



SNS COLLEGE OF TECHNOLOGY

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COIMBATORE-35.



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DEPARTMENT OF AUTOMOBILE ENGINEERING

COURSE NAME : 19AUB204 – AUTOMOTIVE ELECTRICAL AND ELECTRONICS ENGINEERING

II YEAR / IV SEMESTER

Unit 1 – Electrical Systems

Topic : Horns, Wiper and Trafficators



HORNS



- ❖ Horns are an essential component of an automobile, primarily used as audible warning devices to alert pedestrians and other drivers of the presence of the vehicle or an impending hazard.
- ❖ The primary function of a horn is to produce a loud sound that can be heard by others in the vicinity.
- ❖ This sound serves as a warning signal to alert pedestrians, cyclists, and other drivers of the vehicle's presence or an imminent danger.
- ❖ Types of Horns – Electromagnetic Horns, Air Horns, Musical Horns



COMPONENT OF HORN



- ❖ **Horn Button or Switch:** This is the control mechanism used by the driver to activate the horn. It is typically located on the steering wheel or dashboard within easy reach of the driver's hand.
- ❖ **Electromagnetic Coil:** In electromechanical horns, an electromagnetic coil serves as the primary mechanism for generating sound. When an electrical current is passed through the coil, it creates a magnetic field that causes a metal diaphragm to vibrate, producing sound waves.



COMPONENT OF HORN



- ❖ **Diaphragm:** The diaphragm is a thin, flexible metal or plastic disc located within the horn assembly. When the electromagnetic coil is activated, it causes the diaphragm to vibrate rapidly, producing the audible sound of the horn.
- ❖ **Resonating Chamber:** The resonating chamber is an acoustic cavity within the horn assembly that amplifies and enhances the sound produced by the vibrating diaphragm. It is designed to maximize the volume and clarity of the horn's sound output.



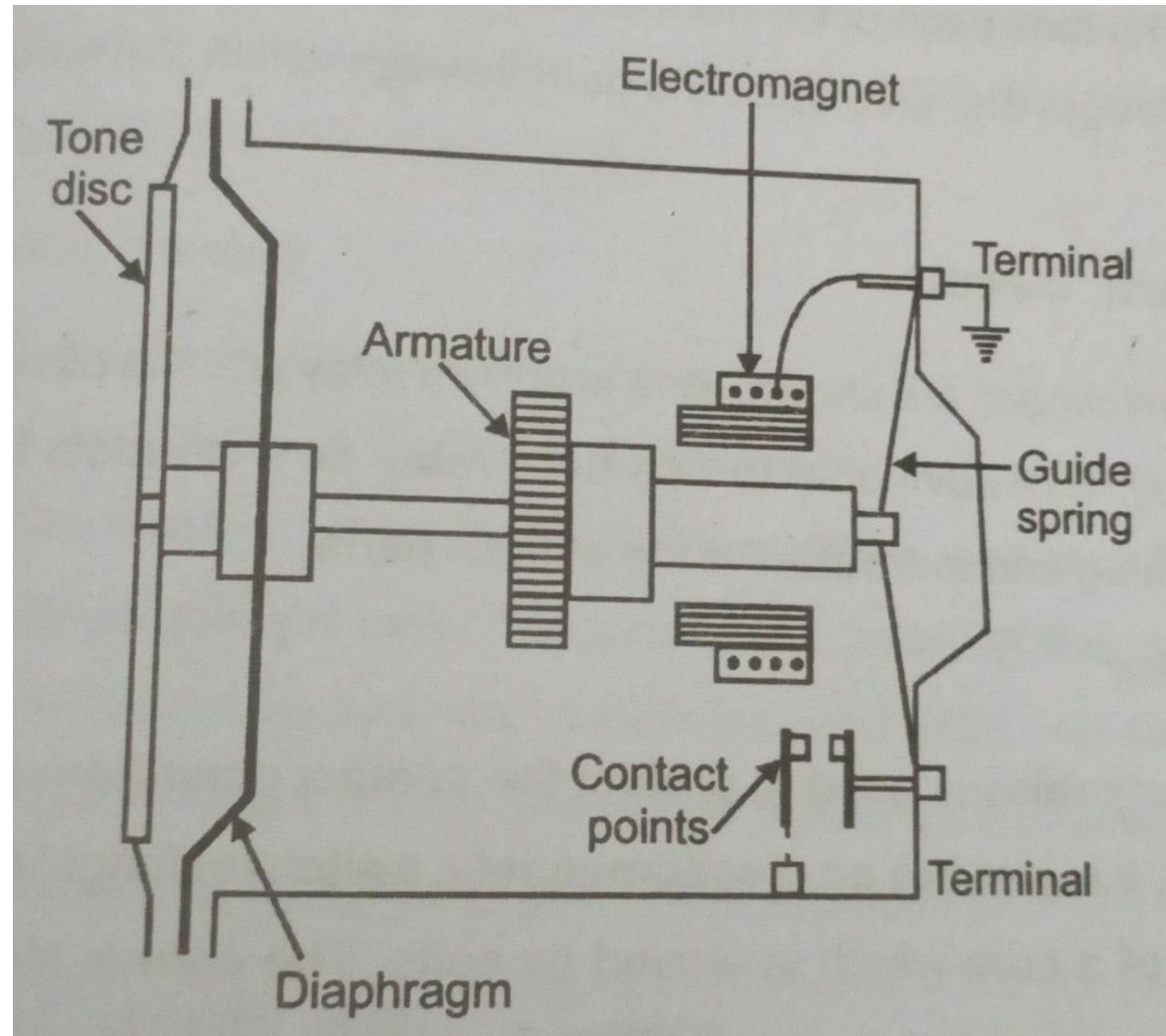
COMPONENT OF HORN



- ❖ **Mounting Bracket:** The mounting bracket is used to securely attach the horn assembly to the vehicle's chassis or frame. It is typically made of metal and may include rubber or other vibration-dampening materials to reduce noise and vibration.
- ❖ **Electrical Wiring:** Electrical wiring connects the horn assembly to the vehicle's electrical system, allowing it to receive power when the horn button or switch is pressed. It typically consists of insulated wires and connectors that transmit the electrical current needed to activate the horn.



HORNS





WORKING OF HORNS



- ❖ When the driver presses the horn button or activates the horn switch on the steering wheel or dashboard, it completes an electrical circuit that sends power to the horn assembly.
- ❖ The electrical current flows from the vehicle's battery through the wiring to the horn assembly.
- ❖ In an electromechanical horn (the most common type), the electrical current reaches an electromagnetic coil within the horn assembly.
- ❖ The coil consists of a wire wound around a metal core.
- ❖ The flow of electrical current through the coil generates a magnetic field around the core of the coil.



WORKING OF HORNS



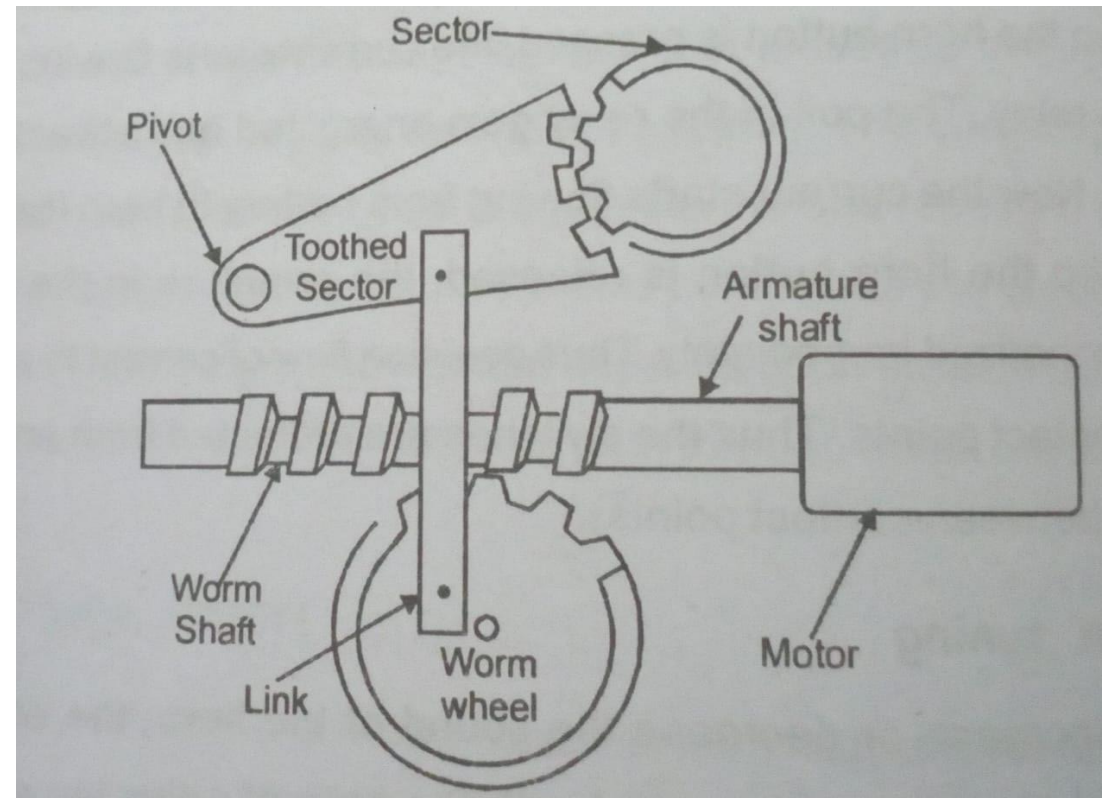
- ❖ The magnetic field interacts with a metal diaphragm (usually made of steel) located within the horn assembly.
- ❖ The diaphragm is attracted and repelled by the electromagnetic forces generated by the coil, causing it to vibrate rapidly.
- ❖ The rapid vibration of the diaphragm creates alternating areas of high and low pressure in the surrounding air, which generates sound waves.
- ❖ These sound waves travel outward from the horn assembly, producing the audible sound of the horn.



WIPER



- ❖ Wipers are essential components of a vehicle's windshield system, designed to keep the windshield clear of rain, snow, dirt, and other debris for improved visibility while driving





COMPONENTS OF WIPER



- ❖ The wiper blades are made of rubber or silicone and are attached to metal arms that are connected to the wiper motor.
- ❖ The blades are positioned in such a way that they make direct contact with the windshield surface.
- ❖ The wiper arms are connected to the wiper blades and move them back and forth across the windshield.
- ❖ The arms are typically made of metal or plastic and are designed to provide the necessary support and flexibility for the wiper blades to make efficient contact with the windshield.



COMPONENTS OF WIPER



- ❖ The wiper motor is responsible for providing the mechanical power needed to move the wiper arms and blades.
- ❖ It is typically located under the vehicle's hood, near the base of the windshield.
- ❖ The motor receives electrical power from the vehicle's battery or electrical system and converts it into rotational motion to drive the wiper arms.
- ❖ The wiper motor is connected to the wiper arms through a linkage system, which consists of rods, pivots, and other mechanical components.
- ❖ The linkage system transfers the rotational motion of the wiper motor to the wiper arms, causing them to move back and forth in a controlled manner.



COMPONENTS OF WIPER



- ❖ The wiper switch is located on the vehicle's dashboard or steering column and allows the driver to control the operation of the wipers.
- ❖ The switch typically has multiple settings, including intermittent, low, high, and off.
- ❖ By selecting the desired setting, the driver can adjust the speed and frequency of the wiper operation according to the current weather conditions.
- ❖ Many vehicles are equipped with a windshield washer system that sprays a cleaning fluid onto the windshield to help remove stubborn dirt and debris.
- ❖ The washer system is usually activated by pulling or pushing a lever on the wiper switch or by pressing a separate button on the dashboard.



WORKING OF WIPERS



- ❖ The driver activates the windshield wipers using the wiper control switch, typically located on the vehicle's dashboard or steering column.
- ❖ The switch allows the driver to select the desired wiper speed or mode, such as intermittent, low, high, or automatic.
- ❖ When the driver selects a wiper speed or mode, it sends an electrical signal to the wiper motor, located under the vehicle's hood near the base of the windshield.
- ❖ The wiper motor receives the signal and activates, initiating the wiper operation.
- ❖ The activated wiper motor generates rotational motion, which is transferred to the wiper arms through a linkage system.



WORKING OF WIPERS



- ❖ The linkage system consists of rods, pivots, and other mechanical components that transmit the rotational motion from the wiper motor to the wiper arms.
- ❖ As the wiper motor rotates, it causes the wiper arms to move back and forth across the windshield in a controlled pattern. The wiper arms are attached to the wiper blades, which make direct contact with the windshield surface.
- ❖ The wiper blades, made of rubber or silicone, make contact with the windshield and sweep across its surface. The flexible blades conform to the shape of the windshield, ensuring efficient removal of water, snow, and debris.



WORKING OF WIPERS



- ❖ As the wiper blades move across the windshield, they collect and sweep away raindrops, snowflakes, dirt, and other debris.
- ❖ The blades are designed with a wiping edge that is shaped to maximize contact with the windshield and minimize streaking.
- ❖ In some vehicles, the windshield wiper system is equipped with a washer fluid reservoir and spray nozzles.
- ❖ When activated by the driver, the washer system sprays a cleaning fluid onto the windshield to help loosen and remove stubborn debris, enhancing the effectiveness of the wiper blades.



TRAFFICATORS



- ❖ Trafficators, also known as semaphore signals or simply semaphores, were early automotive signaling devices used before the widespread adoption of electric turn signals.
- ❖ They were mounted on the sides of vehicles and used to indicate the driver's intention to turn or change lanes
- ❖ Trafficators were typically mechanical devices operated by a lever or switch inside the vehicle.
- ❖ When the driver activated the trafficator control, it triggered a mechanism that extended a hinged arm or paddle outward from the side of the vehicle.



COMPONENTS OF TRAFFICATORS



- ❖ **Semaphore Arms:** Trafficators typically consist of one or two semaphore arms mounted on the exterior of the vehicle, usually near the front and rear. These arms extend horizontally from the vehicle's body when activated and move up and down to signal the intended direction of the turn.
- ❖ **Mechanical Linkage:** Inside the vehicle, there is a mechanical linkage system connected to the semaphore arms. When the driver activates the trafficator lever or switch, it engages the mechanical linkage, causing the semaphore arms to extend and move.



COMPONENTS OF TRAFFICATORS



- ❖ **Control Mechanism:** The control mechanism is usually a lever or switch located on the vehicle's dashboard or steering column. When the driver activates the control mechanism, it triggers the movement of the semaphore arms.
- ❖ **Lighting Element (Optional):** Some trafficators are equipped with lighting elements, such as bulbs or LEDs, to enhance visibility, especially at night or in low-light conditions. These lights may flash or remain illuminated steadily while the semaphore arms are extended.



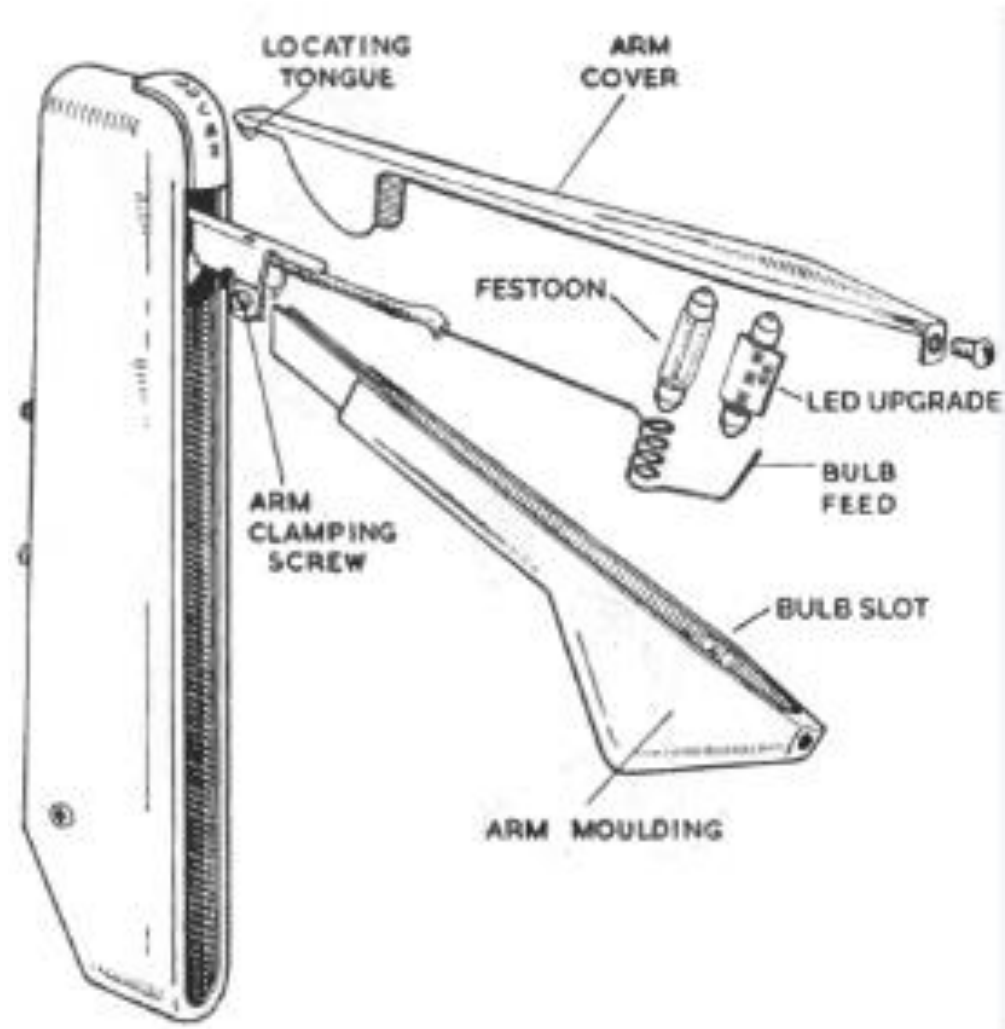
COMPONENTS OF TRAFFICATORS



- ❖ **Wiring and Electrical Components (Optional):** In vehicles with electrically operated trafficators, there may be wiring harnesses, relays, and switches that control the movement and lighting of the semaphore arms. These components receive electrical power from the vehicle's electrical system.
- ❖ **Mounting Hardware:** Trafficators are typically mounted on brackets or hinges attached to the vehicle's body or chassis. The mounting hardware secures the trafficators in place and allows them to move freely when activated.
- ❖ **Indicator Sound (Optional):** In some older vehicles, trafficators may emit a clicking sound when activated to provide an audible indication to the driver that the turn signals are operating.



TRAFFICATORS





WORKING OF TRAFFICATORS



- ❖ The driver activates the turn signal by using a lever or switch usually located on the steering column.
- ❖ This lever is typically positioned so that it can be easily reached by the driver without taking their hands off the steering wheel.
- ❖ When the driver activates the turn signal, it completes an electrical circuit that sends a signal to the turn signal relay.
- ❖ This relay is responsible for controlling the flashing of the turn signal lights.
- ❖ The turn signal relay activates the turn signal lights on the exterior of the vehicle.



WORKING OF TRAFFICATORS



- ❖ These lights are typically located at the front and rear of the vehicle, on the left and right sides.
- ❖ The turn signal lights flash on and off in a specific sequence to indicate the direction in which the driver intends to turn or change lanes.
- ❖ The flashing turn signal lights provide a visual signal to pedestrians, cyclists, and other drivers about the driver's intention to make a maneuver.
- ❖ This helps other road users anticipate the driver's actions and adjust their own driving accordingly



THANK YOU !!!