

**“DEVELOPMENT OF ANTI RIOT ELECTRIC SHIELD
FOR DEFENCE AGENCY”**

A

Project Report

Submitted in the partial fulfillment of the requirements

For the Degree of

Bachelor of Engineering

In

Electrical Engineering (Electronics&Power)

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**DEPARTMENT OF ELECTRICAL ENGINEERING
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ABSTRACT

The invention provides an antiriot shield. The antiriot shield comprises an arc-shaped insulating shield body, wherein a plurality of first metal conductive sheets are vertically fixed on the outer wall of the arc-shaped insulating shield body; a second metal conductive sheet is fixedly arranged between every two first metal conductive sheets; a plurality of positive electrode nails are fixedly arranged on the first metal conductive sheets; the second metal conductive sheets are fixedly provided with a plurality of negative electrode nails which are connected with a positive electrode and a negative electrode of a high-voltage power supply by lead wires respectively; the high-voltage power supply is arranged in an insulating handle and the insulating handle is fixed on the inner wall of the arc-shaped insulating shield body. The antiriot shield has good antiriot performance and is safe and reliable; damages on lives are not caused; the antiriot shield has light weight and is convenient to carry and easy to control.

Anti-riot electric shields are devices used by law enforcement and security personnel during riot control operations. The shields are designed to protect the user from physical harm, while also providing a non-lethal means of crowd control

The shield is typically made of a lightweight, yet durable material and has a built-in electrical charge that can be used to disperse a crowd. The application of an anti-riot electric shield involves several steps. First, the user must ensure that the shield is charged and functioning properly. This can be done by checking the battery or power source and running a quick test to ensure that the electrical charge is working. Once the shield is ready to be used, the user can approach the crowd and use the shield to push back any individuals who are attempting to breach a barricade or create a disturbance.

The electrical charge can be activated by pressing a button or switch on the shield, and the charge will be delivered through the surface of the shield. The electric charge can cause discomfort or pain to individuals who come into contact with the shield, which can discourage them from continuing their behavior. It is important to note, however, that the use of an anti-riot electric shield should be done with caution and in accordance with proper training and protocols, as misuse or excessive force can lead to serious injuries or legal ramifications.

Keywords: Battery charger, charging station, electric vehicle, standards.

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CHAPTER 1

CHAPTER 1

I. INTRODUCTION

1.1 General

An anti-riot electric shield is a type of protective equipment used by law enforcement and security personnel during riot control operations. It is designed to protect the user from projectiles, melee weapons, and other forms of physical attack.

The shield typically consists of a rigid, polycarbonate or acrylic panel that is mounted on a metal frame. The frame is equipped with handles or straps that allow the user to hold the shield securely. The shield may also be equipped with additional features, such as a built-in light, a pepper spray, or a buzzer.

One unique feature of an anti-riot electric shield is the presence of an electric shock system. The system typically consists of conductive strips or wires embedded in the shield's surface, which are connected to a power source and a control unit. When activated, the electric shock system delivers a non-lethal electric shock to any person who comes into contact with the shield, which can help to deter attackers and prevent them from getting too close.

Overall, the anti-riot electric shield is an effective tool for law enforcement and security personnel to use during riot control operations. It provides a high level of protection against physical attacks, and the electric shock system can help to prevent injuries and reduce the risk of escalation during a riot or other form of civil unrest. An anti-riot electric shield is a type of non-lethal weapon used by police and other law enforcement agencies to control and subdue individuals in situations where the use of deadly force is not warranted.

The anti-riot electric shield typically consists of a large, flat panel made of conductive material that is capable of delivering an electric shock when it comes into contact with a person. The shield is powered by a rechargeable battery, and the shock is delivered through a set of electrodes located on the front of the shield.

When activated, the electric shield sends a high-voltage, low-amperage electric shock through the person's body, causing involuntary muscle contractions and rendering them momentarily incapacitated. The shock is designed to be painful but not lethal, and its effects typically wear off within a few minutes.

Anti-riot Electric shields are typically used in situations where police need to subdue a person who is resisting arrest or posing a threat to themselves or others. They are often used in conjunction with other non-lethal weapons, such as pepper spray or Tasers, and are considered to be a valuable tool in maintaining law and order while minimizing the risk of serious injury or death to both suspects and law enforcement personnel.

How much current is required to shock a person?

Current	Reaction
1 milliamp	Just a faint tingle.
5 milliamps	Slight shock felt. Disturbing, but not painful. Most people can "let go." However, strong involuntary movements can cause injuries.
6-30 milliamps	Painful shock. Muscular control is lost. This is the range where "freezing currents" start. It may not be possible to "let go."
50-150 milliamps	Extreme pain, respiratory arrest, severe muscular contractions. Individual cannot let go. Death is possible.
1,000-4,300 milliamps (1-4.3 amps)	Ventricular fibrillation (uneven uncoordinated pumping of the heart.) Muscular contraction and nerve damage begins to occur. Death is likely.
10,000 milliamps (10 amps)	Cardiac arrest and severe burns occur. Death is probable

While any amount of current **over 10 milli- amperes (0.01 amp)** is capable of producing painful to severe shock, currents between 100 and 200 milli-amperes (0.1 to 0.2 amp) are lethal and Human body resistance are follows:

CONDITION (area to suit)	RESISTANCE	
	DRY	WET
Finger Touch	40 k Ω to 1 M Ω	4 k Ω to 15 k Ω
Hand Holding Wire	10 k Ω to 50 k Ω	3 k Ω to 6 k Ω
Finger-Thumb Grasp	10 k Ω to 30 k Ω	2 k Ω to 5 k Ω
Hand Holding Pliers	5 k Ω to 10 k Ω	1 k Ω to 3 k Ω
Palm Touch	3 k Ω to 8 k Ω	1 k Ω to 2 k Ω
Hand Around 1.5 inch pipe (or drill handle)	1 k Ω to 3 k Ω	0.5 k Ω to 1.5 k Ω
Two Hands around 1.5 inch pipe	0.5 k Ω to 1.5 k Ω	250 k Ω to 750 k Ω
Hand Immersed	---	200 k Ω to 500 k Ω
Foot Immersed	---	100 k Ω to 300 k Ω
Human Body, Internal, Excluding Skin	---	200 k Ω to 1,000 k Ω

1.2 Problem Statement



Riots are today a part of every civilized society.



Disagreement for government decisions, religious intolerance, events, hateful content etc. are some of the many reasons that can easily spark.



Riots to handle a riot police, and army must be able to pacify/disperse the crowd without harming them.



This is the major problem with riot control situations, rioters do not listen to any announcements and need to be handled with force which leads to injuries or even deaths of rioters as well as police

CHAPTER 2

CHAPTER 2

II. LITERATURE REVIEW

2.1 Antiriot shield (CN104329992A China):

Introduction:

The invention provides an antiriot shield. The antiriot shield comprises an arc-shaped insulating shield body, wherein a plurality of first metal conductive sheets are vertically fixed on the outer wall of the arc-shaped insulating shield body; a second metal conductive sheet is fixedly arranged between every two first metal conductive sheets; a plurality of positive electrode nails are fixedly arranged on the first metal conductive sheets; the second metal conductive sheets are fixedly provided with a plurality of negative electrode nails which are connected with a positive electrode and a negative electrode of a high-voltage power supply by lead wires respectively; the high-voltage power supply is arranged in an insulating handle and the insulating handle is fixed on the inner wall of the arc-shaped insulating shield body. The antiriot shield has good antiriot performance and is safe and reliable; damages on lives are not caused; the antiriot shield has light weight and is convenient to carry and easy to control.

The technical scheme adopted is:

A kind of riot shield, comprises cambered surface insulation shield body and high voltage source, it is characterized in that:

On the outer wall of cambered surface insulation shield body, be longitudinally fixedly installed multiple first metallic conduction sheet, between every two the first metallic conduction sheets, be fixedly installed a second metallic conduction sheet. Each first metallic conduction sheet is fixed with multiple conical anode electrode nail. Each second metallic conduction sheet is fixed with multiple conical negative electrode nail.

The positive pole of high voltage source is connecting after binding post on multiple first metallic conduction sheets is connected by wire. The negative pole of high voltage source is connecting after binding post on multiple second metallic conduction sheets is connected by wire.

High voltage source is arranged in insulated handle, and the two ends of insulated handle are fixedly connected with respectively by the insulate inner wall of shield body of insulation strut and cambered surface. Insulated handle is provided with power switch, on the wire that the voltage output end that power switch is serially connected in high voltage source is connected with the first metallic conduction sheet.

The inner wall of cambered surface insulation shield is provided with restraint zone. For being enclosed within an arm of policeman during use.

Advantages of this invention:

1. Safe and reliable, cannot damage life, lightweight, easy to carry, easily manipulate.
2. Avoid and the human contact caused a riot, sharp-pointed electrode nail thorn people, serves the effect of barbed wire, and maintains distance.
3. Can disperse riot personnel, electrode nail can send strong electric discharge sound, hides the instinct that electric shock is riot personnel.
4. Ruffian holds fierce tool when attacking policeman, can anxious time bib, bib is sharp electrode nail touching ruffian health simultaneously, and high-voltage electric shock released by electrode nail makes ruffian faint in short-term, loses violence.
5. Several policeman personnel riot shield starts electric shock simultaneously, can send the huge electric shock sound; can produce very large deterrent effect to ruffian.
6. When arresting the criminal of hand-held cutlery, available riot shield of the present invention is contained, and electric shock is implemented in touching by force, criminal is fainted in short-term, arrests smoothly.

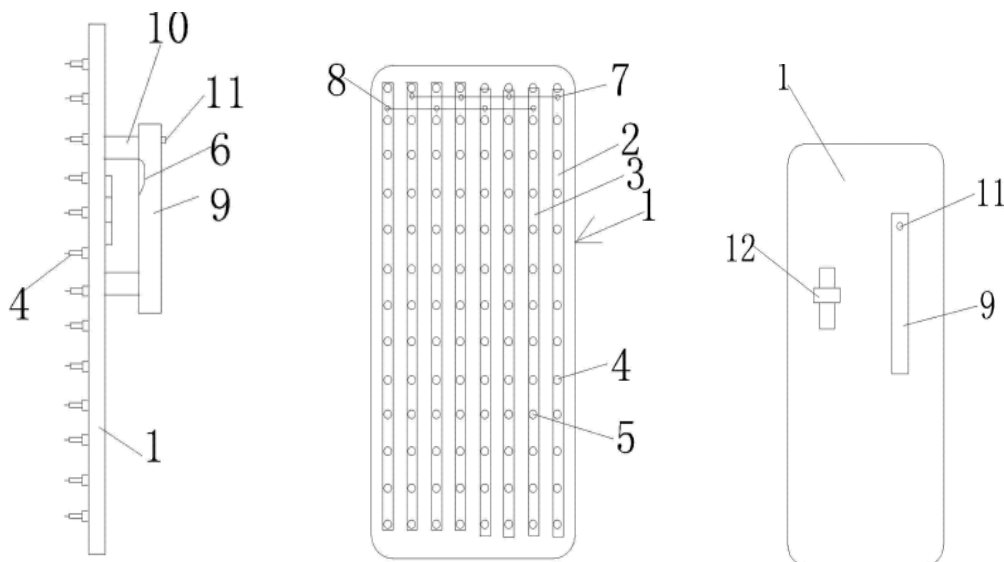


Fig.1 Structural representation of the invention.

Detailed description of the invention:

A kind of riot shield, comprises cambered surface insulation shield body 1 and high voltage source 6, it is characterized in that:

- On the outer wall of cambered surface insulation shield body 1, be longitudinally fixedly installed multiple first metallic conduction sheet 2, between every two the first metallic conduction sheets 2, be fixedly installed a second metallic conduction sheet 3.
- Each first metallic conduction sheet 2 is fixed with multiple conical anode electrode nail 4.
- Each second metallic conduction sheet 3 is fixed with multiple conical negative electrode nail 5.
- The positive pole of high voltage source 6 is connect after binding post 7 on multiple first metallic conduction sheets 2 is connected by wire. The negative pole of high voltage source 6 is connect after binding post 8 on multiple second metallic conduction sheet 3 is connected by wire.
- High voltage source 6 is arranged in insulated handle 9, and the two ends of insulated handle 9 are fixedly connected with respectively by the insulate inner wall of shield body 1 of insulation strut 10 and cambered surface. Insulated handle 9 is provided with power switch 11, on the wire that the voltage output end that power switch 11 is serially connected in high voltage source 6 is connected with the first metallic conduction sheet 2.
- The inner wall of cambered surface insulation shield body 1 is provided with restraint zone 12, for being enclosed within an arm of policeman during use.

2.2 SecPro Anti-Riot Shield for Riot Control:

Introduction:

Riot Shields protect the user from melee attacks with blunt or edged weapons and also thrown projectiles. SecPro Stun Tech Anti-Riot Shield is a non-lethal deterrent that's ideal for passive crowd control, VIP protection and entry shield. These **Riot Shield** protect person from the top of the head to the knees, durable and lightweight protection device from melee attacks with blunt or edged weapons and also thrown projectiles.

Riot Shield Features:

- Designed to quell a riot or a disturbance with electric shock
- Structured with shatter-resistant clear poly-carbonate
- Protects body safely and completely from the impact of stones or stick and from the threat of acid or incendiary liquid
- Transparent poly-carbonate sheet providing wide vision.

Application:

Electrified Shields are designed to deter, to Defend and to Protect with non-lethal application able to restore law and order with LESS THAN LEATHAL force.

Used by:

Prison Cell extractions, Tactical Police units and General Security Contracting companies.

Energizer and construction:

1. IEC tested non-lethal effective electronic shocking device with an open discharge output of +- 80,000 volts at an average current of less than 1 milliamp.
2. Lightweight aluminium metal strips, dim 19mm (wide) x1.8mm (thick) securely fixed with new insulated nylon studs. Each stud fitted with an insulated nylon washer on the inner face of the shields and strategically placed in 6x2 patterns over the front area of shield including outer rim forms the grid through which the non-lethal shock is conducted.
3. Protective pinch-edged black beading securely fitted around the shield edge
4. Activation of shock is by heavy-duty self-return thumb operated momentary switch conveniently situated for activation in the moulded hand grip to allow for continuous rapid deterrent response.
5. Include SAFETY KILL switch with wrist strap and 125DB siren activated in the event of an emergency should the official be disarmed and simulates rendering the shield harmless.

6. All EPS STUNTECH shields are fitted with sealed detachable control box for easy maintenance which houses all electronics including a battery pack ON/OFF switch and standby ON indicator.
7. Dual Visible test spark at pre-determined location in front of the shield ensures:
 - (1) Effective intermittent dual test spark deterrent for would-be aggressors.
 - (2) Low battery indicator i.e. test spark weak and slow; battery needs to be charged.
8. Fully charged battery will continuously operate the shock for up to 1 000+ quarter second bursts.
9. Standby time approx. 500 + hours including centre Nylon Webbing belt support strap.



Fig.2 SecPro Anti-Riot Shield for Riot Control

CHAPTER 3

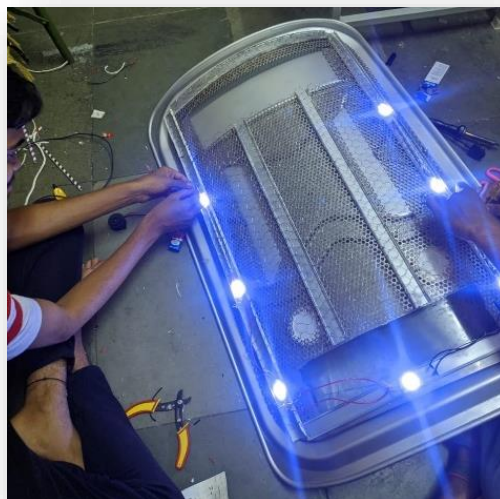
CHAPTER 3

III. METHODOLOGY

Designing an anti-riot electric shield requires careful consideration of both the intended use and potential safety concerns. Here is a general methodology for creating such a shield:

- **Identify the purpose:** Determine the intended use of the shield. Is it meant to disperse crowds, protect law enforcement officers, or both?
- **Choose the appropriate materials:** The shield should be made of a non-conductive material such as polycarbonate or fiberglass. The material should be strong enough to withstand impact and be lightweight enough for easy maneuverability.
- **Determine the size and shape:** The shield should be large enough to provide adequate protection for the user, but not too large that it becomes cumbersome to handle. The shape should be designed to maximize protection while maintaining visibility.
- **Incorporate an electric component:** The shield should include an electric component that can be activated to repel attackers or disperse crowds. This can be achieved using a stun gun or a Taser-like device
- **Include safety features:** The electric component should include safety features such as a trigger lock or safety switch to prevent accidental activation.
- **Test and refine:** The shield should be tested in a controlled environment to ensure its effectiveness and safety. Refine the design as necessary to improve its performance.
- **Train users:** Law enforcement officers who will be using the shield should receive proper training on how to use it safely and effectively.

It's important to note that the use of an electric shield in riot control can be controversial, and there may be legal and ethical considerations that need to be addressed before implementing such a device.



CHAPTER 4

CHAPTER 4

IV. DESIGN MODEL

Designing an anti-riot electrical shield requires careful consideration of various factors such as the materials used, the size and weight of the shield, and the electrical components used to create the shock feature. Here's a basic design model to get you started:

- **Shield Material:** The shield should be made of a strong, lightweight material such as polycarbonate or aluminum. It should be able to withstand impact and be resistant to corrosion.
- **Handle Design:** The handle of the shield should be ergonomically designed to allow for a secure grip, even when wearing gloves. It should be made of a non-conductive material to prevent electrical shock to the user.
- **Electrical Components:** The electrical components of the shield should be designed to deliver a non-lethal electrical shock to deter attackers. The voltage should be high enough to incapacitate the attacker, but not so high as to cause permanent injury. The components should be designed to ensure the safety of the user as well.
- **Battery:** The shield will require a rechargeable battery to power the electrical components. The battery should be able to deliver enough power for several uses before needing to be recharged.
- **Charging System:** The charging system should be designed to allow for easy and safe recharging of the battery. It should be able to charge the battery quickly and have a built-in safety feature to prevent overcharging.
- **Size and Weight:** The shield should be large enough to provide adequate protection, but not so large as to be cumbersome. It should be lightweight enough to allow for easy maneuverability, but sturdy enough to withstand impact.
- **Additional Features:** Depending on the specific requirements of the shield, additional features may be added such as a flashlight, camera, or radio.

Overall, designing an anti-riot electrical shield requires careful consideration of the materials used, the size and weight, and the electrical components used to create the shock feature. The safety of the user should be the top priority, and the shield should be designed to be effective in deterring attackers while also being easy to use and maintain.

Name	Specifications	More about
Polycarbonate Shield	Dimensions:38x23x 1.5 Inch	Wide temperature range, Good tensile strength
Two Battery	9V &4V Battery Pack	Rechargeable.
7 High Power LED	Intensity: 300 lumens, 12V	220V-240v AC Color temp. 3000K
Two Trigger buttons and switch button	Push-buttons are used to Turn-On the LED light & to electrify the shield.	Switch button is used for capacitor discharge and also used for safety button.
Indicators	Red light indicates ON and OFF operation of circuit	
Mild Steel	35x22 Inch	Resistivity coefficient 15×10^{-8}
Taser circuit	<ul style="list-style-type: none"> • Operating voltage: 3.6 v to 5v • Current rating: 300mA(0.3A) 	<ul style="list-style-type: none"> • Output voltage: 800V to 1500 V • It is used to produce high voltage, low current, to send shock waves to weaken or paralyze the subject.
Charging Slot	• -	• -
Pepper spray	<ul style="list-style-type: none"> • Powerful spray that reaches to 15 feet 	<ul style="list-style-type: none"> • Causes no permanent injuries Non-toxic and Non-flammable
Conducting Net	<ul style="list-style-type: none"> • 30x19 Inch 	• -
Circuit box and casing strip	<ul style="list-style-type: none"> • 9.5x6.5 cm 	•
Battery case	• -	• -

Components:

POLYCARBONATE SHIELD:

A polycarbonate shield is a type of protective barrier made from polycarbonate, a strong and durable thermoplastic material. Polycarbonate shields are commonly used in a variety of applications where protection from impact or other hazards is required, such as:

1. **Industrial Safety:** Polycarbonate shields are used in industrial settings to protect workers from flying debris, chemical splashes, and other hazards.
2. **Law Enforcement:** Polycarbonate shields are used by law enforcement officers as a means of protection against thrown objects and other threats.
3. **Sports:** Polycarbonate shields are used in various sports to protect athletes from injury, such as in hockey or football helmets.
4. **Medical:** Polycarbonate shields are used in medical settings to protect healthcare workers from infectious diseases.

BATTERY:

1. When connecting batteries in series, the voltage of the batteries is added together, but the capacity (mAh) remains the same. When connecting batteries in parallel, the voltage remains the same, but the capacity is added together.
2. It's important to note that when creating a battery pack, the batteries should be of the same type, size, and chemistry to ensure proper performance and prevent damage to the batteries or devices being powered. Additionally, care should be taken when connecting the batteries to ensure the correct polarity and prevent short-circuiting.

MILD STEEL:

1. Mild steel, also known as low carbon steel or plain carbon steel is a type of carbon steel that contains a low amount of carbon, typically less than 0.3%. This makes it relatively inexpensive and easy to work with, as it can be easily shaped and formed into various shapes.
2. One of the advantages of mild steel is its strength, as it has a high tensile strength and can withstand a significant amount of stress before breaking. It is also malleable and ductile, meaning it can be easily formed into various shapes without cracking or breaking.

HIGH POWER LED:

A high power LED (Light Emitting Diode) is a type of LED that is designed to produce a higher output of light than traditional LEDs. They are typically used in applications where a high level of brightness is required, such as in automotive headlights, outdoor lighting, and commercial lighting.

High power LEDs are made using a variety of materials, including gallium nitride (GaN) and indium gallium nitride (InGaN). They can produce a wide range of colors, including white, red, blue, and green, and can be used in both single-color and multicolor applications.

INDICATORS:

1. On-off indicators, also known as power indicators, are a type of indicator used to signal the on or off status of a device or system. They are typically used in electronic devices, such as appliances, computers, and other equipment, to provide a visual indication of the device's operating status.
2. On-off indicators can take many forms, including lights, LEDs, or symbols on a display screen. They are often designed to be easily visible and recognizable, using bright colors, flashing patterns, or other visual cues to convey information about the device's status.
3. In some cases, on-off indicators may also provide additional information about the device's status, such as indicating when the device is in standby mode, charging mode, or when an error or malfunction has occurred.

TEASER CIRCUIT:

1. A teaser circuit is a type of electronic circuit that is used to create a flashing or alternating light pattern, typically used in advertising or promotional displays to attract attention to a particular product or service.
2. The circuit consists of a timer, a capacitor, and a transistor or relay switch. When the circuit is first activated, the capacitor charges up through a resistor, and when it reaches a certain threshold voltage, it triggers the timer. The timer then switches the transistor or relay, which turns on the lights or other visual display.
3. The timer is set to turn off the transistor or relay after a specific period of time, allowing the capacitor to discharge and reset the circuit. This causes the lights or display to turn off and creates the flashing or alternating pattern.

CHARGING SLOT:

1. A charging slot, also known as a charging port, is a connector on a device that allows it to be charged using a cable connected to a power source. Charging slots are found on many electronic devices.
2. To charge a device using a charging slot, the user typically connects one end of a cable to the charging slot on the device, and the other end to a power source such as a wall outlet, computer, or portable battery pack. The device then begins to charge, with the speed of charging depending on the output of the power source and the capacity of the device's battery.
3. Charging slots are an essential feature of modern electronic devices, allowing users to conveniently and easily recharge their devices when they run low on

power. They have become standardized over time, with many devices using common connector types, making it easier for users to find compatible charging cables and adapters.

PEPPER SPRAY:

1. Pepper spray, also known as OC spray (Oleoresin Capsicum), is a type of self-defense weapon that uses a chemical compound derived from hot peppers to temporarily incapacitate an attacker. It is commonly used by law enforcement, military, and civilians as a non-lethal means of self-defense.
2. Pepper spray typically comes in a small canister that is easy to carry in a purse, pocket, or on a keychain. When the spray is used, it emits a stream of fine mist that contains capsaicin, the active ingredient in chili peppers. Capsaicin causes an intense burning sensation in the eyes, nose, throat, and skin, which can incapacitate an attacker for up to 30 minutes.
3. Pepper spray is considered a non-lethal weapon because it does not cause permanent damage or injury to the attacker, but it can be effective in stopping an attack and allowing the victim to escape. It is important to note that pepper spray should only be used as a last resort in self-defense situations, and users should be trained in its proper use to avoid accidental harm to themselves or others.

CIRCUIT BOX:

1. A circuit box, also known as an electrical panel or breaker box, is a central hub for electrical circuits in a building or home. It contains a collection of circuit breakers, which are switches that protect electrical circuits from overloading and short circuits, thereby preventing electrical fires and other hazards.
2. The circuit box is typically located in a utility room or basement and is connected to the main electrical service line coming into the building. The circuit breakers in the box are arranged in rows, with each breaker corresponding to a different circuit in the building. When a circuit becomes overloaded or shorted, the breaker automatically trips, cutting off power to that circuit and preventing damage to the electrical system.

BATTERY CASE:

1. A battery case is an accessory designed to provide additional battery life and protection for a mobile device, such as a smartphone or tablet. The battery case typically contains an additional battery, which can be charged separately and used to provide extra power to the device when its internal battery runs low.
2. The battery case typically fits around the device, providing additional protection against scratches, bumps, and drops. It also has a charging port that allows the device and the battery case to be charged simultaneously, typically using a USB cable connected to a power source such as a wall outlet or computer.

- 3. Battery cases come in various shapes, sizes, and capacities, with some models featuring additional features such as a built-in kickstand, LED indicators to show the battery level, or even wireless charging capabilities. Some battery cases are also designed to be waterproof or rugged, making them suitable for outdoor activities or harsh environments.

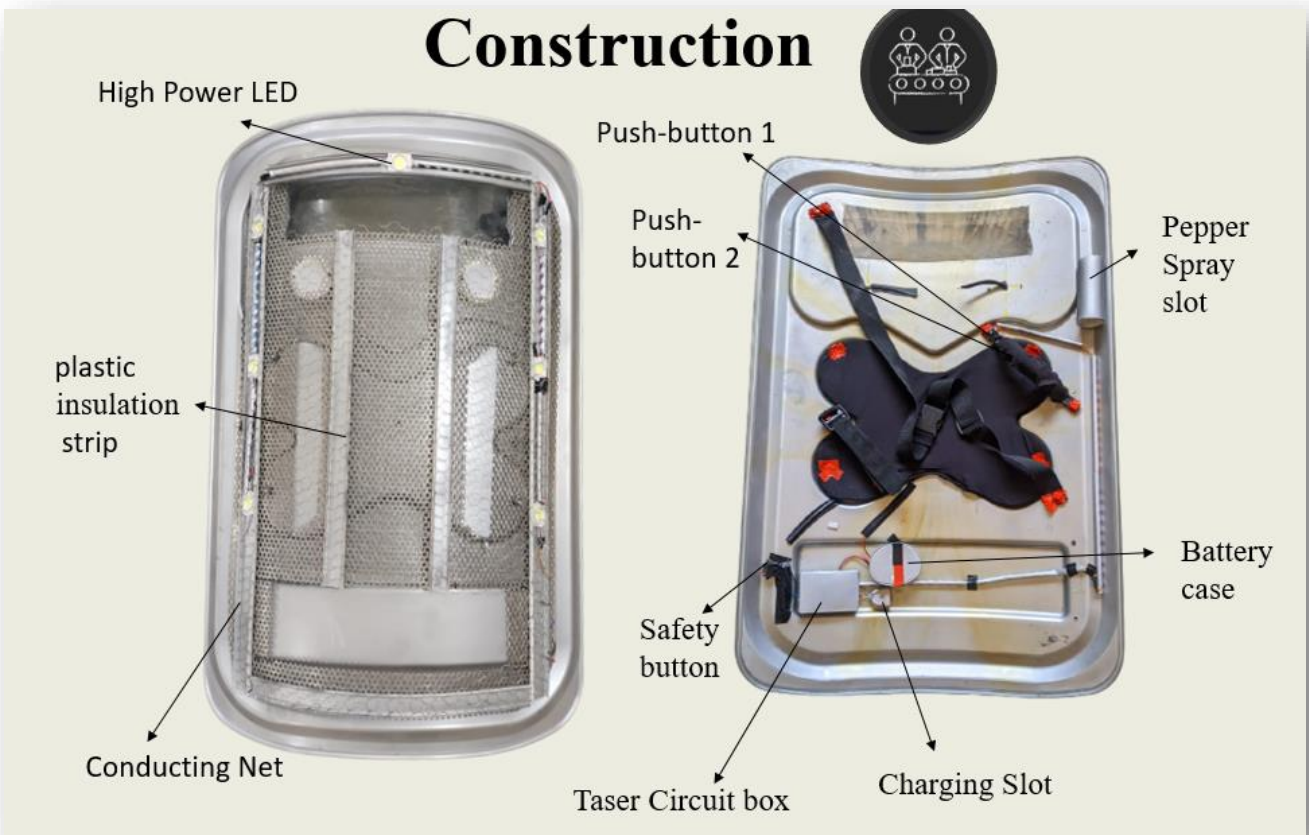
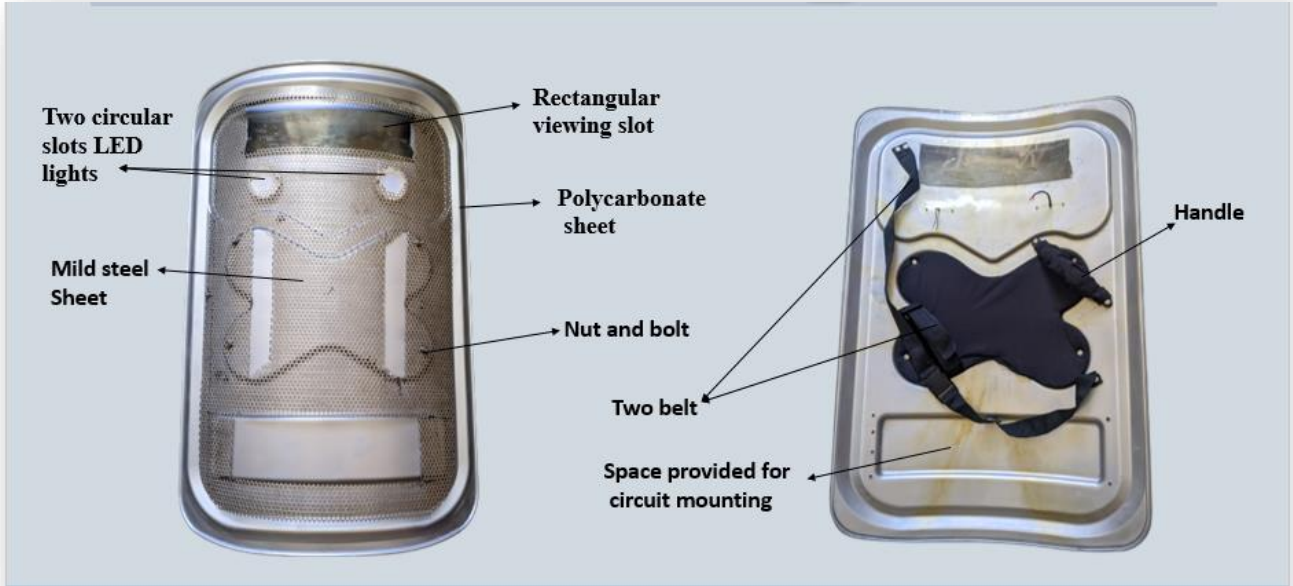


Fig 3: construction diagram of ARES



CHAPTER 5

CHAPTER 5

V. WORKING OF CIRCUIT:

An anti-riot electric shield is a type of shield that is designed to protect law enforcement officers from violent protesters or rioters. It is equipped with an electric shock feature that is meant to deter aggressors from attacking or attempting to grab the shield. The shield is typically made of lightweight and durable materials, such as polycarbonate or high-density polyethylene, and is reinforced with metal or carbon fiber for added strength. The electric shock feature is powered by a battery that is integrated into the shield.

When activated, the electric shock feature generates a high-voltage electrical charge on the surface of the shield. This charge is delivered to anyone who comes into contact with the shield, causing a painful electric shock that can incapacitate or deter an attacker. The amount of voltage delivered by the shield can be adjusted, depending on the situation and the level of force needed to subdue an aggressor.

The shield is also equipped with safety features, such as a lockout switch that prevents accidental discharge, and a safety timer that limits the amount of time the electric shock can be delivered to a single person. Anti-riot electric shields are primarily used by law enforcement agencies and security forces in riot control situations.

While they can be an effective tool for preventing violence and protecting officers, their use can also be controversial and has been subject to criticism from human rights groups.

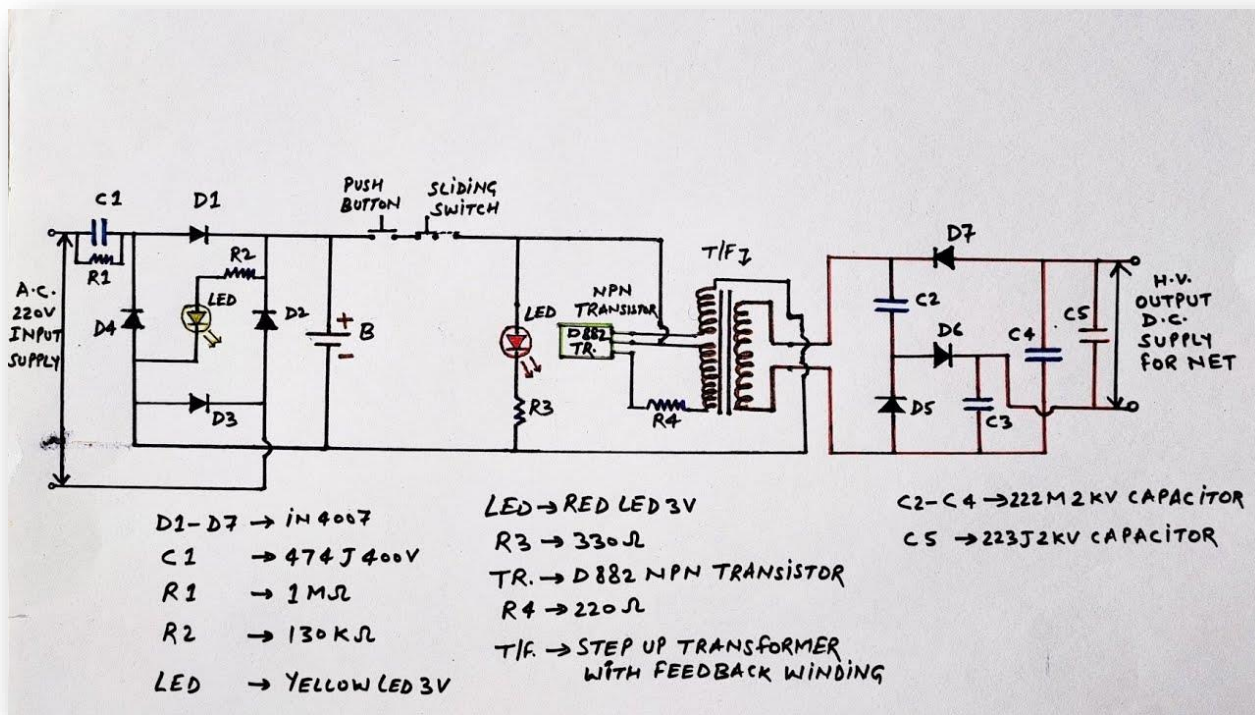


Fig 5: circuit diagram of Taser

A **Taser circuit**: This is a type of stun gun circuit that is designed to generate a high voltage, low current electrical shock. It typically consists of two main components: a voltage multiplier circuit and a control circuit. The voltage multiplier circuit is responsible for boosting the input voltage to a much higher output voltage. It usually consists of a series of capacitors and diodes that are connected in a ladder-like configuration. When a high voltage pulse is applied to the input, the capacitors charge up and discharge through the diodes, causing the voltage to multiply with each stage.

The control circuit is responsible for triggering the voltage multiplier circuit and regulating the output voltage and current. It typically consists of a microcontroller, a pulse generator, and a feedback loop. Which generates a series of high voltage pulses that are fed into the voltage multiplier circuit? The feedback loop monitors the output voltage and current and adjusts the pulse generator to maintain a consistent output.

When the stun gun is fired, the high voltage pulses generated by the pulse generator are fed into the voltage multiplier circuit, which multiplies the voltage to several tens of thousands of volts. The resulting electrical shock is delivered to the target through two electrodes that are usually mounted on the end of the stun gun.

The high voltage shock causes muscle contractions and disorientation in the target, making it an effective non-lethal weapon for law enforcement and self-defense. However, it is important to use a Taser circuit with caution and follow proper safety guidelines, as it can be dangerous if misused.

Calculation of Output:

The output voltage of the power supply should be in the range of 1000V to 2000V. The exact output voltage will depend on the design of the power supply. The current flowing through the mesh should be limited to a safe level to avoid damage to the power supply and ensure safety. The current limit can be calculated using Ohm's Law:

$$I = V / R$$

Where I is the current, V is the voltage, and R is the resistance of the mesh. The resistance of the mesh can be measured using a multi-meter. A typical current limit is 1mA. The power rating of the power supply should be sufficient to handle the current limit and the voltage output.

Note: Building high voltage circuits can be dangerous and should be done with caution. It is important to follow proper safety precautions and use appropriate insulation and protective equipment.



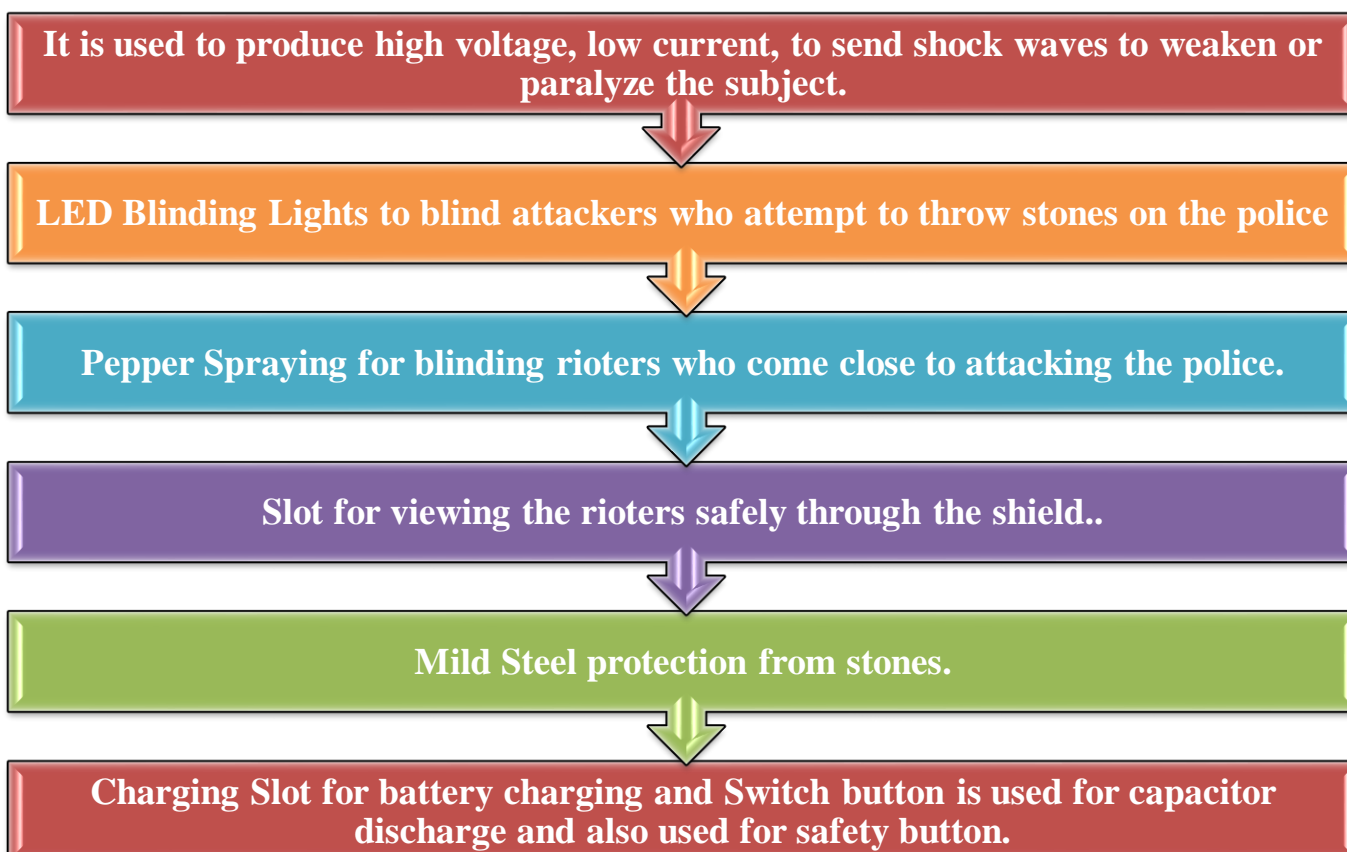
CHAPTER 6

CHAPTER 6

VI. FEATURES



Fig 4: Anti-Riot Electric Shield





CHAPTER 7

CHAPTER 7

VII. THE APPLICATION OF AN ANTI-RIOT ELECTRIC SHIELD:

Anti-riot electric shields are devices used by law enforcement and security personnel during riot control operations. The shields are designed to protect the user from physical harm, while also providing a non-lethal means of crowd control. The shield is typically made of a lightweight, yet durable material and has a built-in electrical charge that can be used to disperse a crowd. The application of an anti-riot electric shield involves several steps. First, the user must ensure that the shield is charged and functioning properly. This can be done by checking the battery or power source and running a quick test to ensure that the electrical charge is working. Once the shield is ready to be used, the user can approach the crowd and use the shield to push back any individuals who are attempting to breach a barricade or create a disturbance.

The electrical charge can be activated by pressing a button or switch on the shield, and the charge will be delivered through the surface of the shield. The electric charge can cause discomfort or pain to individuals who come into contact with the shield, which can discourage them from continuing their behavior. It is important to note, however, that the use of an anti-riot electric shield should be done with caution and in accordance with proper training and protocols, as misuse or excessive force can lead to serious injuries or legal ramifications.

- **Riot control:** The shield could be used by police or military personnel to control crowds during riots or protests, providing a protective barrier against objects such as stones, bottles, or other projectiles that may be thrown at them.



- **Border security:** The shield could be used by border patrol agents to protect themselves from attacks by individuals attempting to cross the border illegally.



- **Prison security:** The shield could be used by prison guards to protect themselves from attacks by inmates during riots or other disturbances.



- **Personal protection:** The shield could be used by individuals in high-risk professions, such as security guards or journalists, who may be exposed to violence or unrest in their line of work.



- **Special operations:** The shield could be used by Special Forces during high-risk operations, providing an extra layer of protection against potential threats.



- **Crowd Control:** An anti-riot electric shield could be used by police or military personnel to control crowds during riots or protests. The shield could provide a protective barrier against thrown objects and prevent attackers from getting too close to the user.



- **Border Control:** An anti-riot electric shield could be used by border patrol agents to protect themselves against attacks from people trying to cross borders illegally.



- **Correctional Facilities:** An anti-riot electric shield could be used by correctional officers to control inmates during riots or other situations where inmates may become violent.
- **VIP Protection:** An anti-riot electric shield could be used by security personnel to protect VIPs during public appearances or events where there is a high risk.





CHAPTER 8

CHAPTER 8

VIII. CONCLUSION

- To avoid injuries to military and police force personnel during riot control incidents, a polycarbonate shield has been developed.
- To solve this issue, we here design a smart Anti-riot shield that allows police personnel repel/arrest rioters without harming themselves or the rioters.
- Thus the lightweight Anti-riot shield is a smart combination of blinders, pepper spray and metal+ Kevlar protection to provide a solution to riot control.

IX. RESULT

General specifications of Anti-riot electric shields used by law enforcement and security personnel:

- **Material:** The shield is typically made of a strong and durable material such as polycarbonate or high-density plastic.
- **Size:** The shield is generally larger than a standard riot shield, measuring approximately 3-4 feet in height and 2-3 feet in width.
- **Weight:** The weight of an electric shield can vary, but it is typically heavier than a standard riot shield due to the added components required to generate the electric charge (between 4 to 5 kg.)
- **Voltage and Current:** The electric shield generates a low-level electric charge, typically ranging from 1000 to 5000 volts, with a current output of less than 10 to 30 milliamps.
- **Battery Life:** The battery life of an electric shield can vary depending on the frequency of use, but it is typically designed to last for several hours of continuous use.
- **Additional Features:** Some electric shields may come equipped with additional features, such as a built-in flashlight or Pepper Spraying for blinding rioters who come close to attacking the police.
- **Overall cost :** Rs.7000/-



It is important to note that the use of electric shields, like any non-lethal weapon, should be subject to strict guidelines and oversight to ensure that they are used appropriately and in a proportionate manner to the threat faced

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