DESIGN AND FABRICATION OF WIRE MESH MAKER

A PROJECT REPORT

Submitted by

SARATHIKANNAN R M 8115U23ME041

in partial fulfilment for the award of the degree

of

BACHELOR OF ENGINEERING

IN

MECHANICAL ENGINEERING

K. RAMAKRISHNAN COLLEGE OF ENGINEERING
(AUTONOMOUS)
SAMAYAPURAM, TRICHY

ANNA UNIVERSITY

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Under the Guidance of

Dr. K. LENIN, M.E, Ph.D.,

Department of Mechanical Engineering

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BONAFIDE CERTIFICATE

Certified that this project report titled "**DESIGN AND FABRICATION OF WIRE MESH MAKER "is** the bonafide work of **SARATHIKANNAN R M, (8115U23ME041),** who carried out the work under my supervision.

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(AUTONOMOUS)
Under
ANNA UNIVERSITY, CHENNAI

DECLARATION BY THE CANDITATE

I declare that to the best of my knowledge the work reported here in has been composed solely by myself and that it has not been in whole or in part in any previous application for a degree.

Submitted for the project Viva- Voce held at K. Ramakrishnan College of Engineering on ___________

SIGNATURE OF THE CANDITATE

ACKNOWLEDGMENT

We thank the almighty god without his blessing it would not have been possible for us to complete this project.

At this moment of having successfully completed our project, we wish to convey our sincere thanks and gratitude to our management of our college and our beloved chairman **Dr. K. RAMAKRISHNAN, B.E., Ph.D., who** provide all the facilities to us.

We would like to express our sincere thanks to our Executive Director

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We extend my gratitude to all the staff members of Mechanical Engineering Department, **K. RAMAKRISHNAN COLLEGE OF ENGINEERING (AUTONOMOUS)** for their kind help and valuable support to complete the project successfully. We would like to thank my parents, and friends who have always been a constant source of support in our project.

ABSTRACT

This project focuses on designing and developing a manual wire mesh maker, offering a cost-effective and customizable solution for small-scale and on-site wire mesh production. The machine enables the creation of wire mesh with adjustable grid sizes, wire thicknesses, and patterns, such as zigzag configurations, to cater to various industrial and construction needs. Its manual operation ensures ease of use and flexibility while maintaining consistent quality and minimizing material waste. The portable design allows for on-site fabrication, reducing logistical challenges and costs. This project provides an affordable and practical solution for wire mesh production, emphasizing sustainability, versatility, and accessibility.

.***Key Words: Manual wire mesh, customization, portability, sustainability.***

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CHAPTER 1

INTRODUCTION

A wire mesh maker is an innovative device designed to streamline the production of wire mesh, a crucial material used in industries such as construction, agriculture, and manufacturing. The machine aims to enhance efficiency and precision while significantly reducing manual effort in mesh fabrication. With increasing demand for high-quality and customizable mesh, the wire mesh maker offers a versatile solution by integrating advanced automation and user-friendly features. The development of this device is rooted in a vision to provide cost-effective, reliable, and portable systems that cater to diverse industrial needs.

The ideology behind the wire mesh maker is to transform the traditionally labour-intensive process of mesh production into a more streamlined and automated operation. This device leverages modern engineering principles to ensureconsistency and accuracy, meeting the stringent quality standards required in many applications. By integrating mechanisms for wire feeding, bending, and interlocking, the machine enables uniform and high-precision meshes. It operates with minimal supervision, making it a practical solution for businesses looking to reduce labour costs and increase production rates. The wire mesh maker embodies innovation by blending efficiency with simplicity, ensuring accessibility for a wide range of users.

At its core, the working principle of the wire mesh maker revolves around automation and mechanical precision. Raw wires are fed into the machine, where they undergo processes such as bending, pattern formation, and interlocking to form a grid. The machine incorporates motors and precision guides to maintain uniform spacing and alignment throughout the mesh. Operators can control parameters such as wire thickness, mesh size, and grid design, allowing for customization according to specific requirements. Advanced versions may include sensors and automated controls to further optimize the process and reduce material waste, making the operation more sustainable. One of the key features of the wire mesh maker is its ability to create zigzag-patterned wires, which are essential in certain mesh designs. This is achieved using a specialized bending mechanism that alternates the wire's direction at consistent angles and intervals. The design of the zigzag wires can be adjusted by modifying the amplitude and wavelength of the bends, enabling the production of meshes with varying strengths and aesthetics. This flexibility is particularly useful in applications where specific structural or decorative patterns are required. The machine’s ability to produce consistent zigzag wires ensures the durability and reliability of the final mesh product. To address the growing need for mobility and on-site usability, the wire mesh maker also comes in a portable version. This compact and lightweight design incorporates all the essential functionalities of a standard machine while offering the added advantage of portability. Features such as a foldable frame, modular components, and optional battery operation make it an ideal choice for remote or temporary work sites. The portable version is particularly useful in construction and agricultural settings where wire mesh needs to be fabricated directly at the application site, eliminating the need for transportation and reducing project timelines.

The portable wire mesh maker is designed with user convenience in mind, featuring an intuitive control panel and adjustable settings. Operators can easily customize the machine to handle different wire gauges, mesh sizes, and patterns without requiring extensive technical knowledge. Its robust construction ensures durability, even in demanding work environments, while its energy-efficient operation minimizes running costs. By combining portability with functionality, the device empowers users to produce high-quality wire mesh wherever and whenever it is needed.

The wire mesh maker represents a groundbreaking advancement in mesh production technology, providing a versatile solution for a wide range of industrial applications. Its innovative design integrates automation, precision, and portability, effectively addressing challenges associated with traditional mesh fabrication. Boththe standard and portable versions offer reliable and efficient ways to produce high-quality meshes with customizable patterns, making them adaptable to various needs. By streamlining the production process, reducing manual effort, and ensuring consistent output, this device is set to become an essential tool in industries that rely heavily on wire mesh for structural, functional, or decorative purposes.

CHAPTER 2

LITERATURE REVIEW

The development of the wire mesh maker draws upon the foundational concepts explored in *"Manufacturing Processes for Engineering Materials"* by Kalpakjian and Schmid. Wire mesh, essential for industries like construction and agriculture, has traditionally been produced using labour-intensive orsemi-automated processes, as detailed in *"Industrial Robotics"* by Groover et al. These conventional techniques face challenges such as inconsistent product quality and high labour costs. Recent research underscores the need for efficient and versatile solutions, paving the way for the innovation of the wire mesh maker. Wire mesh production involves processes like cutting, bending, and interlocking wires, as discussed in *"Sheet Metal Forming Processes"* by Altan et al. Traditional approaches struggle to meet demands for customization and uniformity, highlighting the importance of advanced systems to overcome these challenges.

Automation in manufacturing has transformed production capabilities, as described in *"Automation, Production Systems, and Computer-Integrated Manufacturing"* by Groover. Technological advancements like programmable logic controllers (PLCs) and sensor-driven monitoring systems are increasingly being employed to optimize wire mesh production, including processes like feeding, bending, and cutting. The wire mesh maker integrates these technologies to ensure high-speed, high-precision production. For specific applications requiring intricate designs, such as zigzag or grid patterns, wire bending mechanisms play a crucial role. Techniques like roller bending and CNC-based shaping, explained in *"Metal Forming Mechanics and Metallurgy"* by Hosford and Caddell, contribute to the machine's ability to produce complex patterns with accuracy and efficiency.

Material selection is crucial in wire mesh production, influencing the durability and performance of the final product. This is extensively analyzed in *"Materials Science and Engineering: An Introduction"* by Callister and Rethwisch. The wire mesh maker supports diverse materials, including steel and aluminum, each with unique mechanical properties such as tensile strength and bending behavior. Research into coating and treatment technologies, as detailed in *"Corrosion Engineering"* by Fontana, informs the development of meshes that resist environmental degradation, ensuring high durability for various industrial applications.

The principles of portable manufacturing systems are elaborated in *"Manufacturing Engineering and Technology"* by Kalpakjian and Schmid. Compact designs with energy-efficient systems allow on-site applications, significantly reducing logistical costs and improving operational efficiency. The wire mesh maker adopts these principles, ensuring a balance between transportability and robust functionality. Additionally, user-centric design elements, such as intuitive interfaces and adjustable settings, enhance operator experience and customization, enabling production tailored to specific needs.

Sustainability in manufacturing, as discussed in *"Sustainable Manufacturing:*

Challenges, Solutions, and Implementation Perspectives" by Dornfeld et al., has become an essential focus in modern systems. The wire mesh maker incorporates energy-saving technologies, precise material handling, and waste reduction features to minimize its environmental footprint. With automated error detection and efficient wire handling mechanisms, the machine aligns with the global emphasis on sustainable manufacturing practices. This combination of adaptability, precision, and eco-conscious design positions the wire mesh maker as a transformative tool in the industrial landscape.

CHAPTER 3

PROBLEM IDENTIFICATION

Manual labor dependency: Traditional wire mesh production relies heavily on manual labor, which leads to inconsistent quality, slower production rates, and increased labor costs. Skilled operators are required for tasks such as cutting, bending, and interlocking wires, creating inefficiencies and bottlenecks in the manufacturing process.

Inconsistent Quality: Manual methods and semi-automated systems often result in inconsistencies in wire alignment, grid spacing, and pattern uniformity. These variations can compromise the structural integrity and aesthetic quality of the mesh, limiting its reliability in critical applications like construction reinforcement.

Limited Customization: Existing systems struggle to produce highly customizable mesh designs, such as unique grid sizes, wire thicknesses, or complex patterns like zigzag configurations. This limitation reduces their versatility and applicability across diverse industrial needs, including decorative and specialized functional uses.

High Material Waste: Conventional production techniques often lead tosignificant material wastage due to inaccuracies in wire cutting, bending, and alignment. This inefficiency increases production costs and negatively impacts sustainability efforts in industries focused on reducing environmental impact.

Lack of Portability: Most wire mesh production systems are fixed in manufacturing facilities, requiring pre-fabrication and transportation to project sites. This adds logistical challenges, increases transportation costs, and limits the ability to produce mesh on-site, particularly in remote or large-scale construction projects.

Complexity of Operation: Many wire mesh production machines require extensive training and expertise to operate, which can be a barrier for small-scale businesses or operations in regions with limited access to skilled labor. This complexity further reduces the adoption of automated solutions.

Limited Material Compatibility: Traditional systems are often designed to handle a narrow range of materials, restricting their use for specific applications. In industries requiring specialized materials like high-strength steel, corrosion-resistant alloys, or lightweight metals, this limitation creates additional challenges.

Inefficiency in Small-Scale or Custom Projects: For small-scale or custom projects, traditional large-scale manufacturing setups are inefficient, requiring significant time and resources for setup and operation. This makes it challenging for smaller businesses or one-time projects to access affordable and high-quality wire mesh.

Energy Inefficiency: Many wire mesh production systems consume significant energy, contributing to high operational costs and environmental impact. This inefficiency is particularly problematic in large-scale operations where energy conservation is a priority.

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Limited Integration of Modern Technology: Existing wire mesh systems often lack advanced features like programmable settings, real-time error detection, and automation. The absence of these technologies limits production efficiency, increases downtime, and fails to meet the growing demand for modern, adaptive manufacturing solutions.

CHAPTER 4
OBJECTIVES

Enhance Production Efficiency: To reduce manual labour dependence and increase production speed and consistency through automation, streamlining the wire mesh manufacturing process.

Improve Product Quality: To ensure uniformity and precision in wire alignment, grid spacing, and pattern designs, guaranteeing the structural integrity and visual appeal of the final product.

Enable Customization: To provide flexible and programmable settings, allowing the production of mesh designs with varying grid sizes, wire thicknesses, and complex patterns, meeting diverse industrial needs.

Promote Sustainability: To minimize material waste and reduce energy consumption through precise cutting and bending, aligning with eco-friendly and cost-efficient production practices.

Increase Portability and Accessibility: To design a portable, user-friendly system that can be easily transported to on-site locations, enabling wire mesh production in remote areas or for small-scale projects.

CHAPTER 5

SELECTION OF MATERIALS

5.1 METAL FRAME:

A metal frame is a structural framework made from metal materials, typically steel, aluminium, or other alloys, used to support and enclose various components or systems. Metal frames are known for their strength, durability, and resistance to wear and corrosion, making them ideal for a wide range of applications, from construction and automotive industries to machinery and furniture design.

The frame consists of a network of interconnected metal parts, often including beams, supports, and joints, which work together to bear loads, distribute stress, and provide stability. Metal frames are often custom-designed to meet specific structural requirements, with the choice of material depending on factors likeweight, strength, and environmental conditions.

In applications like construction, metal frames provide the backbone for buildings, bridges, and industrial structures, ensuring structural integrity and longevity. In machinery, they act as the foundation for assembling parts and components, offering rigidity and support. Additionally, metal frames can be used in portable devices and equipment, such as in the wire mesh maker, where the frame supports the functionality and mobility of the machine while maintaining strength andstability under operation.

The key advantages of metal frames include high load-bearing capacity, resistance to environmental degradation, ease of maintenance, and the ability to be fabricated into complex shapes for diverse applications. Depending on the manufacturing process, metal frames can be welded, bolted, or fastened together, and are often treated with coatings or finishes (e.g., powder coating or galvanization) to enhance durability.

5.2 STABILITY FRAME:

A stability wood frame refers to a structural framework made from wood, designed to provide support and stability for various applications, such as buildings, furniture, and equipment. Wood frames are typically constructed from solid timber or engineered wood products like plywood, MDF (medium-density fibreboard), or laminated veneer lumber (LVL), depending on the required strength and application.

The frame is built by joining wooden beams, studs, or posts to create a skeleton structure that supports the load and distributes stress evenly across the system. Wood is chosen for its natural strength, versatility, and aesthetic appeal, as well as its relatively low cost compared to materials like metal or concrete. In construction, wooden frames are commonly used for residential buildings, interior walls, doors, and windows, providing both structural integrity and insulation.

In terms of stability, wood frames rely on the inherent strength of the wood and the design of the frame itself. Properly constructed wood frames can bear substantial loads, but their stability can be influenced by factors such as wood species, grain direction, moisture content, and the quality of the joinery. To enhance stability, wooden frames are often reinforced with metal brackets, screws, or nails, ensuring that the connections remain secure over time.

Wood frames are also relatively lightweight, making them easier to handle and assemble than metal or concrete alternatives. However, they can be more susceptible to environmental factors such as humidity, temperature fluctuations, and pests, which can affect their durability. To mitigate these issues, wood frames are often treated with preservatives, sealants, or finishes to increase their resistance to decay, rot, and insect damage.

Overall, stability wood frames are valued for their combination of strength, flexibility, and natural appeal, offering reliable support for a variety of applications when properly designed and maintained.

5.3 STEEL PLATE:

A steel plate, particularly a cuboidal plate, refers to a flat, rectangular or square-shaped piece of steel with a cuboid (3D rectangular) form. These plates are commonly used in construction, manufacturing, and machinery applications due to their strength, durability, and versatility. Steel plates are made from various grades of steel, each tailored to specific needs based on factors such as strength, corrosion resistance, and machinability.

Typically, a steel cuboidal plate has a uniform thickness and is defined by its length, width, and depth. The thickness of the plate can vary depending on the intended application, ranging from thin sheets for lighter structural uses to thicker plates for heavy-duty applications like bridge building, pressure vessels, or industrial machinery.

Steel plates are manufactured through processes like hot rolling or cold rolling, where steel is passed through rollers to achieve the desired thickness and shape. They can also be cut, welded, or formed into other shapes, making them versatile components for structural frameworks, floors, walls, and other architectural or industrial elements.

One of the primary benefits of a steel cuboidal plate is its high strength-to-weight ratio, which makes it capable of supporting heavy loads without excessive weight. It also offers excellent resistance to wear, impact, and high temperatures, along with resistance to corrosion when coated or alloyed with elements such as chromium (as in stainless steel). This makes steel plates suitable for use in harsh environments, including industrial settings, marine applications, and outdoor infrastructure.

In terms of applications, steel cuboidal plates are used in a variety of industries, including construction (for foundations, support beams, and structural frames), automotive (as body panels, chassis components), and heavy equipment manufacturing (as base plates, frames, and parts that require high load-bearing capacity).

The primary advantages of steel plates include their durability, adaptability, and strength, making them an essential material in any industrial or construction setting where reliability and longevity are important.

Use of cuboidal plate:

The use of a cuboidal steel plate in a wire mesh maker, particularly for the bending of wire, plays a crucial role in ensuring the precision and stability of the bending process. The cuboidal steel plate serves as a sturdy, flat surface on which the wire is manipulated during the manufacturing process. This material provides the necessary support and rigidity to maintain accuracy while bending or shaping the wire into the desired pattern, such as a zigzag or grid configuration.

The steel plate's solid, stable structure offers several advantages in the wire mesh production process:

Support for Bending Mechanism: The cuboidal steel plate acts as a foundation or base where the wire is securely placed before being bent. It helps guide the wire as it moves through the bending mechanisms, ensuring that the wire maintains its intended path and that the bends are uniform and precise.

Durability and Strength: Steel's inherent strength allows it to withstand the high forces applied during the wire bending process without deforming or warping. This ensures that the bending process remains consistent over time, preventing any distortion or irregularities in the mesh.

Uniform Bending Angles: The smooth, flat surface of the steel plate helps achieve consistent bending angles for the wire, ensuring uniformity in the mesh pattern. Whether forming simple straight lines or complex zigzag patterns, the steel plate acts as a reference point that helps maintain accurate alignment and spacing between wires.

Heat Resistance: In cases where the bending process involves heat (such as in welding or high-temperature shaping), the steel plate's heat-resistant properties ensure that it can endure the thermal stresses without degrading, allowing it to function effectively in a variety of wire mesh manufacturing setups.

Efficient Material Flow: The cuboidal shape of the steel plate provides a controlled environment for wire feeding and bending, which ensures smooth material flow. This contributes to a faster and more efficient production process, reducing downtime or material jams.

Overall, the cuboidal steel plate serves as a critical component in the wire mesh maker by providing stability, durability, and precision during the wire bending process. Its robust properties ensure that the wire is bent consistently, leading to high-quality, uniform wire mesh for various industrial and commercial applications.

5.4 MILD STEEL:

Mild steel, also known as plain-carbon steel, is the most common form of steel because its price is relatively low while it provides material properties that are acceptable for many applications, more so than iron. Low- carbon steel contains approximately 0.05–0.320% carbon making it malleable and ductile. Mild steel has a relatively low tensile strength, but it is cheap and malleable; surface hardness can be increased through carburizing. It is often used when large quantities of steel are needed, for example as structural steel. The density of mild steel is approximately 7.85 g/cm3 (7850 kg/m3 or 0.284 lb/in3) andthe Young's modulus is 210 GPa (30,000,000 psi).

Low-carbon steels suffer from yield-point run out where the material has two yield points. The first yield point (or upper yield point) is higher than the second and the yield drops dramatically after the upper yield point. If a low-carbon steel is only stressed to some point between the upper and lower yield point thenthe surface may develop Lüder bands. Low-carbon steels contain less carbon than other steels and are easier to cold-form, making them easier to handle. Mild steel isone of the most commonly used construction materials. It is very strong and can bemade from readily available natural materials. It is known as mild steel because of its relatively low carbon content.

Mild steel usually contains 40 points of carbon at most. One carbon point is .01 percent of carbon in the steel. This means that it has at most .4 percent carbon. Most steels have other alloying elements other than carbon to give them certain desirable mechanical properties. 1018 steel, a common type of mild steel, contains approximately .6 percent to .9 percent manganese, up to .04 percent phosphorus, and up to .05 percent sulphur. Varying these chemicals affects properties such as corrosion resistance and strength. Mild steel is very strong due to the low amount of carbon it contains. In materials science, strength is a complicated term. Mild steel has a high resistance to breakage.

Mild steel, as opposed to higher carbon steels, is quite malleable, even when cold. This means it has high tensile and impact strength. Higher carbon steels usually shatter or crack under stress, while mild steel bends or deforms. Mild steel is especially desirable for construction due to its weldability and machinability. Because of its high strength and malleability, it is quite soft. This means that it can be easily machined compared to harder steels. It is also easy to weld, both to itself and to other types of steel. It takes on a nice finish and is polishable. However, it cannot be hardened through heat treatment processes, as higher carbon steels can. This is not entirely a bad thing, because harder steels are not as strong, making them a poor choice for construction projects**.**

5.5 ROLLER:

The roller used to roll out PVC-coated wire in a wire mesh maker is a critical component in ensuring the smooth and efficient production of high-quality wire mesh. These rollers are typically made from high-strength materials such as steel or aluminium, offering durability to withstand the constant pressure and friction during the rolling process. To prevent damage to the PVC coating, some rollers feature a rubber or polyurethane coating, providing a protective layer that ensures the wire’s coating remains intact and scratch-free.

The primary function of the roller system is to guide and flatten the PVC-coated wire as it moves through the machine. The wire, which is coated with PVC for enhanced durability and corrosion resistance, is fed into the roller system, where it

is evenly tensioned. The rollers help shape the wire into the desired straightness and smoothness while ensuring the PVC coating remains consistently appliedacross the wire. Proper tension control is crucial to maintaining uniformity in the coating and preventing slack or distortion. Rollers also help ensure the wire's tension is appropriately adjusted during the process, which is essential for the integrity of the PVC coating. Whether the wire is coated through dipping orextrusion, the roller system ensures that the wire adheres to the coating without disruptions, such as misalignment or kinks. This precise control enables a continuous and uniform feed, improving the overall efficiency and speed of the wire mesh production.
Another advantage of the roller system is its ability to handle high-speed production. By guiding the wire through the system, the rollers allow for fast, continuous processing, making it well-suited for high-volume manufacturing. This contributes to increased productivity, ensuring that the production process runs smoothly with minimal interruptions.

The roller system is also designed to withstand elevated temperatures in cases where the PVC coating involves heat, such as in extrusion processes. These rollers can endure heat without warping or degrading, maintaining their performance evenunder high-temperature conditions. This feature ensures the quality of both the wire and its PVC coating throughout the manufacturing process. Furthermore, the rollers are often adjustable or customizable to accommodate a variety of wire gauges and diameters. This flexibility allows the roller system to process different wire sizes, from thin wires used in delicate mesh applications to thicker, more robust wires needed for heavy-duty uses. The adjustable tension and shape control ensure that all wire types, regardless of size, maintain consistency and quality during production.

5.6 FASTNERS:

Fasteners used to connect the metal frame with the stability frame play a critical role in ensuring the structural integrity and stability of the overall system, particularly in machinery or equipment like a wire mesh maker. These fasteners are designed to securely hold the metal and stability frames together, enabling the frames to function as a cohesive unit while withstanding mechanical forces, vibrations, and external stresses during operation. The most common types of fasteners used for this purpose include bolts, screws, nuts, rivets, and welds. Bolts and nuts are frequently used due to their ease of installation and removal, allowing for secure connections that can also be adjusted or disassembled if needed. Screws provide a similar function but are often used in smaller applications where precision and tightness are crucial. These fasteners are typically made from high- strength materials such as steel, stainless steel, or alloy metals to ensure durability and resistance to wear and corrosion.

Rivets are often used when a permanent, non-removable connection is needed. They are especially useful in situations where vibration resistance is important, as they provide a solid bond that is less likely to loosen over time. Welds, on the otherhand, offer a more permanent and robust connection. Welding is used when maximum strength is required, as it joins the metal components by melting and fusing them together, creating a highly durable and rigid connection.

The choice of fasteners depends on several factors, including the load-bearing requirements, the need for adjustability, and the environment in which the equipment will operate. For example, in outdoor or corrosive environments, stainless steel fasteners are preferred due to their corrosion-resistant properties. In contrast, for applications where high strength and vibration resistance are essential, heavy-duty bolts, nuts, or rivets may be used.

Fasteners must be selected carefully to ensure they can handle the stresses that will be applied during the operation of the wire mesh maker or any similar machinery. This includes considering factors like torque, tensile strength, and the potential for wear over time. Additionally, to ensure proper alignment and a secure fit, fasteners are typically used in combination with washers, spacers, and other components to distribute pressure evenly across the connection points.

CHAPTER 6

DESIGN AND FABRICATION

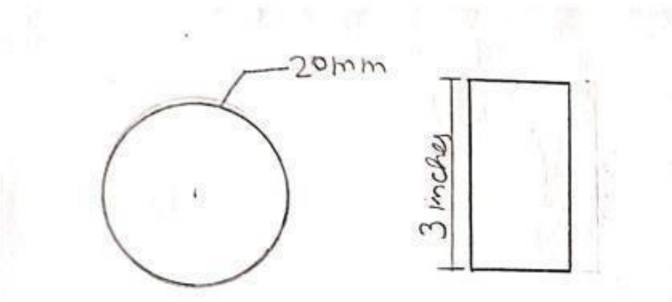

Fig 6.1:Pvc pipe

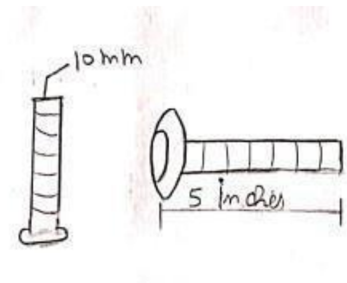

Fig 6.2:Screw

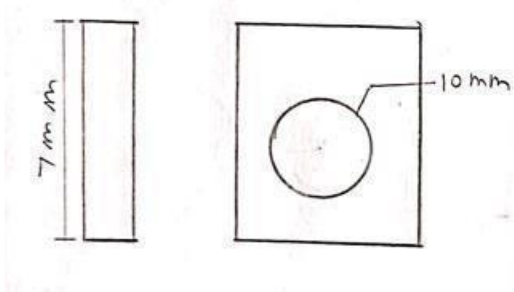

Fig 6.3: Back plate

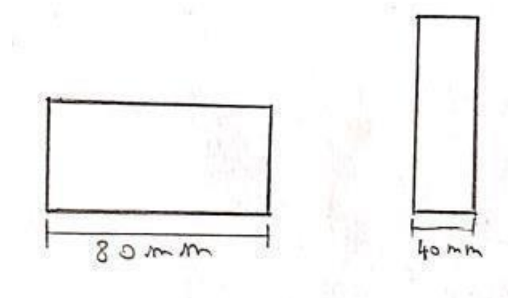

Fig 6.4: Handle plate

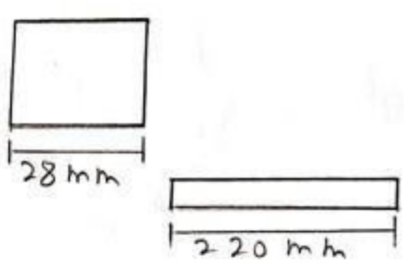

Fig 6.5: Cuboidal plate

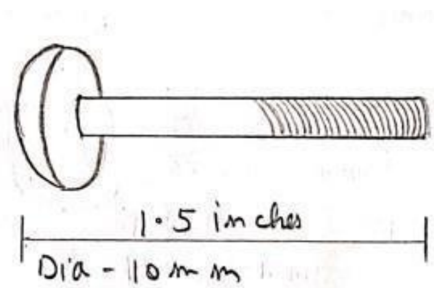

Fig 6.6:Fastners

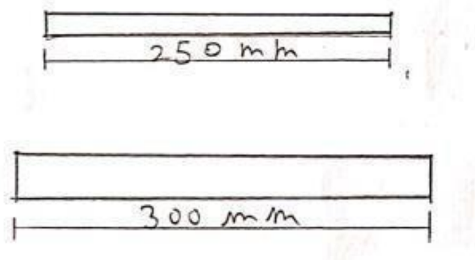

Fig 6.7 : Steel frame

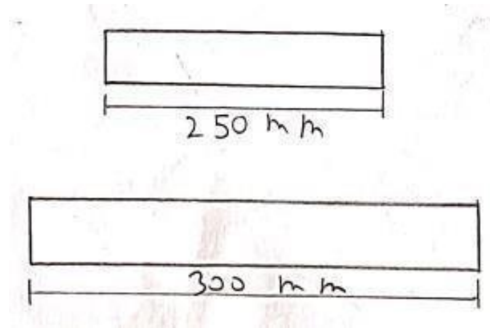

Fig 6.8 :Stability frame

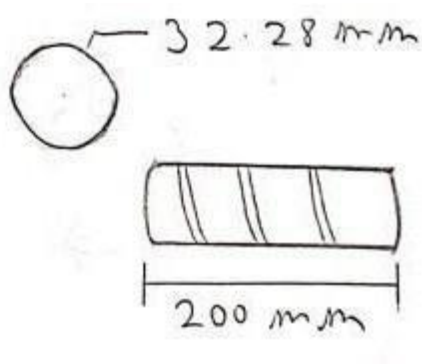

Fig 6.9: Cylindrical pipe

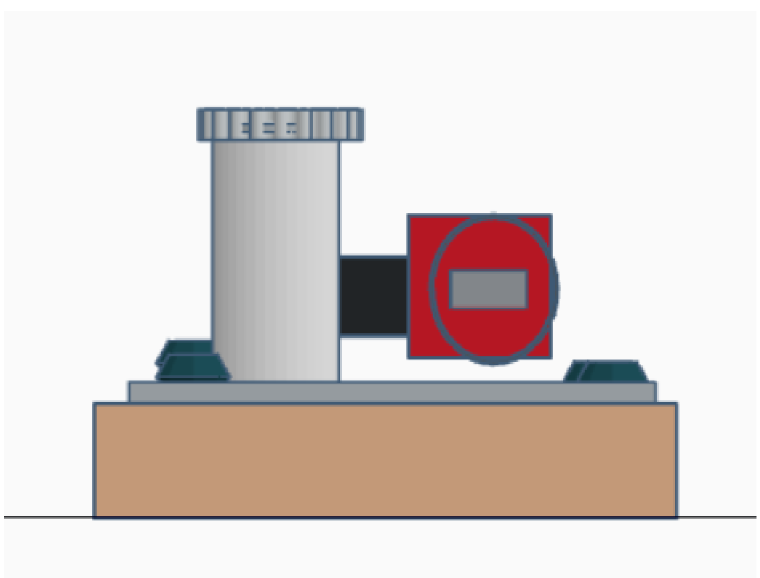

Fig 6.10: Front view

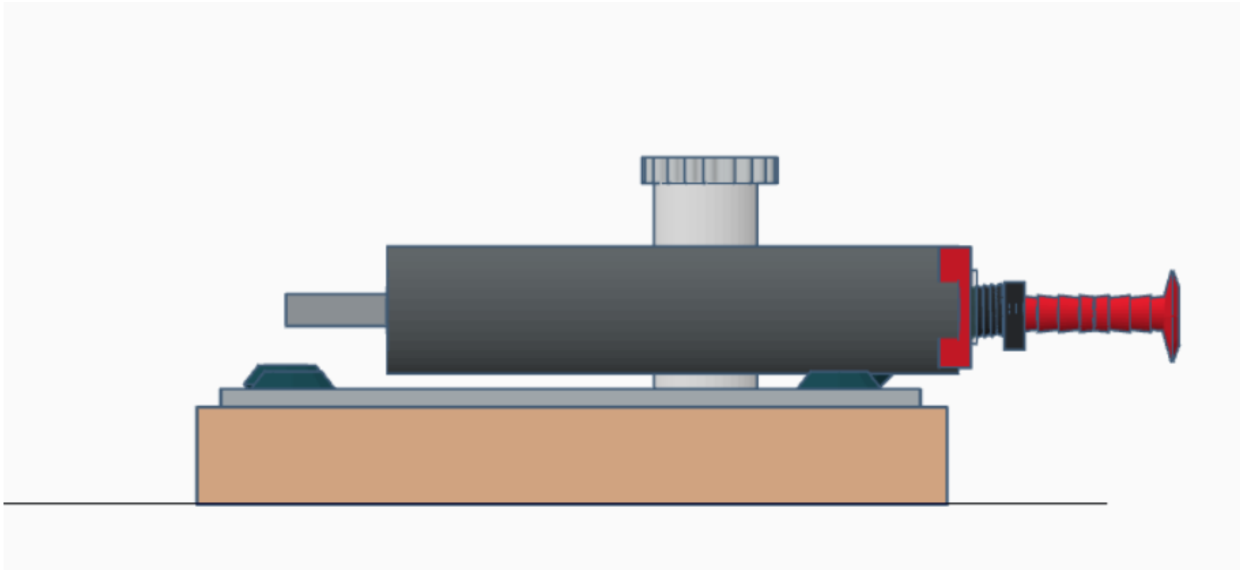

Fig 6.11 : Side view

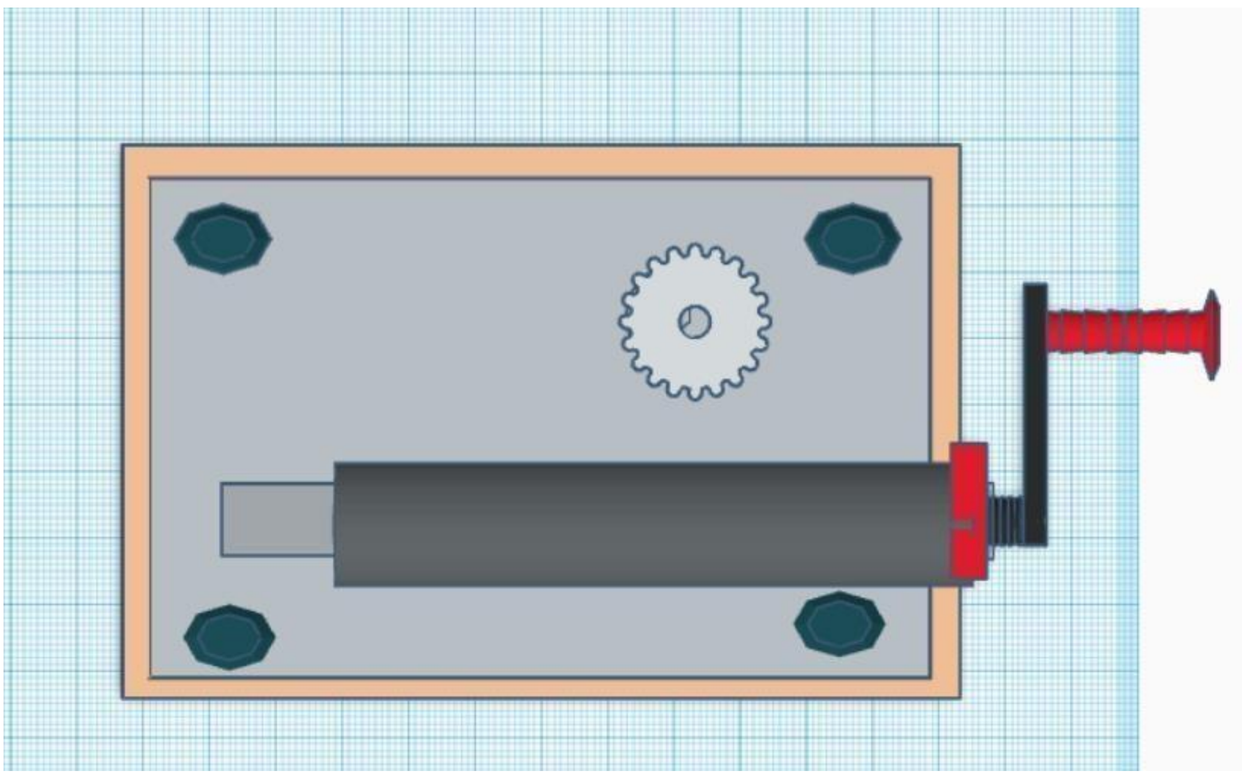

Fig 6.12: Top view

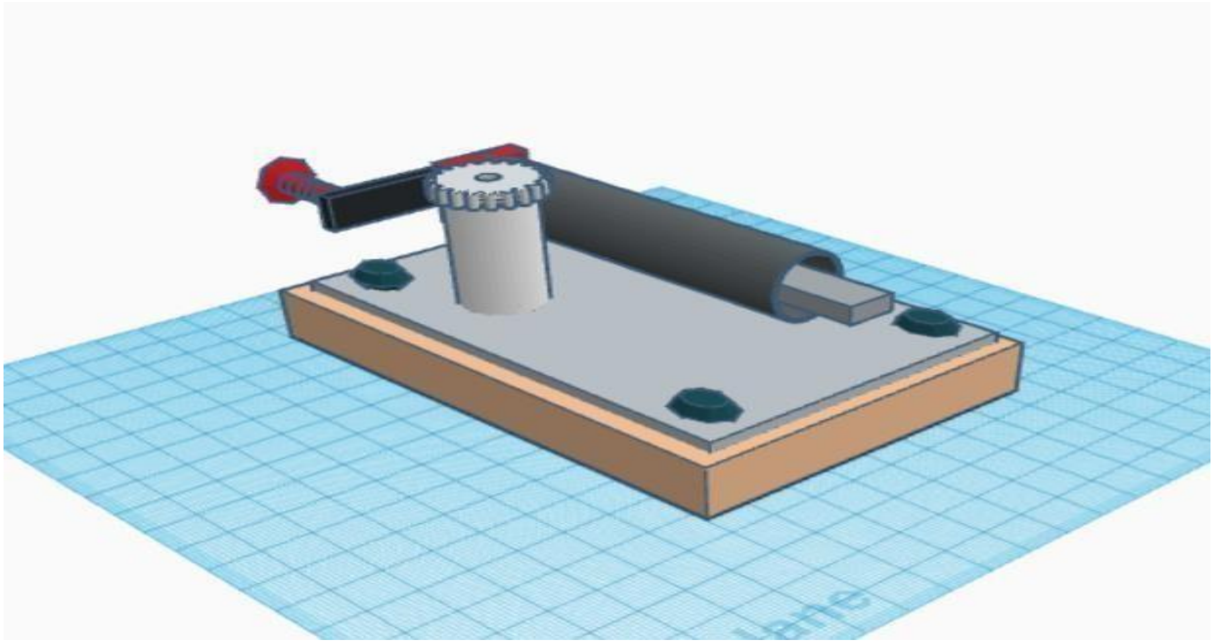

Fig 6.13: 3D model

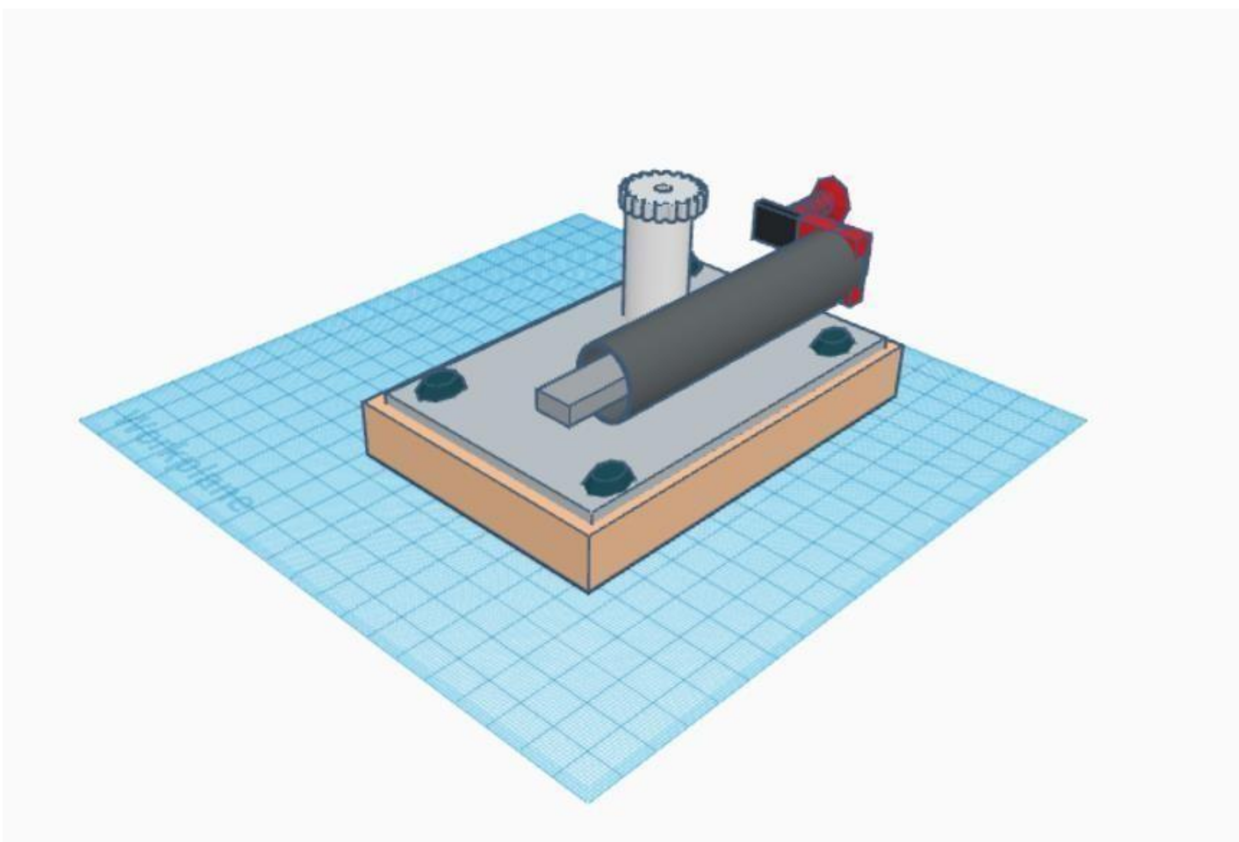

Fig 6.14 : 3D model

CHAPTER 7

FABRICATION MODEL

Fig 7.1: Fabricated project

Fig 7.2: Fabricated project

CHAPTER 8

COST ESTIMATION

SL NO	PARTICLES	AMOUNT
1	OTHER ALLOWANCES	250
2	LATHE	500
3	DRILLING	500
4	WELDING	500
5	GAS CUTTING COST	100
6	OVERHEAD CHARGES	100
7	MATERIAL COST	700
8	MANUFACTURING COST	700
	TOTAL COST	3,350

CHAPTER 9
WORKING PRINCIPLES

The working principle of a manual wire mesh maker is based on simple mechanical systems that rely on manual input for shaping and interlocking wires into a mesh pattern. The process begins with feeding the wire into the machine, typically by placing a spool or coil of wire into the feeder. The operator controlsthe speed of the wire feed, usually by turning a crank or handle, pulling the wire through the system. Once the wire is in place, it moves to the bending section, where manual bending tools or rollers are used to shape the wire into the desired pattern, such as a zigzag or grid configuration. The operator adjusts these tools or rotates the wire to ensure uniform bends, which are critical for the mesh's structure.

After the wire is bent, the next step involves aligning and spacing the wires. Manual wire mesh makers typically feature adjustable guides or spacers that help the operator maintain consistent wire spacing. These guides are manually adjusted to ensure the correct alignment of each row of wire, ensuring uniformity across the mesh. Once the wire is aligned, the individual wires are interlocked, either by twisting the ends together or using tools like pliers to secure them. This step is essential to ensure the mesh holds together and maintains its structural integrity.

Finally, the operator cuts the formed mesh to the desired size using manual cutting tools, such as hand-operated cutters or shears.

This step requires careful measurement to achieve precise dimensions. After cutting, any finishing touches, such as smoothing sharp edges or applying coatings for rust prevention, may be performed manually. While the process is labour- intensive and slower than automated systems, it offers flexibility for small-scale production or customized wire mesh, with the operator's expertise being crucial in achieving consistent quality and accurate results throughout the production process.

CHAPTER 10
RESULT

The result of this manual wire mesh maker project would be the creation of a cost-effective, customizable, and efficient machine for small-scale wire mesh production. It would allow for the creation of wire mesh with adjustable grid sizes and wire thicknesses, improving quality control and reducing material waste. The machine would be easy to operate, flexible for various applications, and portable, making it ideal for small businesses or on-site production. Overall, the project would provide a practical solution for customized wire mesh at a lower costcompared to automated systems.

CHAPTER 11

CONCLUSION AND FUTURE SCOPES

Conclusion:

- The manual wire mesh maker project successfully demonstrates a cost-effective and efficient solution for small-scale wire mesh production.
- It allows for the production of customizable wire mesh with adjustable grid sizes, wire thicknesses, and patterns, improving flexibility in various industrial and construction applications.
- The machine provides enhanced quality control with minimal material waste, offering a sustainable alternative to larger, automated systems.
- The design offers portability and ease of use, making it ideal for small businesses or on-site production, especially in remote locations.
- laborers. The semi-automatic butt removal machine eliminates the need for repetitive manual labor, thus reducing the risk of work-related injuries and promoting better working conditions.

Future Scopes:

- **Automation Integration:** Future development could incorporate automated feeding, bending, and interlocking systems to increase production speed and reduce human error.
- **Material Compatibility:** Expanding the machine's ability to handle different types of materials (e.g., galvanized, stainless steel, or PVC-coated wire) for broader application.

- **Scalability**: Designing scalable models that can cater to both small and large-scale production needs.

- **Advanced Customization Features:** Adding digital controls or touchscreen interfaces for more precise adjustments and automated pattern creation.

- **Energy Efficiency Improvements:** Incorporating energy-efficient motors or solar-powered systems to reduce the operational cost and environmental impact of the machine.

The manual wire mesh maker project delivers a cost-effective and efficient solution for producing customizable wire mesh, suitable for small-scale applications. It ensures improved quality control, minimal material waste, and ease of use, with a design that supports portability for on-site production. Future advancements could include automation, broader material compatibility, scalability, and energy-efficient features, enhancing its functionality and sustainability for diverse industrial needs.

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