What is a Lightning Arrester?
NO.....

It’s not a very fast Police Officer
According to most definitions, a Lightning Arrester is....
A Device Used on Power Systems above 1000V to Protect other Equipment from Lightning and Switching Surges
Although Lightning Rods are devices that divert lightning surges to ground, they are simple conductive terminals that are always at ground potential and are never energized.

It is not a Lightning Rod.
Other Devices Similar to Lightning Arresters

**Surge Suppressor:** This is also a surge diverter, but generally for voltages well below 1000 volts.

**TVSS (Transient Voltage Surge Suppressor):** Again, this is also a surge diverter, but generally for voltages well below 1000 volts.
How do Lightning Arresters Protect Power Systems?
Typically 8400 Volts

System Without Arrester

115 or 220 Volts

Impulse Sensitive Transformer

What is a Lightning Arrester
When Lightning strikes the system ---- equipment is damaged and the lights go out.

Transformer

Typically 8400 Volts

115 or 220 Volts
Typically 8400 Volts

115 or 220 Volts

However on a System With an Arrester
What is a Lightning Arrester

Typically 8400 Volts

115 or 220 Volts

When Lightning strikes

Sensitive equipment is saved by the Arrester
What exactly does a lightning arrester do?

- It Does not Absorb the Lightning
- It Does not Stop the Lightning
- It Does **Divert** the Lightning to Ground
- It Does Clamp (limit) the Voltage produced by the Lightning
- It Only protects equipment electrically in parallel with it.
Ok, how does it divert lightning?
At the Heart of All Arresters is the Metal Oxide Varistor (MOV)

The MOV Disk is a Semiconductor that is sensitive to Voltage.

At normal Voltages the MOV disk is an insulator and will not conduct current. But at higher voltages caused by lightning it becomes a conductor.
The MOV Disk is a very fast acting electronic switch. It is an open switch to standard system AC voltages and a closed switch to lightning voltages.
By magnifying the MOV material 5000 times, Metal Oxide Grains and Dopants in the material can be discerned.

Each MOV Disk with a 35mm diameter and a 35mm height contains about 28 Billion MOV Grains.
The MOV Grains and their Junctions are the Electronic Switches that turn on and off in unison to divert the lightning around the equipment.

The Switches are at the junctions between the grains.
A lightning arrester is essentially a collection of billions of microscopic junctions of Metal Oxide Grains that turn on and off in microseconds to form a current path from the top terminal to the ground terminal of the arrester.
So there you have it. A Lightning Arrester is a device, used on power systems, that contains billions of electronic switches that divert lightning around sensitive equipment and saves them from damage.
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Thank you for using ArresterWorks as your source of information on Arresters.

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