

**KWAME NKRUMAH UNIVERSITY OF SCIENCE AND  
TECHNOLOGY.**



**DEPARTMENT OF MATERIALS ENGINEERING.  
AFRICAN INDIGENOUS GOLD AND SILVER  
SMITHING.**

**MSE 257**

**GROUP 8.**

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**GROUP MEMBERS NAME INDEX NUMBERS SIGNATURE**

**ABSTRACT.**

Gold and silver have been an important part of African societies attesting to their significant role in many aspects of African states. With this, the art of forging these precious metals has been passed from generations to generations through time immemorial not only showing the wonderful yet complex methods employed but also serving as a dynamic expression of identity, spirituality and connection to the natural world. This report dives into the characteristics of indigenous gold and silver smithing, exploring the intriguing yet complex methods used and the symbiotic relationship between culture,

craftmanship and materials employed and its continuing evolution whilst maintaining the deep-rooted connection to the past.

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## **INTRODUCTION.**

The continent of Africa, through her diverse cultural landscape lies a tradition of artisanship which spans centuries if not time immemorial – the art of indigenous gold and silver smithing. Africa, being home to some of the most advanced civilizations to have existed, gave birth to the amazing ancient practice of gold and silver smithing. This ancient practice not only reflects the continents tapestry of culture, histories and artistic expressions but are the living embodiments of heritage, storytelling and spiritual connections, encapsulating the essence of people who have passed down these skills through generations.

This report invites you to embark on a journey through the world of African indigenous gold and silver smithing. A world where each piece carries the weight of history, tradition and unique cultural identities of its creators from the grand and majestic golden masks of mummies from much older Egyptian-Kushite civilizations, amazing yet intriguing and carefully forged coins of Axum to the more recent and artistically carved objects of west African states attesting to the wealth and power of those states.

With this being said, like many great west African state or people, the Akan are not only known for their wealth of gold, but for their magnificence of their gold smithing. Although the majority African gold and silver smithers still practice their traditional method of forging and casting gold and silver, recent rise in technology contributes greatly into these artisans combining traditional and advanced technological method in this practice to meet growing demand on the market.

## **HISTORICAL BACKGROUND.**

Gold and silver have held great of importance in many African civilizations and societies throughout history from the grand and

majestic golden masks of mummies from much older Egyptian-Kushite civilizations, amazing yet intriguing and carefully forged coins of Axum to the more recent and artistically carved objects of west African states attesting to the wealth and power of those states reflecting the role gold and silver has played in the socio-economic structure of many of these civilizations. The amazing and complex art of smithing gold and silver has been passed from generation to generation not only for its artistic importance but to ensure cultural, historical and spiritual continuity. Ghana, formally known as British gold coast stands as a testament to the abundant gold reserves of the country which led the Akan's to developed some of the most amazing art of gold smithing.



**Fig. 1.1:** Golden mask of Tutankhamun. New kingdom Egypt.



**Fig. 1.2:** Pectoral disc, Asante (Ashanti), Ghana, before 1874 , cast gold.



**Fig. 1.3:** silver and gold coins from Axum.



**Fig. 1.4:** Akofena.

## MATERIALS AND EQUIPMENTS NEEDED.

### Materials:

- **Gold and Silver Alloys:** Pure gold and silver are often too soft for practical use, so alloys are created to enhance durability. Common alloys include 18-karat gold (75% gold and 25% other metals) and sterling silver (92.5% silver and 7.5% copper).
- **Gemstones:** Precious and semi-precious gemstones, such as diamonds, rubies, sapphires, and emeralds, are often incorporated into jewelry designs.
- **Solder:** Solder is used to join metal pieces together. It comes in various types and melting points to suit different applications.
- **Casting Investment:** This material is used in the casting process to create molds for intricate designs. It is often a mixture of plaster and other substances.
- **Flux:** Flux is applied to metal surfaces before soldering to prevent oxidation and ensure a clean bond.
- **Polishing Compounds:** Various compounds are used for polishing metals to achieve a smooth and lustrous finish.

- **Chasing and Repoussé Tools:** These tools are used to create intricate patterns and designs by manipulating the metal's surface.

### Equipment:

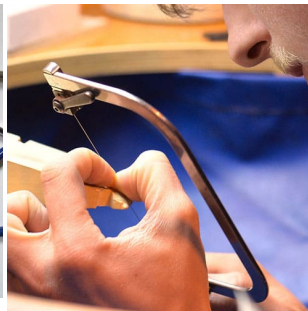
- **Torch or Kiln:** A torch or kiln is used for melting and soldering metal. Torches can be fueled by acetylene, propane, or other gases.
- **Anvil:** Anvils provide a solid surface for shaping and forming metal. They come in various shapes and sizes.
- **Hammers and Mallets:** Different types of hammers and mallets are used for shaping, texturing, and forming metal.
- **Rolling Mill:** Rolling mills are used to reduce the thickness of metal sheets and to create textures.
- **Flex shaft or Dremel Tool:** These rotary tools with various attachments are used for precision work, engraving, and polishing.
- **Files and Sandpapers:** Files are used for shaping and refining, while sandpapers help in smoothing and finishing surfaces.
- **Pliers and Tweezers:** Various types of pliers and tweezers aid in holding, bending, and manipulating small components.
- **Jeweler's Saw:** A small, fine-toothed saw used for cutting intricate designs in metal.
- **Drawplate:** A drawplate is used to reduce the diameter of wire, creating finer gauges.
- **Mandrels:** Mandrels help shape rings and other curved forms.



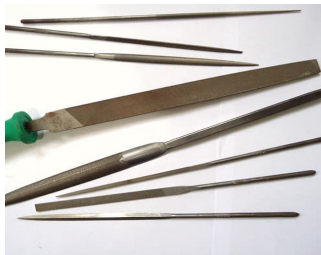
anvil



pliers



A jeweler's saw



files



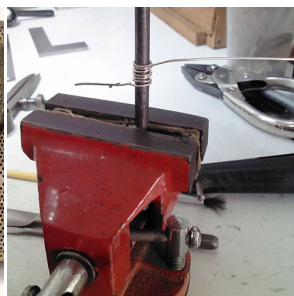
flex shaft



bench hammer.



soldering torch or tool.



bench vise.



A draw plate.

**List of tools for gold and silver smithing.**

## THE PROCESS INVOLVE IN GOLD AND DIAMOND SMITHING.

The act of transferring gold and silver from ores into the finish product involves a process called **casting**.

**Metal casting** is a 7,000-year-old process used in both manufacturing and fine art. During metal casting, molten metal is transferred from a crucible into a mold to create a positive metal cast object. The metal and mold are cooled, and the metal object is removed and finished. Traditional metal casting techniques include lost-wax casting, plaster mold casting, die casting, and sand casting, to name a few. These metal casting processes may be completed in a foundry or a jewelry studio.

### The basic metal casting process

The basic metal casting process involves creating a pattern and a mold, then pouring molten metal into the mold. You will then extract the solid metal casting and finish your piece. This process is customizable for different types of metal casting, along with shapes, sizes, and more.

#### Step 1: Create the pattern

Before you make your mold, you must create a pattern to determine the mold's shape. The pattern can be a 3-dimensional model of your final cast. It may be shaped in wax, sand, plastic, or even wood. Some casters use molds made of plaster or silicone, which are materials that could not withstand a molten metal cast but allow the caster to mass create wax multiples to use in expendable mold casting. When you are shaping your pattern, make sure your account for any anticipated shrinkage when the metal cools. Patterns may also be gated with sprues to allow the molten metal to flow into the mold.

#### Step 2: Make the mold

After you have created a pattern, it is time to make your mold. As we mentioned above, you may choose to make a reusable mold, which is typically made from metal, or a single-use mold, which may be made from sand, plaster, or ceramic shell. Each of these methods for making molds are optimized for different casting metals and various levels of pattern complexity. If you are working with a wax or plastic pattern, you can burn out the pattern inside of a kiln.

#### Step 3: Choose the metallic alloy

All metal castings are produced from either ferrous or non-ferrous alloys. Alloys are a mixture of elements that provide the best mechanical properties for the final cast's use. Ferrous alloys include steel, malleable iron, and gray iron. Non-ferrous alloys that are most used in casting are aluminum, bronze, and copper. If you are working with precious metals in a jewelry studio, you may work with silver, copper, gold, and platinum.

#### Step 4: Melt the alloy

Melting processes vary between alloys because each alloy will have a different melting temperature. Essentially, melting consists of placing the solid alloy in a crucible and heating it over an open flame or inside of a furnace.



#### Step 5: Pour into the mold

Pour the molten metal into the mold cavity. If it is a small casting, you may simply pour from the crucible where the metal was heated directly into the mold. A larger casting may require a small



team to support heating the metal inside of a furnace and transferring the metal into a larger crucible or ladle before being poured into the mold.

Make sure to follow all recommended safety guidance when pouring molten metal. Make sure you wear protective clothing, including natural fiber clothing, long pants and sleeves, insulated gloves, and safety goggles. Work in a well-ventilated space to avoid any risks from dangerous fumes. Make sure you have a chemical fire extinguisher nearby and keep your walkway between the furnace and the mold clear. Allow the mold to solidify before moving onto the next step.



#### **Step 6: Remove the casting from the mold.**

When the metal has cooled and solidified, you can remove it from the mold. If you cast into a single-use mold, you can break away the mold from the casting. If you used a plaster investment, you would want to quench the plaster in water after the metal has solidified. The water will help break away the mold. For reusable molds, you may use ejector pins to extract your casting.

#### **Step 7: Finishing**

File and polish your solid metal cast! This may involve cleaning your cast metal object, like scrubbing away excess mold material in water, breaking off the casting gates with clippers for small objects, or even an angle grinder for large pieces

