could be one also. The exceptional political contention of the late Republican time frame gave extraordinary intending to the presentation of one's heredity and in this manner required its accentuation, showed in such conventions as the cursus, wax envisions, and funerary parades, as a crucial component for achievement (Gersh-Nesic, 2014).

The presentation of the principate framework under Augustus, which was the majestic family, its circle soon came to advantaged official open models. The official royal picture sorts were authoritatively shown in sebasteia, which were sanctuaries, of the majestic faction, and were carefully intended to pass on particular ideas about the ruler and in addition his family and his position. Two of the most powerful, and extensively spread, media for royal pictures were coins and model. Numerous researchers trust that official

picture sorts were initially made in the capital city of Rome and spread endlessly to the regions to serve as tests for nearby laborers, which could direct them to take after neighborhood admired conventions. Coins regularly are effortlessly spread and immediately scattered, achieving various nationals and occupants, and along these lines the head's picture borne on the coins could be seen and his power recognised by individuals the whole way across the unfathomable realm.

Also, in the case of the "terrible" rulers particularly Nero and Domitian, whose rules were portrayed by catastrophic event and who after they were dead were censured by the Senate. The magnificent pictures were generally reused or even destroyed relying upon the thought of the deceased. Damnatio memoriae, a cutting edge term for the most serious reprobation, incorporated the deletion of an individual's name from open references, and even strike on their representations as though brought against the subject himself. The majority of the royal pictures of "terrible" rule were likewise expelled from general visibility, regularly later removed and utilized into making different representations of private people or heads of the next decades who considered as "great". Pictures that were generally simple to perceive were those that had been modified on the grounds that specific elements, for example, an ununiformed hairline or uncommonly smoothed ears are regular signs that a bust had been changed from an initial highlight of the underlying figure (Gersh-Nesic, 2014).

2.4 Statuary & Portrait Sculpture

The Romans and in addition the Greeks wanted to show their divine beings in models or statues. The Roman rulers started to claim godlikeness then so they excessively turned into

the subject of regularly titanic and romanticised statues, for the most part depicted with an arm raised to the masses and striking an appropriately legitimate position as in the Augustus of the Prima Porta. Statues could likewise be utilized for beautifying purposes as a part of the home or garden and they could be scaled down, particularly in valuable metals, for example, silver. One kind of such statues which were unconventional to the Romans was the Lares Familiares. These were normally in bronze and spoke to the spirits which secured the home. They were normally shown in sets in a corner inside the house and are energetic figures with arms raised and long hair who commonly wear a tunic. (Gersh-Nesic, 2014)

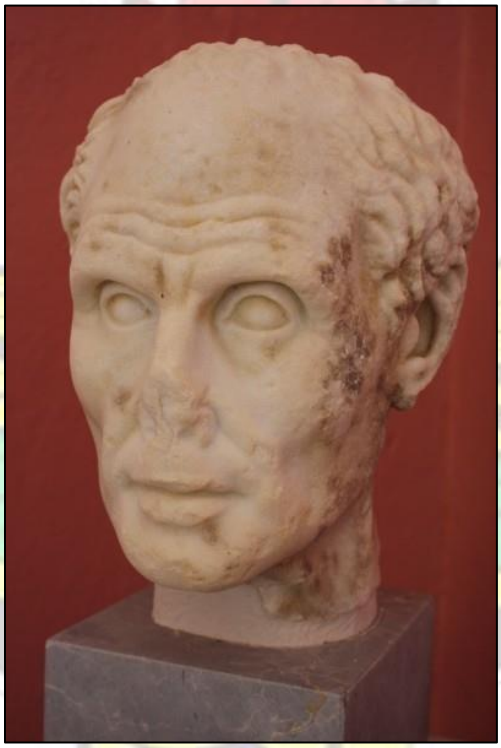

Fig. 2.4: Roman Portrait Bust

(Gersh-Nesic, 2014)

More so, it is in the exceptional range of picture that Roman figure truly comes to separate itself from other creative ideas and customs. The custom of keeping wax burial service veils, was what educated the authenticity in Roman representation model, of perished

relatives in the familial home which were worn by the particular grievers at funerals. These were regularly fastidious delineations where even the deformities have been diminished and the physical attributes or parts of a specific face were recorded. Exchanged to stone, we then have numerous case of private picture busts which move far from the romanticised representations of before figure and present the subject as old, wrinkled, scarred or overweight; to put it plainly, these pictures come clean. (Gersh-

Nesic, 2014)

By and by, for authority pictures of the decision first class, as opposed to lower class subjects, the subject kept on being admired, for instance, the statue of Augustus as Pontifex Maximus has the head looking significantly more energetic and new confronted than he really was at the season of chiselling (end of the first century BCE). Be that as it may, when of Claudius in the mid first century CE, and considerably all the more so under Nero and the Flavian heads, official likeness every so often took a stab at more authenticity. In the same time frame female representations are additionally prominent for their intricate haircuts and they doubtlessly were prime instigators in style patterns. (Gersh-Nesic, 2014)

Under Hadrian there was a return to idealised images such as in Classical Greek sculpture (e.g. the colossal statue of Antinous, c. 130 CE) but there was an important innovation in terms of a more natural rendering of the eyes in marble works. Previously, pupil and iris had only been painted on to the sculpture but now these also came to be sculpted as had been the case in bronze and terracotta works (Gersh-Nesic, 2014).

Fig. 2.5: The Braschi Antinous

(Gersh-Nesic, 2014)

Authenticity yet again came back with the Antonines, and such components as crow'sfeet and heaviness return. There was additionally right now a pattern for cleaning the skin parts of the marble which then differentiated, specifically, with the hair, which was profoundly cut and left unpolished. Moreover, in this period it got to be elegant to have a complete middle instead of simply the shoulders underneath the head. (It is just plain obvious, for instance, the bust of Commodus as Hercules, c. 190-2 CE in the Capitoline Museum, Rome). The bust of Caracalla (c. 215 CE) in the same exhibition hall is another great case of the relinquishment of vision in first class representation for the sovereign has a firmly edited whiskers, decided turn of the head, taut mouth and mean-looking eyes which plainly deceive his character. By the late Empire first class picture gets to be predictable and surrenders all endeavours at sensibly catching the physical traits of the subject. Representation of sovereigns, for example, Diocletian, Galerius and Constantine

I (see the monster bronze head in the Capitoline Museums), for instance, have barely any discernable physiognomic highlights, maybe trying to affirm the ruler's separation from conventional mortals and nearness to the heavenly (Gersh-Nesic, 2014).

2.5 Mosaic

According to Carinemahy (2011), mosaic is the craft of making pictures with an array of little bits of hued glass, stone, or different materials. The most punctual known case of mosaics made of various materials were found at a sanctuary working in Ubaid, Mesopotamia, and are dated to the second 50% of 3nd thousand years BCE. They comprise of bits of shaded stones, shells and ivory. Unearthing at Susa and Choqa Zanbil show confirmation of the initially coated tiles, dating from around 1500 BCE.

Mosaics of the fourth century BCE are found in the Macedonian royal residence city of Aegae and they enhanced the floors of Hellenistic estates, and Roman homes from Britain to Dura-Europos. Marvelous mosaic floors are found in Roman manors crosswise over North Africa, in spots, for example, Carthage, can at present be found in the broad accumulation in Bardo Museum in Tunis, Tunisia. The most well-known mosaics of the Roman world were made in Africa and in Syria, the two wealthiest regions of the Roman Empire. Numerous Roman mosaics are found in Tunisian galleries, the vast majority of which date from the second to the seventh century CE.

Carinemahy continues to add that the most popular subject for mosaics was mythological scenes, such as the triumphs of Neptune or Dionysos, which are frequently found. The Orpheus myth (with animals) and the muses (Clio, Melpomene, Thalia, Terpsichore, Urania, Euterpe, Calliope, Polyhymnia and Erato), sometimes with the god Apollo, are also often illustrated. Inspiration could also come from daily life, like hunting (often with dogs),

agriculture, fishing, as well as arts and crafts. Amphitheater and circus games were also a much-appreciated subject for mosaics. The four seasons and the sea (fish, the god Oceanos) are also the subject of numerous mosaics. The seasons were illustrated like people, with a characteristical object to identify them. During the Christian period, some subjects of paganism continued to be used, but some new symbols were also employed. There are nearly no biblical scenes found in Roman mosaics.

Waage (2016), opines that mosaic in art, is a decoration of a surface with designs made up of closely set, usually variously coloured, small pieces of material such as stone, mineral, glass, tile, or shell. Unlike inlay, in which the pieces to be applied are set into a surface that has been hollowed out to receive the design, mosaic pieces are applied onto a surface that has been prepared with an adhesive. Mosaic also differs from inlay in the size of its components. Mosaic pieces are anonymous fractions of the design and rarely have the dimensions of pieces for intarsia work (fitted inlay usually of wood), whose function is often the rendering of a whole portion of a figure or pattern. Once disassembled, a mosaic cannot be reassembled on the basis of the form of its individual pieces. Technical insight is the key to both the creation and the appreciation of mosaic, and the technical aspects of the art require special emphasis. There are also significant stylistic, religious, and cultural aspects of mosaic, which have played an important role in Western art and have appeared in other cultures. Although mosaic is an art form that appears in widely separated places and at different times in history, in only one place—Byzantium—and at one time—4th to 14th centuries—did it rise to become the leading pictorial art.

2.6 Welding

The art of fabrication and practices that join things, mostly metallic or thermoplastics substances to produce a bond is termed welding (Muhammad, 2012). Welding is a process by which metals and filler material are introduced to intense heat to cause melting, and solidification upon cooling to create strong hard bonds to produce the weld.

Some selected metal welding procedures are:

1. Shielded metal arc welding, (SMAW) also known as ―stick welding‖, uses an electrode that has flux, the protectant for the puddle, around it. The electrode holder holds the electrode as it slowly melts away. Slag protects the weld puddle from atmospheric contamination (Schnick, M., Fuessel, U., Hertel, M., Haessler, M., Spille-Kohoff, A., & Murphy, A. 2010).
2. Gas tungsten arc welding, (GTAW) also known as TIG (tungsten, inert gas), uses non-consumable tungsten electrodes to produce the weld. The weld area is protected from atmospheric contamination by the inert gas such as Argon or Helium (Liang & Yuan, 2008).

2.6.1 Types of welding

Welding is done through variety of means on the type of material to be welded.

2.6.1.1 Aluminium welding

Woodworker (2016), has it that utilising a propane light and some aluminium brazing poles is a brisk approach to holding aluminium without utilizing a welder. It makes for an

exceptionally solid bond and with a little practice should be possible rapidly with incredible looking results.

The ESAB Knowledge Centre (2016), opines that Gas Tungsten Art Welding (GTAW) procedure is frequently a reasonable choice for welding aluminium. It was created in 1944 (see fig1), is still broadly used to effectively weld aluminium composites today. A portion of the most noteworthy quality welds utilised as a part of basic applications, for example, full entrance channel welds on cryogenic weight vessels, are solely made with this welding procedure. Substituting current (AC) is utilised for most applications, yet coordinate current (DC) force is utilized for some particular applications. The GTAW procedure was created sooner than the Gas Metal Arc Welding procedure, (GMAW) and for a period, was utilised to weld aluminium of every metal thickness and joint sorts. The

GTAW procedure has subsequently been supplanted by the gas metal arc welding (GMAW) process for some aluminium welding applications, fundamentally as a result of the expanded pace of the GMAW procedure to weld thicker segments. In any case, GTAW still has an essential spot in the aluminium welding industry. GTAW, with substituting current (AC) and immaculate argon protecting gas, is presently frequently used to weld more slender gauges of aluminium (up to ¼ inch) furthermore for applications where feel are generally vital. Rotating current (AC) is the most mainstream strategy for gas tungsten arc welding aluminium. An adjusted wave AC curve gives cleaning activity to most applications and partitions the bend heat about equitably amongst terminal and base material. GTAW power hotspots for AC welding, which take into account modification of the harmony between polarities, empower the client to pick either upgraded circular segment cleaning or more prominent infiltration abilities. For more particular applications,

we can discover GTAW utilised as a part of the immediate current anode negative mode (DCEN). This strategy gives curve centralization of around 80% of the warmth at the base material and around 20% at the anode. This outcomes in moderately profound and tight weld infiltration, and practically nothing, assuming any, huge circular segment cleaning amid the welding operation. Regularly utilised with immaculate helium protecting gas, this strategy for welding is equipped for welding much more noteworthy thicknesses of material (up to 1 crawl) and is frequently utilised as a part of programmed crease welding applications. The third method of GTAW is the immediate current cathode positive (DCEP). With this technique, we have around 20% of the warmth produced at the base plate and 80% at the anode. We make fantastic cleaning activity yet exceptionally shallow entrance. This is presumably the slightest utilized technique for GTAW.

McCabe (2015), affirms that Aluminium is the most troublesome combination to weld. Aluminium oxide ought to be cleaned from the surface before welding. Aluminium comes in warmth treatable and nonheat treatable alloys. Heat treatable aluminium combinations get their quality from a procedure called maturing. Critical diminishing in elasticity can happens when welding aluminium due to over maturing.

2.6.1.2 Arc Welding

According to The Lincoln Electronic Company (2016), arc welding is one of a few combination forms for joining metals. By applying extreme heat, metal at the joint between two sections is dissolved and brought about to intermix - specifically, or all the more generally, with a middle of the road liquid filler metal. After cooling and cementing, a metallurgical bond is made. Since the joining is an intermixture of metals, the last weldment possibly has the same quality properties as the metal of the parts. This is in sharp difference

to non-combination procedures of joining (i.e. patching, brazing and so forth.) in which the mechanical and physical properties of the base materials are not the same as the joint.

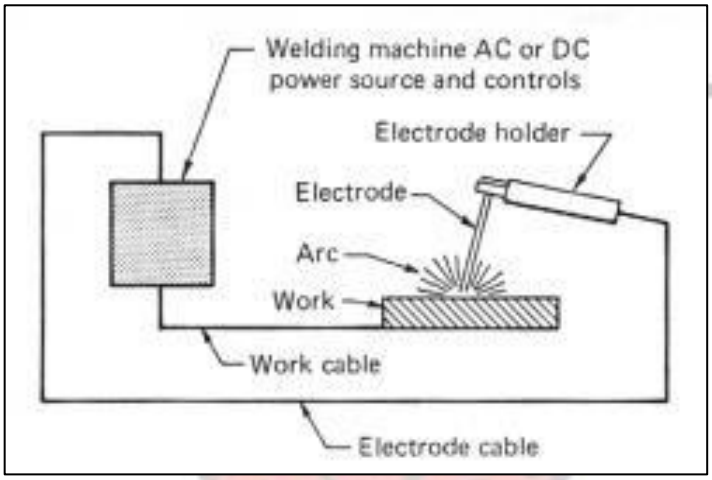

Fig. 2.6: The basic arc-welding circuit

Source: http://www.lincolnelectric.com/en-us/support/process-and-theory/Pages/arcwelding-detail.aspx

In arc welding, the extreme heat expected to melt metal is delivered by an electric arc welding. The circular segment is framed between the real work and an anode (stick or wire) that is manually or mechanically guided along the joint. The anode can either be a rod with the function of essentially conveying the current between the tip and the work. Then again, it might be a uniquely arranged bar or wire that leads the present as well as melts and supplies filler metal to the joint. Most welding in the assembling of steel items utilizes the second sort of terminal. The basic arc-welding circuit is illustrated in Fig. 2.6. An AC or DC power source, fitted with whatever controls may be needed, is connected by a work cable to the work piece and by a "hot" cable to an electrode holder of some type, which makes an electrical contact with the welding electrode. (The Lincoln Electronic Company, 2016)

An arc is made over the hole when the invigorated circuit and the cathode tip touches the work piece and is pulled back, yet still with in close contact. (The Lincoln Electronic Company, 2016)

The arc creates a temperature of around 6500ºF at the tip. This heat melts both the base metal and the cathode, delivering a pool of liquid metal some of the time called a "hole." The hole hardens behind the anode as it is moved along the joint. The outcome is a combination bond. Be that as it may, joining metals requires more than moving a cathode along a joint. Metals at high temperatures have a tendency to respond artificially with components noticeable all around - oxygen and nitrogen. At the point when metal in the liquid pool comes into contact with air, oxides and nitrides structure which obliterate the quality and sturdiness of the weld joint. Subsequently, numerous circular segment welding forms give a few method for covering the curve and the liquid pool with a defensive shield of gas, vapour, or slag. This is called circular segment protecting. This protecting averts or minimizes contact of the liquid metal with air. Protecting additionally may enhance the weld. A case is a granular flux, which really adds deoxidizers to the weld. Covering on a covered (stick) cathode gives a vaporous shield around the bend and a slag covering on the hot weld store. (The Lincoln Electronic Company, 2016)

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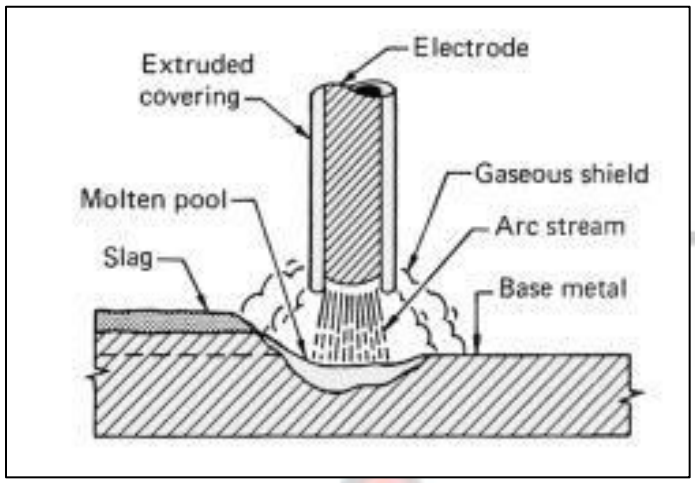

Fig. 2.7: This shows how the coating on a coated (stick) electrode is done

Fig. 2.7 illustrates the shielding of the welding arc and molten pool with a Stick electrode. The extruded covering on the filler metal rod, provides a shielding gas at the point of contact while the slag protects the fresh weld from the air.

2.7 Osagyefo Dr Kwame Nkrumah

According to Daah (2011), Dr Nkrumah's outstanding administration and style and additionally his concern for Africa's unity for future development make him a unique leader of our time. Consider this declaration made by Dr Kwame Nkrumah " It is clear that we must find an African solution to our problems, and that this can only be found in African unity. Divided we are weak; united, Africa could become one of the greatest forces for good in the world". This statement by Dr Nkrumah in the early years of independent Ghana for Africa's unity with his idea for the creation of Union of African

State was not completely accepted around then. Nonetheless, more than 50 years on, African Leaders are currently discussing the same thought about the change of the OAU to AU in 2004. If this prophetic thought by Dr Nkrumah was adhered to at that time, Africa would have been better off than now. Consider the fact that most Africans are poor; however, our continent is potentially extremely rich. Our mineral assets, which are being exploited with foreign investors, range from gold and precious stones to uranium and petroleum. Our forests contain a portion of the finest woods to be grown at anyplace. Our cash crops incorporate cocoa, coffee, rubber, tobacco and cotton. When it comes to power, which is a major factor in any economic development, Africa contains over 40% of the potential water power of the world, as compared with about 10% in Europe and 13% in North America. Yet so far, less than 1% has been developed. This is one of the reasons why we have in Africa the paradox of poverty in the midst of plenty, and scarcity in the midst of abundance..." African unity as proposed by Dr Nkrumah as at that time would have minimised to a significant level this heart breaking statistics. A content analysis of Dr Nkrumah‘s speeches at conferences, meetings and gatherings of organisations, institutions as well as African Leaders are the same speeches being repeated now with the only addition being power point presentations.

The Osagyefo, Dr Kwame Nkrumah created more than 20 books and publications. He has major authority when it comes to Political theories and Practical Pan-Africanism. Dr. Kwame Nkrumah benevolently committed his life to show how future children and girls of Africa ought to set themselves up and endeavour to bring together Africa and bridle its riches for the advantage of all relatives of the mainland. Today, the African continent is

beset with poverty and misery even as it is endowed with abundance of natural, climatic, strategic and human wealth. (Williams, 2016).

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Fig. 2.8: Osagyefo Dr Kwame Nkrumah in a formal attire

Source: https://en.wikipedia.org/wiki/Kwame_Nkrumah#/media/File:Kwame_Nkrumah_(JFKWHP-AR6409-A).jpg

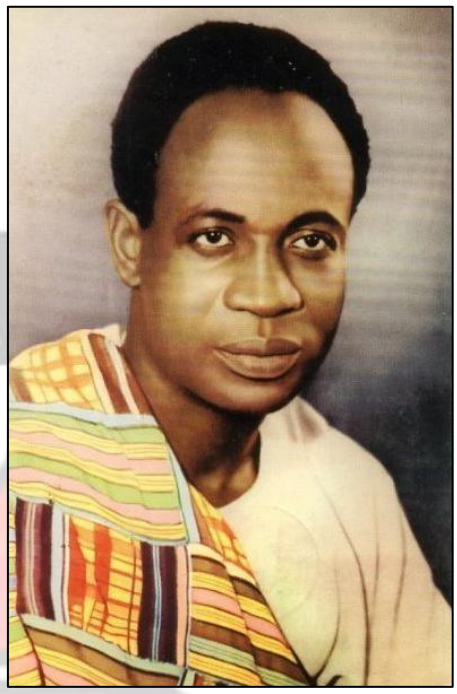

Fig. 2.9: Osagyefo Dr Kwame Nkrumah in a traditional attire

Source: http://m.gbcghana.com/1.7042355

Both photographs show Dr Nkrumah in formal attire. The _left‘ photo shows him in western attire whiles the _right‘ one shows him in a formal Ghanaian attire.

CHAPTER THREE

MATERIALS AND METHODS

3.0 Introduction

This chapter entails the various processes which were employed in the acquisition of data and the documentation of information. The research methods that were used in executing this project were studio-based and descriptive research methods.

3.1 Research

According to Shuttledworth (2016), research can basically be defined as the process of collecting facts, information and data for the purpose of improving knowledge. Research as a whole, whether historical, economic or scientific, somewhat requires more of interpretation and a personal view of the subject matter by the researcher. This view is the main focus or principle that is able to define the form or type of experiment. Observation and description are the bases of research and as such it includes collection of new data from both primary and second-hand sources. It also involves using the existing data for another purpose.

Research is all about employing meticulously addressed methods and scrupulously accurate analysis and also stressing on the development of general concepts, tenets or theories that will indeed aid in comprehending, predicting or controlling data and information pertaining to a subject matter. Research in the field of education is a more disciplined approach to answer questions for the purpose of problem solving. Research is basically the problem-solving activity which aims at testing a hypothesis or addressing a problem. Hypothesis is

said to be derived, tested and either accepted or rejected and compared with established agreement. Hypotheses are also of limited use for the more problem-solving scenarios. This hypothesis approach is best suited for certain methods and problem embedded in experimental methods. The formulation of questions and problems in the research is considered as a more generalisable research approach (Anderson & Arsenault, 2000).

According to Pathak (2008), research is a combination of two words. These are Re + Search. ‗Re' means to do something again and again whereas the ‗Search' means to discover something by finding something out. Research on a very basic level is the procedure by which man analyses an idea over and over and gathers information. The information might be both numerical and of non-numerical nature. On the premise of gathered information, he reaches a few inferences. Truth be told, the craft of experimental examination is known as Research.

3.2 Research design

The research plan alludes to the general system by which one incorporates the diverse segments of the study in a coherent and intelligent way, subsequently, guaranteeing one with successfully addressed issue; it constitutes the measurement for the gathering, estimation, and investigation of information. The explored issues decide the kind of outline one ought to utilize and not the opposite (De Vaus, 2001).

The research design that was suitable for this research project was the qualitative research approach which entails the descriptive and studio-based research methods.

3.2.1 Qualitative research design method

According to Shuttleworth (2016) qualitative research clarifies subjective exploration as a magnificent method for settling results and demonstrating or invalidating a theory. The structure has not changed for a considerable length of time, so is standard crosswise over numerous exploratory fields and teachings. After factual investigation of the outcomes, a far reaching answer is obtained, and the outcomes can be talked about and published. Subjective trials likewise sift through outside components, if appropriately outlined, thus the outcomes picked up can be seen as genuine and fair. Subjective analyses are helpful for testing the outcomes picked up by a progression of subjective trials, prompting a last reply, and a narrowing down of conceivable bearings for subsequent research to take.

Cheek (2008) argues that, the idea of 'research design' inside subjective examination is more hazardous than inside quantitative exploration, with option terms including (yet not constrained to) 'research system', 'research approach' and 'research sort'. Considering subjective exploration, at first depicts 'research outline' as 'the route in which an examination thought is changed into an exploration venture or plan that can then be done by an examination or exploration group'.

The Qualitative research design was however necessary in the study. Under the qualitative research design, studio-based and descriptive research methods were employed. The descriptive research method was used extensively to document the information and procedures of the study whereas the studio-based has to do with the methodology of the physical project execution.

3.2.1.1 Studio-based Research Method

Significantly, Borgdorff (2006) finds that such research must happen through making craftsmanship protests that contain unsaid or encapsulated learning, yet regardless he likewise finds a crucial part for hermeneutic techniques and for the exploration question. Addressing, obviously, is customarily connected with works of art. "Testing" works of art are said to 'toss into inquiry' either. To not toss something into inquiry appears to be verging on inconceivable for contemporary practice. However the part of the exploration question in Practice-driven Research or in Art Practice as Research still produces impressive tension.

According to Rust C, Mottram J and Till J (2007), the gathering report of the Research in and through the Arts Conference held in Berlin in 2005 notes that numerous representatives 'recognized the challenges of finding an unmistakably explained research question, especially in the visual expressions'. European agents were apparently careful about the UK's Research Assessment Exercise (RAE) - driven "foreordained" methodology. The RAE, supplanted in 2014 by the Research Excellence Framework, the REF, required broad documentation of procedures and results for its errand of surveying the nature of examination in UK advanced education organisations.

Protests to the exploration question as a vital foundation of studio research also emerge in the 2007 AHRC's 'Audit of Practice-Led Research in Art Design and Architecture', in which Paul Rader watches that 'one long standing qualification between artistic work and outline is the real trick that compelling artwork is grounded in issue finding while configuration will probably be critical thinking', and that in issue finding, the examination inquiry is not huge (Rust et al., 2007).

3.2.1.2 Descriptive Research Method

According to Polit & Hungler (1999), this sort of exploration depicts what exists and may reveal new certainties and importance. The purpose of descriptive research is to

- observe
- describe
- document

This includes the gathering of information that will give a record or depiction of people, gatherings or circumstances. Instruments we use to acquire information in clear studies incorporate questionnaires

- interviews (closed questions)
- observation (checklists, *etc*.)

There is no test control or in reality any arbitrary choice to bunches, as there is in trial research.

The attributes of people and gatherings, for example, medical caretakers, patients and families might be the centre of enlightening examination. It can give an information base which can go about as a springboard for different sorts of quantitative exploration strategies (Polit & Hungler 1999).

Dudovskiy (2016) deduce that Descriptive examination can be clarified as an announcement of issues as they are at present with the scientist having no influence over

variable. In addition, "graphic exploration might be portrayed as just the endeavour to decide, depict or distinguish what is, while expository examination endeavours to set up why it is that way or how it came to be" Descriptive exploration is "want for throwing light on current issues or issues through a procedure of information accumulation that empowers them to portray the circumstance more totally than was conceivable without utilizing this technique"

In its substance, descriptive studies are utilised to depict different parts of the marvel. In its well-known arrangement, graphic examination is utilised to depict attributes and/or conduct of test populace. An essential unmistakable quality of enlightening examination contrasted with option sorts of studies identifies with the way that while clear research can utilise various variables, one and only variable is required to direct a graphic study. Three primary motivations behind distinct studies can be clarified as depicting, clarifying and approving examination discoveries. Elucidating studies are nearly connected with observational concentrates, however they are not restricted with perception information accumulation technique, and contextual analyses, and additionally, overviews can likewise be indicated as mainstream information gathering strategies utilized with illustrative studies (Dudovskiy, 2016).

3.3 Materials and Methods

The materials and methods section covers the methods, materials, tools and equipment employed in fabricating the metal bust of Osagyefo Dr Kwame Nkrumah.

3.3.1 Materials

The material which aided in the composition of the end results of the final art piece encompasses variety of materials and metal being the end product material. Refractory materials such as Clay and cement were used to produce the cement mould which was required in obtaining the full image of the figure. The metals which as used in the final work were aluminium, iron and steel pipes.

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3.3.1 Notation on the impact of selected media

After critical analysis of the various materials with respect to their properties, aluminium was best suited for the final work. Aluminium was appropriate because it is lighter and also able to be manipulated into forming the desired shapes. Since the whole work was going to be welded together as one whole piece, it was necessary to get a light metal which would make joining of the various parts easier. Iron and steel pipes were used for the base to hold the aluminium bust.

3.4 Tools

The tools which were used in executing the work are as follows: Chasing Hammer, chasing tools, doming tools, clay modelling tools, rubber mallet, metal scriber, metal ruler, shears, tweezers, stakes and anvil, files (small and big and well as smooth and rough), adjustable saw frame and blades, welding rods, bee wax, planishing tools, tear drop tool, wooden mallet, pencil and aluminium rods.

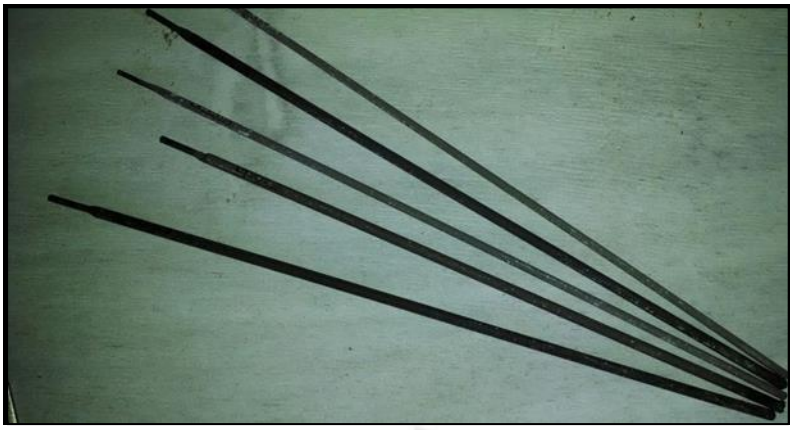

Fig. 3.1: Electrode for electric arc welding

The electrodes (Fig. 3.1) where used which the aid of the arc welding machine to fuse metal pipes and bars together to form the base or pedestal of the metal figure.

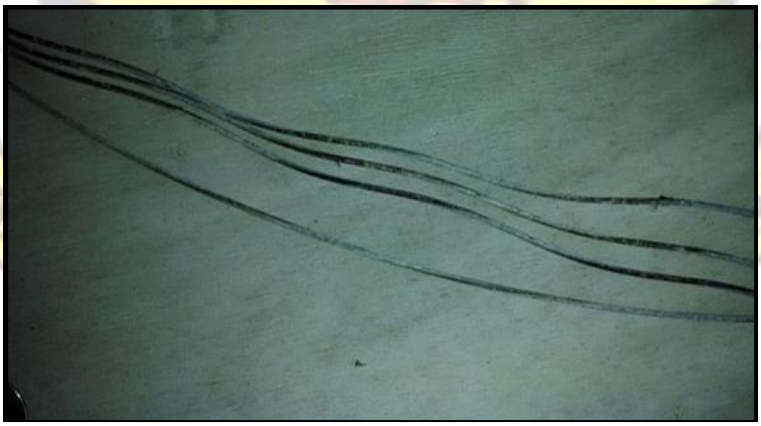

Fig. 3.2: aluminium rods

The aluminium rods (Fig. 3.2) of 4mm were used in welding of the aluminium pieces together. Acetylene gas generated form calcium carbide was the heat source for the welding using oxy-acetylene torch.

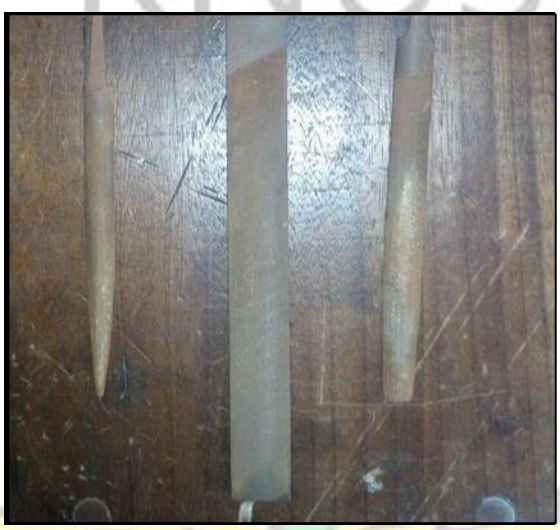

Fig. 3.3: files both rough and smooth

The files (Fig. 3.3) were used to file the edges of the aluminium pieces in order to properly align the edges to meet each other to make the aluminium welding process much more accurate and easier.

Fig. 3.4: wooden mallet

The wooden mallet (Fig. 3.4) was used in conjunction with a piece of wood to push the aluminium sheet in the mould in order for the aluminium sheet to assume the shape of that portion of the mould.

Fig. 3.5: Centre punch

The metal scriber (Fig. 3.5) was used to make altering marks as well as accurate shapes such as the square for the test pieces on the aluminium sheet in order to serve as a guide when piercing or cutting with the guillotine.

Fig. 3.6: pair of tweezers

Pair of tweezers (Fig. 3.6) was used to handle the hot metal after the annealing process.

Fig. 3.7: chasing tools and chasing hammer

The chasing tools were used in conjunction with the chasing hammer (Fig. 3.7) in order to create relief features in metal for the portrait bust.

Fig. 3.8: jewellers‘ saw frame

The jeweller‘s saw frame (Fig. 3.8) was used in conjunction with piercing blade to cut precise measurement created with the metal scriber (Fig. 3.5)

Fig. 3.9: doming punches

The doming punches (Fig. 3.9) were used alternatively with the chasing tools for the chasing and repoussé aspect of the forming process. The dooming punch of 19/32 inches was used to push the hole beneath the nose region.

Fig. 3.10: pair of Callipers

Pair of callipers (Fig. 3.10) was used as a measuring tool to aid the researcher in selected the appropriate gauge of material.

3.5 Equipment

Equipment used for the project include: bench anvil, guillotine, gas cylinder**,** metal work bench, and the arc welding machine.

NYANSAPƆ WƆ SANE NO BADWENMA

Fig. 3.11: anvil

The anvil (Fig. 3.11) aided in the forming and flattening of the aluminium sheet during the forming process. The iron rods which were used for the stand or pedestal was also straightened on the anvil.

NYANSAPƆ WƆ SANE NO BADWENMA

Fig. 3.12: guillotine

The guillotine (Fig. 3.12) was used to cut the aluminium sheet into smaller pieces. It was also used by the researcher to cut uniform shapes such as the small pieces which were used in welding the test piece.

NYANSAPƆ WƆ SANE NO BADWENMA

Fig. 3.13: Oxygen cylinder

The Oxygen cylinder contained oxygen which was used together with the acetylene from carbide generating machine was used for welding. This cylinder supplied of oxygen for the welding of the test pieces.

NYANSAPƆ WƆ SANE NO BADWENMA

Fig. 3.14: acetylene generator

The acetylene generator (Fig. 3.14) supplied acetylene gas for the aluminium welding process. The acetylene gas was mixed with oxygen in torch to give the hot frame.

NYANSAPƆ WƆ SANE NO BADWENMA

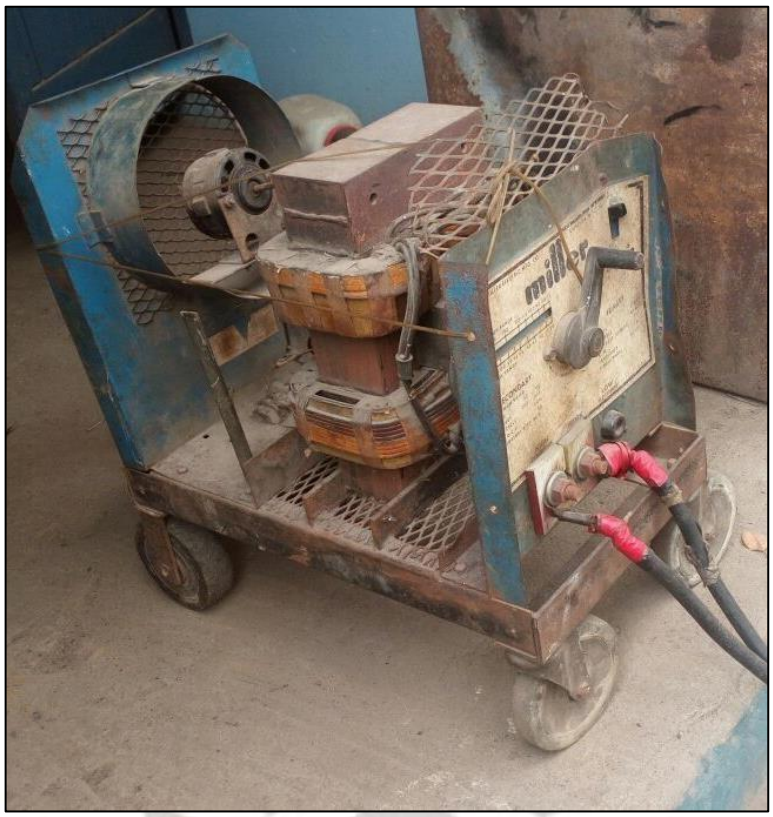

Fig. 3.15: electric arc welding machine

The electric arc welding machine (Fig. 3.15) was used with the electrodes (Fig. 3.1) for the arc welding process. The arc welding was used in welding metal pipes and bars for the pedestal.

NYANSAPƆ WƆ SANE NO BADWENMA

Fig. 3.16: Metal work bench

The metal work bench (Fig. 3.16) was used to properly align the edges of the relief figures as well facilitate the cooling of the aluminium metals after annealing.

NYANSAPƆ WƆ SANE NO BADWENMA

Fig. 3.17: gas cylinder for annealing purposes

The Gas cylinder (Fig. 17) in conjunction with a blow torch for the annealing of the aluminium sheets

3.6 Aluminium

According to Bell (2016), aluminium (otherwise called aluminium) is the most copious metal component in the worlds outside layer. What's more, it really is great as well, since we utilise a ton of it. Around 41 million tons are smelted every year and utilised in an extensive variety of uses. From auto bodies to lager jars, and from electrical links to aeroplane skins, aluminium is a major a portion of our ordinary lives. Aluminium is lightweight, very conductive, intelligent and non-harmful metal that can be effortlessly

machined. The metal's strength and various invaluable properties makes it a perfect material for some mechanical applications.

Aluminium has:

- Atomic Symbol: Al
- Atomic Number: 13
- Element Category: Post-transition metal
- Density: 2.70 g/cm^3
- Melting Point: 1220.58 °F (660.32 °C)
- Boiling Point: 4566 °F (2519 °C)
- Moh's Hardness: 2.75

Bell continues that, the generation of aluminium from metal is based upon aluminium oxide (Al2O3), which is removed from bauxite mineral. Bauxite typically contains 3060% aluminium oxide (generally alluded to as alumina) and is routinely found close to the world's surface. This procedure can be isolated into two sections; (1) the extraction of alumina from bauxite, and (2), the purifying of aluminium metal from alumina.

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Fig. 3.18: Aluminium metal

3.6.1 Preparation of aluminium sheets

Aluminium sheets measuring A3 size (Fig. 3.19) was acquired to be cut into small square pieces of 1 inch. The various A3 aluminium sheet were cut using the guillotine to get the specified sizes. Before the A3 was cut with the guillotine, the various measurements were drawn on the metal sheets using a shape tool (Fig. 3.20). The gridlines on the metal provided the reference along which the small pieces were meticulously cut. Cutting the small pieces with the guillotine (Fig. 3.21) was consuming more time, hence a big pair of shears was used to cut the metal into smaller pieces (Fig. 3.22) after the guillotine has been used to cut the aluminium sheet into long strips. A sizable amount of the metal was cut and the remaining was collected for the chasing and repoussé process which has to do with the vital features of the bust such as the nose, eyes and ears.

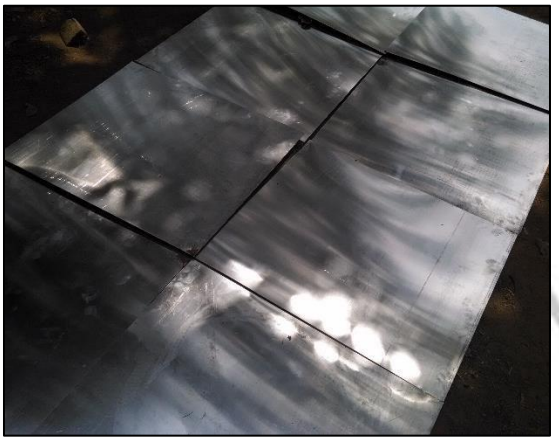

Fig. 3.19: A3 sized aluminium sheets

Fig. 3.20: Measuring the gridlines for the cutting process

Fig. 3.21: Cutting the metal sheet with the guillotine

Fig. 3.22: Cutting the strips into small squares

3.7 Test piece

After cutting pieces of metal the aluminium welding technique was experimented on them. Initially, aluminium pieces were collected into a crucible and melted into a crucible using the foundry. The ingot was milled to desired gauge. The small metal pieces were placed side by side one after the other and the aluminium rod together with the oxyacetylene torch was used to fuse the pieces together at the point where they meet. Due to the light nature

of the metal, many of the pieces melted before they could even be joined together. The process was repeated in order to get an accurate and clean welded joint. In order to secure the joint, the welded pieces were turned over and reinforced by closing all gabs beneath the welded joint. This is because, when welding the aluminium pieces together, the metal rod does not completely fill the aligning joint so in order to ensure that the joint has been completely sealed, the welded metal sheets are turned over to check for spaces and lags.

Fig. 3.23: Several welded aluminium pieces

Fig. 3.24: Shows metal pieces joined together in a more compact form

3.6.2 Preparing clay for the model

Clay was collected from the Ceramic Section, KNUST, and further processed by pounding and sieving in other to get a fine consistency prior to the modelling process. A sizable amount was collected on a flat wooden board and a pestle was used to do the pounding.

Fig. 3.25: Clay pounding

3.8 Fabrication process

This section entails a vivid account of the fabrication and finishing process of the Osagyefo Dr Kwame Nkrumah metal portrait bust. The fabrication process has been categorised into the following areas:

- Clay modelling
- Mould making
- Metal forming
- Welding the parts together
- Fabricating the pedestal
- Finishing

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3.8.1 Clay modelling

Pictures of Osagyefo Dr Kwame Nkrumah was used as a guide to develop the portrait first in clay. This was because a mould had to be done in cement in order to start the metal forming process. After acquiring an adequate amount of clay suitable for the proposed size of the clay model, an armature was first constructed (Fig, 3.26). The armature consisted of steel metal bars which were welded together. A metal mesh of varied sized both big and small were wrapped strategically around the armature (Fig.
3.27). The armature was placed on the working table and the modelling process begun. The additive and method (Fig. 3.28) of clay modelling was employed on the modelling process. Clay was added bit by bit unto the armature to get the basic bust shape of
Osagyefo Dr Kwame Nkrumah which conformed to the reference pictures.

Fig. 3.26: Welded armature

Fig. 3.27: Welded armature with mesh

Fig. 3.28: Adding clay to the armature

Fig. 3.29: Forming the basic bust shape

After obtaining the basic shape of the bust, the clay was left to harden to the leather hard state. The vital features of the bust were then modelled using the assorted clay modelling tools. The head shape was first acquired followed by the facial characteristics. The facial characteristics of the bust were defined bit by bit to bring out the unique features of the portrait (Fig. 3.32). The unique features entails the special characteristics that will identify the model as a true likeness of Osagyefo Dr Kwame Nkrumah. The clay model surface was occasionally kept semi-wet in order to make necessary correction after critical analysis of the resemblance. A cloth was also used to cover the whole model in order to prevent it from getting bone dry. The model was then meticulously detailed with respect to the resemblance to the reference images. The textures on the head which represented the hair was created with short broom. The bottom of the short broom was used to create these textures by mean of hitting the areas of the hair with the bottom of the broom. When the desired features were obtained (Fig. 3.33), the whole surface of the model excluding the textured part were burnished with a hand shovel to get the surfaces very smooth.

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Fig. 3.30: Defining the basic bust shape

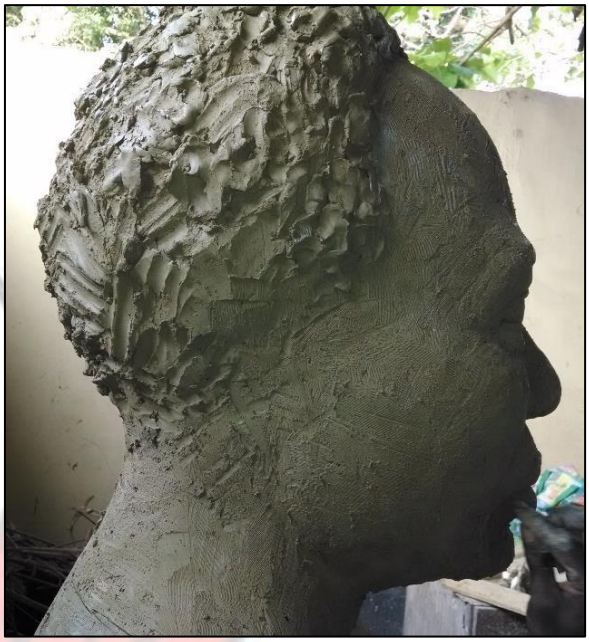

Fig. 3.31: The head shape of the personality

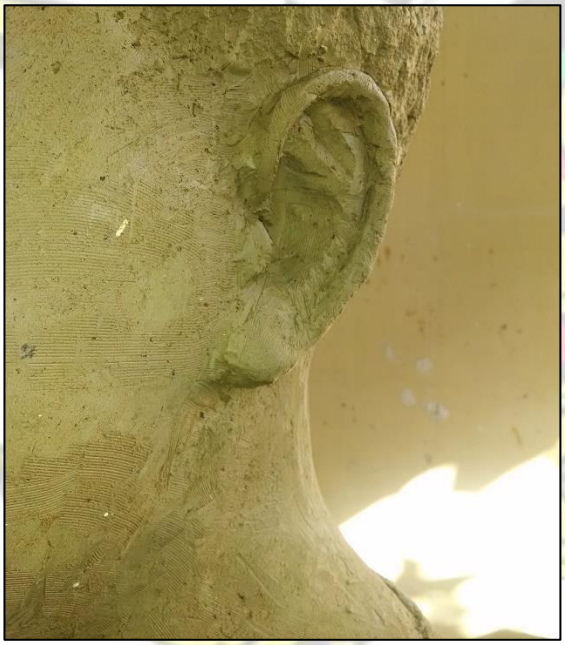

Fig. 3.32: Introducing the vital features of the figure

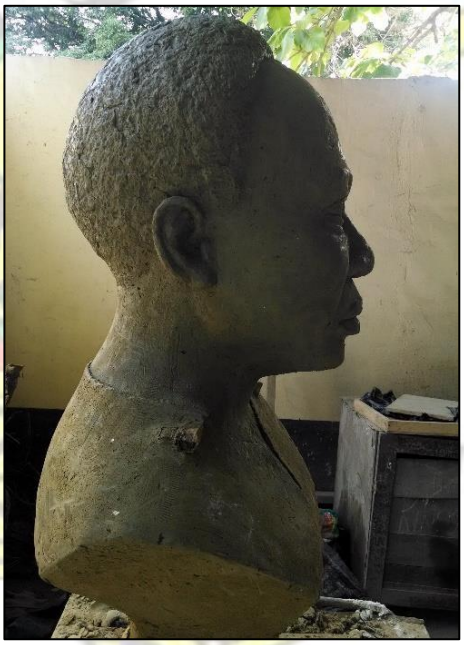

Fig. 3.33: The complete model

3.8.2 Mould making

After having obtained the desired portrait model, it was prepared for casting mould. The clay model was virtually divided into two parts namely mould _A‘ and mould _B‘. A line was drawn from the left to the right side of the model in order to create two-part mould which was categorically labelled _A‘ and _B‘. Mould _A‘ is the front part of the model which entails the face, bit of the ears and the chest whereas mould _B‘ covered the opposite part which was the remaining half. Clay wall (Fig. 3.35) was mounted following the parting line to serve as the parting wall for mould _A‘ and _B‘. The wall measured the proposed thickness or height of the mould. The application of the mould material was done in two part namely, the first and second coat. The material was used for the mould was cement and chicken mesh to make the mould strong and unbreakable. The dry cement was poured on the concrete floor (Fig. 3.34) and mixed with water to get a desired consistency for the first coat. In order to accurately pick the details of the clay model, a more liquid mixture of cement and water was prepared and applied directly unto the clay model. The first part which is the front part, mould _A‘, of the clay model was first covered in the first coat (Fig. 3.36). When every part of the front part of the clay model (Fig. 3.37) was covered in the mould material, it was left to dry. The second coat mixture which is thicker and more solid as compared to the first coat was applied unto the first coat bit by bit by the additive method of mould application (Fig. 3.28). The second coat mixture was repeated to get the desired thickness which was achieved by meeting the thickness of the clay wall to complete the first front mould (mould _A‘). The back or the remaining part of the model which is separated by the clay wall was prepared next.

The clay wall was removed before the first coat of the back (mould _B‘) in order not to create a gab at the parting joint. Another parting joint was created using clay which was in

a more liquid consistency as compared to the clay wall and applied to the edge of the dried cement parting line or wall of the first mound (mould _A‘). The first coat was then prepared and applied unto the back part of the clay model (mould _B‘) to first take the back details just like the front mould. Chicken mesh was wrapped around the model after the first coat in order to strengthen the mould. The second coat was applied after the first coat had dried following the same procedure as the front mould to get the desired thickness. When the second mould (mould _B‘) was complete (Fig. 3.39), it was left to dry in order to be separated (Fig. 3.40).

Fig. 3.34: Preparing the mould materials

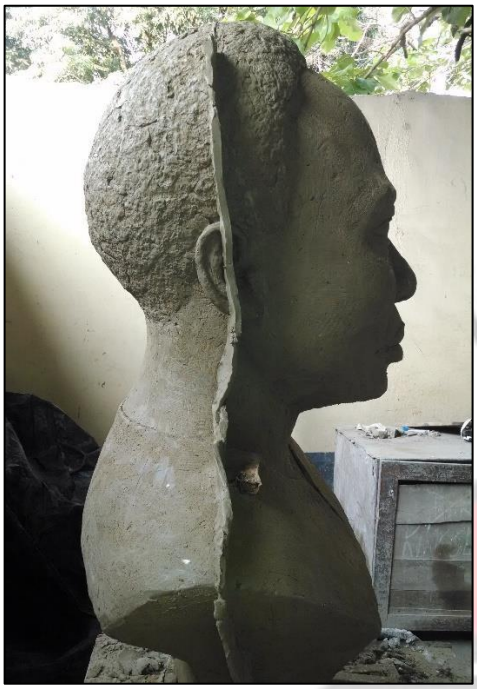

Fig. 3.35: The clay wall on the clay model

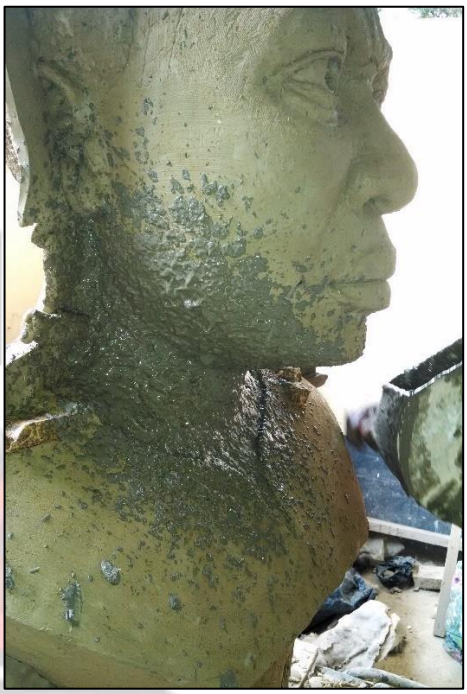

Fig. 3.36: Applying the first coat for mould _A‘

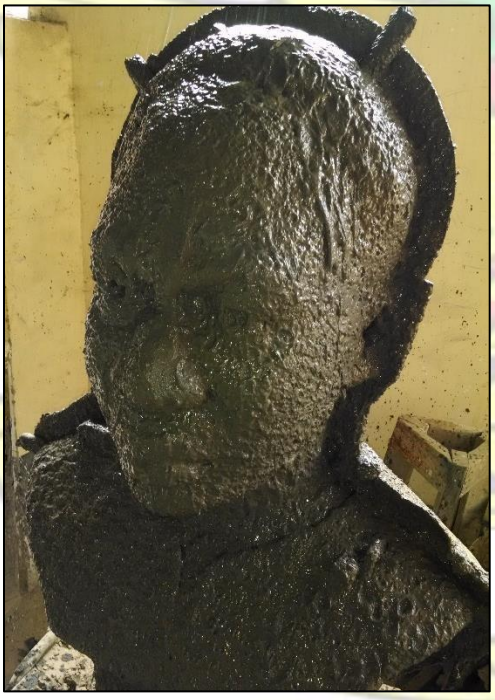

Fig. 3.37 Complete first coat for mould _A‘

Fig. 3.38: Applying second coat for mould _B‘

Fig. 3.39: The complete second coat

Fig. 3.40: Dried complete two part mould

After the two part mould (A & B) had completely dried, they were separated and removed. Since the mould has not completely dried due to the size of the model which would take a long time for the whole thing to harden, the clay model was destroyed during the separation process. A wooden stick was used to hit the parting joint (Fig. 3.41) to split the two halves in order to facilitate the parting process. Mould _A‘ was removed first followed by mould _B‘ (Fig. 3.42). Traces of clay were left in both sides. The clay was removed by scooping them out bit by bit until a great amount had been removed including the armature. After scooping all the clay out, the mould was washed under running water with a scrub brush (Fig. 3.43) to remove the small clay traces which were trapped in the intricate areas of mould especially mould _A‘ which has the face. Great care handling the moulds was paramount since they were heavy and any mistake could break or destroy them.

Fig. 3.41: Separating the mould

Fig. 3.42: Removing the clay model from mould _B‘

Fig. 3.43: Scrubbing clay residue from mould _A‘

3.8.3 Metal forming

Having obtained the two part cement mould, the aluminium sheets were used to pick the shape of the figure in the mould in separate parts. All parts of the bust were formed

separately and later welded together to form a completely stable unit. The broad sections were formed first. The mould was apparently divided into sections. Since the mould was in two parts each part was formed separately and joined together.

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3.8.3.1 Forming the flat portions

The flat areas of the mould were traced with sugar paper. The flexible nature of sugar paper, made it appropriate for acquiring the shapes of the various parts in the mould excluding the intricate areas such as the nose, mouth, ears and eyes. Sugar paper was arranged in the mould to take the shape of the various sections (Fig. 3.44). The papers were then meticulously cut with a pair of scissors in accurate alignment to each other (Fig. 3.45).

Fig. 3.44: Placing the sugar paper in the mould to conform to the shape

After tracing all areas of the mould excluding the intricate parts such as the nose, eyes, ears and mouth, the papers were taken out of the mould and placed on the aluminium metal sheets to be traced and pierced. Pencil was used for tracing the shapes of the papers which assumed the shapes of the sections on the aluminium sheet.

Fig. 3.45: Altering the sections to shape in mould _B‘

In order not to create confusion, a naming structure was developed by the researcher for the mould. Every piece of sugar paper which represented a portion of the mould was given numbers according to the specific mould it belonged. The sections of mould _A‘ for example were named using the description of the portion of the mould. For example the in mould _B‘, the portion which represented the back of the bust was named _back 1‘, _back 2‘ as well as _side back 1‘ and _side back 2‘ which represented the side parts of the back.

3.8.3.2 Forming the reference models

Complex areas such as the nose, eye, ear, eyes and the mouth in mould _A‘ was traced with a different approach. Instead of using the sugar paper which would have been impossible to obtain all necessary parts, those areas were picked up using clay. Lumps of clay was prepared (Fig. 3.46) pushed into all these areas to get the exact shapes (Fig. 3.47). They were then removed and placed in a cool environment to dry (Fig. 3.48 & 3.49). These clay parts represented the exact shaped in the mould which made chasing and

repoussé of these portion much easier since they served as references for the forming process.

Fig. 3.46: Preparing the clay for the intricate parts

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Fig. 3.47: Taking the shapes of the intricate parts with clay

Fig, 3.48: Clay models eyes, mouth and nose

Fig. 3.49: Clay models of ears

3.8.3.3 Forming the broad sections

After tracing unto the aluminium sheet, the traced shapes were pierced out using the jeweller‘s saw frame. When all the traced shapes had been pierced out, they were annealed (Fig. 3.50) to prepare them for the forming and bending process.

Fig. 3.50: Annealing the aluminium sheet for the forming process

The various sections were placed one after the other in the mould and a rubber mallet and a wooden stick were used to hit the metal to conform to the shape of the mould. The chest areas for example was arranged in sections and a rubber mallet was used to hammer (Fig.

3.51) then to shape. When the metal hardens, the annealing process was repeated and the process continued. All the pieces were hammered in the cement mould until they conformed to the shapes of the areas which they meant to be. Each section was carefully placed to touch each other at their edges. After hammering, the researcher realized that the metal pieces were overlapping instead of aligning at the edges. This was as a result of the malleable nature of aluminium. The metal somewhat expanded and distorted the initial shape in which it was cut. The shapes were resized due to the expansion and all excess parts were marked with pencil and pierced. They were then rearranged in the mould to check their alignment. The parts which were not well aligned were removed and further filed to obtain the desired results. The edges which were distorted due to the excessive annealing and tampering were placed in the mould and straightened to get flushing edges at every point. Several checks were conducted to make sure they aligned properly in the mould so as to obtain the same shape as the model if arranged and welded together. Every section of the sheets in the mould was named according to the same naming structure which was used for the sugar paper sections.

Fig. 3.51: Pushing the aluminium with mallet at the bottom part of mould _B‘

Fig. 3.52: Hammered aluminium sheets at the upper head region

The same approach was used in defining the face of the bust. Aluminium sheets that were pierced for the forehead, cheeks, chin and the other facial features of the head were annealed and placed in the respective part of the mould the rubber mallet was used to get the basic shape of the face. The face was divided into four parts, the forehead (Fig. 3.54) and two parts which included half of the nose and mouth and the chin (Fig. 3.53) to half of the neck. The aluminium sheets were arranged accordingly and hammered to get the sunken shapes partially. The wooden stick was used to get the sunken areas of the nose, eyes, ears and mouth. These areas were not hammered too deep since they would be cut off and replaced with the exact one after the chasing and repoussé process.

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Fig. 3.53: Forming half of the face

Fig. 3.54: Forming the forehead region

3.8.3.4 Forming the eyes, nose, mouth and ears in metal

After creating the basic facial part of the mould, the intricate facial features were fabricated next using a different approach namely chasing and repoussé. The clay models of the eyes, nose, mouth and ears served as reference models on which the researcher looked unto to form them separately one by one.

3.8.3.4.1 Eyes

Aluminium sheet was annealed and domed to a desired height which could accommodate the size and length of the ears. The two separate aluminium sheets were cut separately. The left eye was fabricated first. The shape of the size of the eye which included ample space in the form of surrounding skin of the eye was drawn on the metal sheet. The aluminium sheet for the left eye was placed in the bee wax pitch and a doming chasing tools with the aid of a chasing hammer were used to create a dome. In order to create a desired depth, the metal was removed and annealed periodically when it became hard in order not to get the metal torn. The process was repeated until specific depth was achieved (Fig. 3.55). After the doming process, the metal was turned over to start the chasing and repoussé of the eye. In order to fix the metal in the wax pitch, wax was melted and poured into the sunken area till it was full. It was left to cool and turned over to be fixed into the wax pitch. The metal with the cooled wax filling the space created by the doming process was heated to fix them into the pitch. When the metal and wax cooled and the domed area face-up, the eye is traced unto the domed metal using the reference left eye model as a guide. The lines of the eye shape were marked out using the marking chasing tool. Having marked the shape of the eye, the metal was removed and annealed to be placed back for further detailing. Sunken areas were created using the repoussé tools and the chasing tools were used to define the sharp corners and areas to imitate that of the reference model (Fig. 3.56). The chasing and repoussé process was repeated (Fig. 3.59) until the shape has successfully matched that of the reference model after which the metal was removed from the pitch with the application of heat. The remaining wax on the metal was burnt off and the wax pitch was repaired by levelling the pitch with the application of heat to make room for the right eye. The entire

process from the doming to the final shape was repeated to create another eye which represented the left eye following the right eye reference model.

Fig. 3.55: Domed shape for the eye

Fig. 3.56: Chasing the shape of the eye

Fig. 3.57: Defining final features of the eye

3.8.3.4.2 Nose

Following the same process as the eye, the shape of the ear together with ample space around the nose was drawn on the aluminium sheet. The shape was first domed in the pitch

until a desired depth was achieved. Unlike the eye where a simple dome was created before the eye was defined on the domed shape, the repoussé technique was used to create the shape of the nose upside down in a sunken form. After frequent annealing and repoussé, the desired depth was obtained and the metal was removed from the pitch. Bee wax was poured into the cavity and fixed into the pitch to begin the chasing. The bottom of the nose was chased to create a deep uniform groove. The surface of the nose was planished using planishing tool with the help of the chasing hammer in order to make the surface smooth. When the desired surface finish was achieved (Fig. 3.58) the metal was removed and the pitch was prepared for the mouth.

Fig. 3.58: Complete chasing and repoussé of the nose

3.8.3.4.3 Mouth

Following the same procedure as the nose, the lips was drawn on the aluminium sheet. The depth of the lips was achieved by beating the metal down using the repoussé or tear drop-ended tool. When the required depth was achieved, the metal was removed from the pitch

and turned upside down to further define the exact features. Rough areas were planished using the planishing tool to level the surface to complete a perfect replica (Fig. 3.59).

Fig. 3.59: Complete chasing and repoussé of the lips

3.8.3.4.4 Ears

The ears were also fabricated following the same procedures as that of the eye. The left ear was fabricated first. After annealing the metal it was domed using a wooden stick and a wooden mallet (Fig. 3.60). The shape of the ear was drawn on the metal with pencil following the shape of the clay model. The sunken areas of the ear were achieved using the repoussé technique. The complex details of the ear were achieved with both the chasing and repoussé technique (Fig. 3.61 & 3.62). The measurement of the eye and shape were obtained from the reference model. After achieving the desired shape of the ear (Fig. 3.63), the process was repeated to obtain the right ear.

Fig. 3.60: Doming the metal for the ear

Fig. 3.61: Defining the shape of the ear

Fig. 3.62: Chasing the shape the details of the ear

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Fig. 3.63: The finished chasing and repoussé of the ear

3.8.4 Welding the various parts

The metal pieces were welded bit by bit until the whole bust was complete. The face was assembled first. The chased facial elements being the eyes, nose, ears and lips were pierced out using the jewellers‘ saw frame after the chasing and repoussé process was complete. These facial elements were fixed onto the broad surfaces of the head. In order to properly execute the welding process of the face without distorting the desired figure.

The pieces of metals were placed in their respective portions in the mould _A‘ (Fig. 3.64) and the welding process begun from the bottom which is the jaw region to the forehead region. All the eyes, nose and lips excluding the ears were welded following the areas of their contact region. In order to properly secure the welded joint, the welded parts which were welded in the mould were removed from the mould and turned over to re-weld all loose parts to reinforce the welded joints (Fig. 3.65). When all edges have properly been secured, the welded parts were placed back into the mould to complete the figure of the

face. The eyes were also placed together with the welded portion (Fig. 3.66) which were the nose the lips and the cheek. When the face in mould ‗A' was complete, the metal pieces which form the head were also placed in their respective portion and welded together (Fig. 3.68). The grid line spaces in the hair was also welded to close them up.

The process continued until all metal elements of mould ‗A' had been well welded (Fig. 3.69 & 3.70).

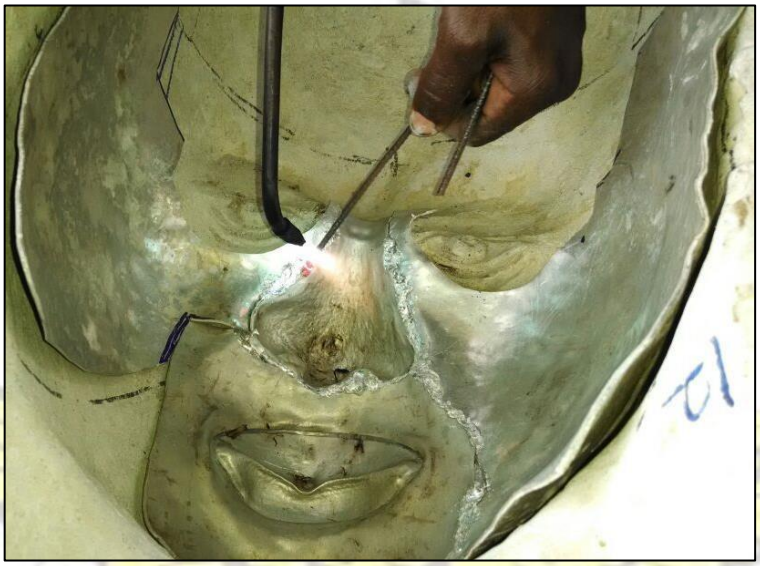

Fig. 3.64: Welding the nose, lips and cheeks

Fig. 3.65: Reinforcing the welded joints

Fig. 3.66: Welding the eyes

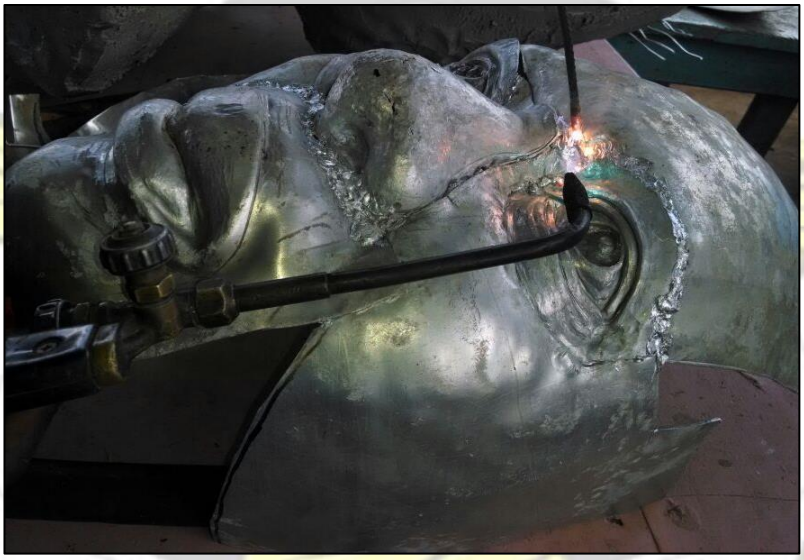

Fig. 3.67: Reinforcing the welded joints of the eyes and forehead

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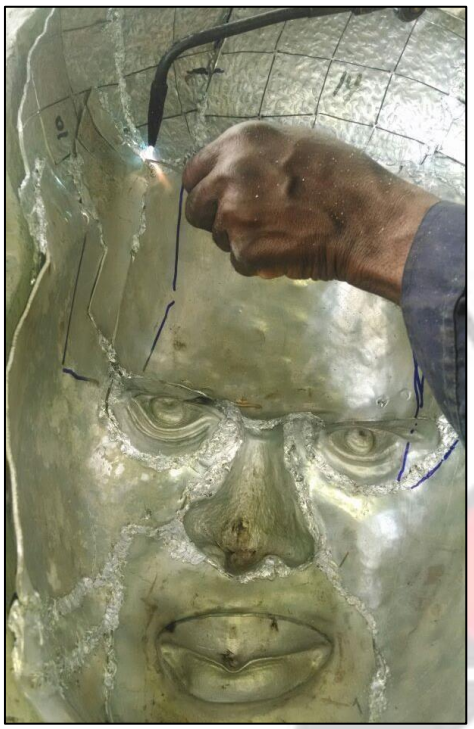

Fig. 3.68: Welding the part of the hair unto the face

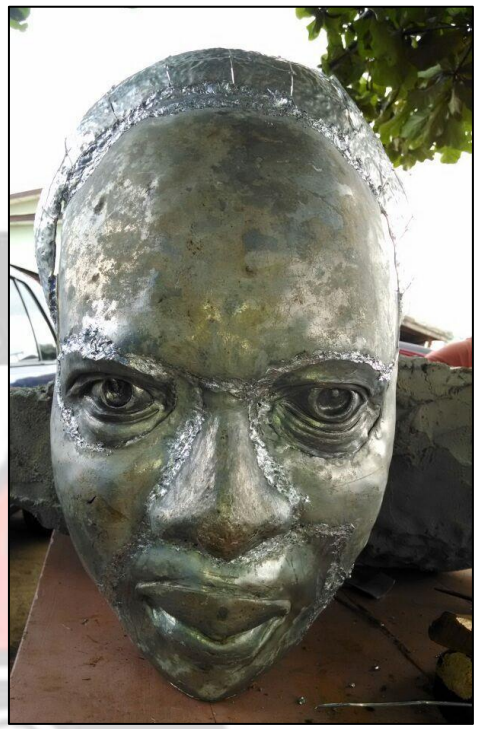

Fig. 3.69: The complete welded face

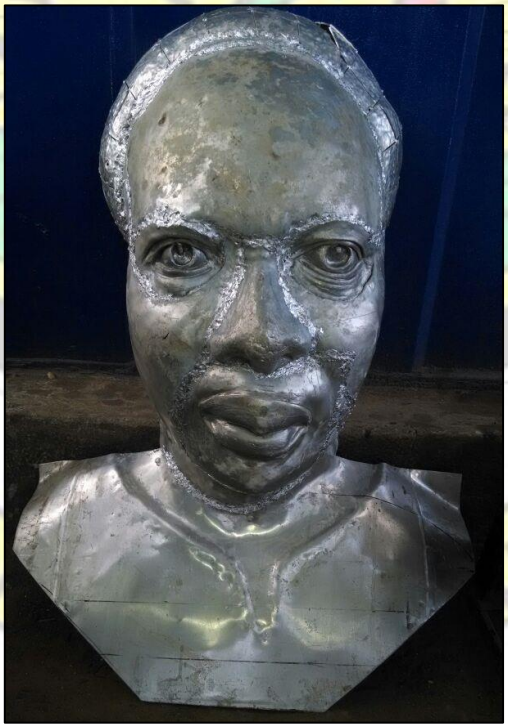

Fig. 3.70: The complete welded figure of mould _A‘

When the mould _A‘ metal figure was complete, the same procedure was followed to achieve the desired outcome. Unlike the metal figure for mould _A‘, mould _B‘ has no intricate detail designs such as the eye, nose and ears so the metal parts were placed in their respective portions in the mould to be welded together. The metals from mould _B‘ were assembled from the bottom to top. The lower region of the mould which is the back of the figure was welded first and consisted of three metal pieces. After welding these parts, the next was welding to join the ear region. The part of the neck on mould _B‘ consisted of three metal pieces. The welded part of the neck was welded to the back of the figure and joined to the edge of the mould _A‘ figure (Fig. 3.71). The welded joints were further secured by closing all gabs. The back of the head in mould _B‘ however consisted of five parts excluding the grid-pierced pattern of the hair region. These parts were welding to join the whole welded figure directly until it was complete. When the welding process of the pieces of mould _A‘ and _B‘ was complete, there happened to be holes or spaces in the figure. This included the area where the ears were to be fixed. The pair of chased ears were placed on their respective positions at edges of the sides of the joined metal figure of mould _A‘ and _B‘ and welded (Fig. 3.72). Sugar paper was

however used to trace the remaining areas with the aid of a pencil by placing the piece of sugar paper at the back of the affected area and the pencil was used to draw the shape of the hole along the edge.

Fig. 3.71: Welding the neck region of mould _A‘ and _B‘ together

Fig. 3.72: Welding the ear unto the figure

Fig. 3.73: Welding the metal head region of
mould _A‘ and _B‘ together

3.8.5 Fabricating the Pedestal

A pedestal was fabricated on which the metal figure was to rest on. The pedestal is made up of iron rods and steel pipes. The iron rods and steel pipes were cut to a desired size (Fig. 3.75). The base of the pedestal was constructed using square pipes and iron rods. The square steel pipes were welded together to form a rectangular shape. The middle of the rectangular shape was filled with a cross of double round iron rods. A single metal rod was bent on an anvil to conform to the curvature of the inner base wall of the metal portrait figure. A single rod was welded in the middle of the curved iron rod in an overlapping manner (Fig. 3.76). In order to connect this curved iron rod and the rectangular metal base, a single iron rod was cut and welded to join the two (Fig, 3.77). The intersection of the iron rods in the middle of the rectangle was where the iron rod was welded. The rough welded joints were ground using the angle grinder machine.

Fig. 3.74: Cutting the metal rods for the base of the pedestal

Fig. 3.75: The base of the pedestal

Fig. 3.76: Forming the inner support

Fig. 3.77: The inner support for the pedestal

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Fig. 3.78: Welding inner support unto the base support

Fig. 3.79: The complete pedestal

CHAPTER FOUR

DISCUSSION OF RESULTS AND APPRECIATION

4.1 Results

The literature search did not discover a combination of chasing and repoussé and aluminium welding. Most of the works that were found were either one of them. A typical example is the artist Jordi Diez Fernandez who produces figurative sculpture with scrap

metal. The art of photorealism is not only limited to refractory materials or the metal casting techniques but metal sheet forming and the welding technique can be combined to produce a portrait figure in metal other than casting as the study has proven.

The main aim of the study was to fabricate Osagyefo Dr Kwame Nkrumah using the welding technique. The study revealed an infallible truth that, provided there is an outmost resemblance in the clay model of the proposed figure, it is possible to transfer that resemblance unto the metal. The resemblance of the clay model was paramount to the successful execution of the metal portrait of Osagyefo Dr Kwame Nkrumah.

Another aim of the project was to experiment and explore the aluminium welding technique into forming the realistic portraiture. The aluminium welding technique was experimented with pieces of aluminium sheets. Continuous practice of this technique improves effectiveness of the technique since aluminium is a very light metal and the design could be distorted, if care was not taken.

Finally, the study was also aimed at assessing other portrait-making techniques such as modelling and casting in comparison to welding. Clay and other refractory materials in modelling as well as casting are the major mediums through which artists express their three dimensional portrait making. The clay modelling technique was however explored and the researcher discovered that it is easier to produce a portrait figure in clay having the needed skillset unlike the metal which is also malleable but cannot be altered after rigorous subjection to hammering and annealing.

Fig. 4.1: the final metal bust of
Osagyefo Dr Kwame Nkrumah

4.2 Appreciation

Osagyefo Dr Kwame Nkrumah was the main centre of focus in this project since he was the first leader of Independent Ghana and even before the time former Ghana which was known as the Gold Coast. On March 6, 1957, at 12 am, Nkrumah declared Ghana to be an independent nation. In celebration and in respect he was given the title of Osagyefo by the people, which translates roughly as ―redeemer‖ or ―the victorious one‖ in the Akan tongue. Today, Nkrumah is still one of the most respected leaders in African history. His

legacy lives on today in the continued existence of Convention People‘s Party. He has been honoured throughout the nation. A typical example is the Kwame Nkrumah Mausoleum and the Kwame Nkrumah University of Science and Technology.

The facial characteristics of the metal figure is what defines it as a portrait of Osagyefo Dr Kwame Nkrumah. These characteristics includes the eyes, ears, nose and the overall structure of the face. These characteristics are not dissimilar from that of the clay model which was imprinted in the mould. The whole metal figure was successfully executed based on the dependency on the elements and principles of design. Without these principles and elements, the metal figure would not have resembled the clay model. The outfit of the figure which is the jumper represents the uniqueness and diversity of the African culture. The African jumper that complements the kente and other types of cloths and fabrics are worn by Ghanaians.

The chasing and repoussé technique employed in fabricating the vital features of the head was very essential in the success of the project. Without these techniques, there wouldn‘t have been a more detailed representation of the eyes, nose, lips and eyes in the sheet medium. Chasing helped entirely in building a replica of the vital features based on the clay reference models. The repoussé technique also brought out the sunken and raised details of the vital features in the effort of creating a replica.

The aluminium welding technique was also suitable given the thickness of the aluminium sheets and was able to fuse beautifully in a clean line. All assembled sections of the metals originating from the mould _A‘ and _B‘ were successfully fused together using the aluminium welding technique. Parts formed using the chasing and repoussé techniques as

well as those formed using the embossing and hammering techniques were all harmoniously combined into the single unit through the aluminium welding technique.

The aluminium metal was suitable for this project. Aluminium is a light metal and can be manipulated into different shapes.

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CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary

In Ghana, metal artist and sculptors are limited to the old ways of realistic portrait making in the sense that, they either model the portrait in clay, cement or carve them in wood, cast them with lost wax casting or cold casting. Artist in Ghana are not exploring different methods in the art of portraiture. Although clay modelling is one of the ways of creating large portraits, other processes must be explored by metal artists.

The research, demonstrates that the forming processes such as embossing, hammering, chasing and repoussé can be combined to create a photorealistic portrait. The project could not have been complete without the chasing and repoussé technique. This is because the chasing and repoussé technique is the technique that was used to make the vital facial features of the metal portrait which brought about the resemblance of Osagyefo Dr Kwame Nkrumah unto the metal figure. Chasing and repoussé is able to produce promising results when it comes to replication of relief objects.

5.2 Main findings

The study explored both clay and metal as the medium through which realistic portraiture is achieved;

- Clay is a very suitable material for the purpose of modelling due to the pliable nature of the material and its ability to be altered repeatedly until the desired

shape is achieved. However, maintaining the durability of the modelled figure requires other processes such as firing, mould making and casting.

- Cement is able to harden when mixed with water and it is also able to withstand harsh weather conditions. Cement on the other hand cannot be altered easily when it hardens and correcting defective areas to achieve the desired shape might be near to impossible.
- Aluminium however is a very soft metal. It does not corrode or rust hence making it the appropriate material for the forming of photorealistic bust. Its silvery coloured appearance which makes it appealing for making artworks.

The study also explored the oxy-acetylene aluminium welding technique as well as the electric arc welding technique. Chasing and repoussé were also used. Among others the study found that:

- Using the electric arc welding technique is limited to ferrous metals and as such was used in the construction of the support. Due to the light weight of the bust, the arc welded pedestal was more than appropriate in saving time and money as well as providing stability for bust.
- Aluminium welding is somewhat cumbersome because if the aluminium is not thick, welding becomes very difficult. If proper care is not taken most of the material will be lost through melting.
- Chasing and repoussé was conducive for the realisation of the realistic features of the facial resemblance. Chasing and repoussé is confirmed as appropriate for relief figures.

5.3 Conclusion

The successful execution of this project has revealed that portraits are not limited to clay and other materials and metal cast, but that there can be an amalgamation of the chasing and repoussé technique as well as embossing and aluminium welding technique. The research has proven that a metal sculpture can be produced without the casting technique which is the commonest method by which statues are produced in Ghana. Clay is a suitable material due to its pliable nature as it can be altered continuously until the desired shape is acquired. Clay can be added or subtracted to get the desired form. The clay however has to be fired in order to make it more durable and the whole process consumes a lot of time and money before the final work is obtained.

Aluminium is a metal that does not tarnish, corrode or rust. It can maintain its appearance and lustre for a long period of time. The study has also introduced a new approach to the creation of portraiture. It will add to the existing knowledge in the making of photorealistic portraiture. The project would give room and encourage metal artists to explore their creative prowess in this field of study.

5.4 Recommendations

Based on the successful execution of the project, it has been established that the aluminium oxy-acetylene welding technique can be used in producing a photorealistic representation of a figure aside the usual materials such as clay and cement practised by local artist. Having achieved a realistic portrait figure of Osagyefo Dr Kwame Nkrumah, the researcher can boldly recommend this process as an alternative for metal artists in this field and other fields alike.

Moreover, the researcher would like to recommend that metal artist should experiment with different techniques other than the usual which are mostly clay modelling, cement modelling, cement casting, metal casting etc. Metal artists in Ghana should explore other methods of making portraits in other to pave way for diverse techniques and other materials which can be much better, less expensive and also be able to achieve better if not the same results as the existing methods of photorealistic portraiture.

Aluminium is a less expensive metal and is also malleable. It does not corrode and therefore is a suitable metal for making photorealistic portraits. The researcher will therefore recommend aluminium as the right metal for making busts and other related artefacts.

The researcher will also like to recommend a proper installation of an acetylene generator at the Metal Section since there was a problem with the present one. This made the aluminium welding somewhat difficult. The researcher had to seek other metal working workshops in order to secure a proper working acetylene generator. This consumed money and time which in turn slowed down the rate of work and extended the completion date.

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