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A FUN SCIENCE TOY FOR KIDS!: BUZZING STUNT MAGNETS/SIZZLE MAGNETS

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ABSTRACT

Torpedo magnets make their buzzing or singing sound due to vibrations caused by their attraction and repulsion forces when they are released from a separated state. The narrow, aerodynamic shape of the torpedo magnets facilitates this rapid and chaotic clashing as they seek a stable, aligned magnetic state, creating high-pitched, rattling sounds as they repeatedly collide and separate in the air or on a low-friction surface.

The Mechanism:

Separation: You hold two torpedo magnets apart (e.g., using your fingers to keep a small gap).

Attraction and Release: When you release the magnets, their strong attraction pulls them together.

Collision and Repulsion: Because of their torpedo shape, they don't just stick together. Instead, they collide and try to align their poles.

Vibration and Clashing: The rapid cycle of clashing, separating, and realigning creates high-frequency vibrations.

Sound Production: These vibrations produce a distinctive clattering, buzzing, or "singing" sound, similar to a bird's chirp or a rattlesnake's rattle.

Shape: The narrow, elongated, or ellipsoidal shape of torpedo magnets is crucial, as it allows them to "wrestle" for alignment rather than simply snapping together, maximizing the time they spend clashing and buzzing.

Strong Magnetism: The magnets are highly magnetized, creating strong forces that cause them to interact vigorously.

Minimal Contact: The shape is designed for minimal contact and maximum opportunity for clashing during the initial collision and subsequent movements.

KEYWORDS: Torpedo magnet, singing magnet.

INTRODUCTION

Torpedo magnets or buzzing magnets. These torpedo magnets make a buzzing sound when you throw them up into the air together. A fun science toy for kids! Magnets produce sizzling or buzzing sounds through rapid, erratic collisions and bounces from their elliptical shapes when tossed into the air. These magnets, often called "sizzle magnets" or "buzzing stunt magnets," vibrate against each other at a high frequency, creating a high-pitched clattering sound before a final, stronger collision. Made out of the strong magnetic material, hematite, the two highly-polished magnet's poles are aligned through the narrow circumference. As the magnets fall, both the North and South poles are trying to make contact, which results in a bizarre buzzing sound as they constantly move around each other.[1]

- **Shape and Bounce:** The key is that these magnets are not spherical but have an elliptical or other non-spherical shape. When tossed, they collide, but due to their shape, they bounce erratically instead of just hitting once and stopping.
- **High-Frequency Collisions:** These bounces create a rapid series of high-frequency collisions, causing the magnets to vibrate against each other.
- **Sound Production:** The continuous vibrating and clattering generates a high-pitched, buzzing or sizzling sound.
- **Loudness:** The more magnets you use, the greater the combined weight and force, and while this might seem like it would make a bigger sound, it can actually inhibit movement and make the sound less pronounced compared to just two magnets.

Types of Sizzle Magnets

- **Sizzle Magnets:** These are specially designed with an elliptical shape to create the buzzing effect when they collide.
- **Buzzing Stunt Magnets:** Another name for magnets that produce a high-pitched clattering sound when they are tossed and collide.
- **Rattlesnake Egg Magnets:** These are a specific type of multi-purpose office magnet that creates a unique vibrating or buzzing sound when they are in motion.

When one of the magnets (either the electromagnet or the permanent magnet) is attached to a thin membrane the rapidly changing magnetic field makes the membrane vibrate. The vibrating membrane bumps into nearby air molecules causing them to vibrate as well. This vibration travels through the air as a sound wave.

Torpedo magnets produce sound because their unique ellipsoidal shape causes them to collide and rebound rapidly when thrown together, creating a high-pitched buzzing or clattering sound as they fight to align their magnetic poles. The momentum of the magnets briefly overcomes the magnetic attraction, leading to a series of impacts and brief moments of separation, which generates the vibrating sound.[2]

Figure-1: Sizzling magnet.

Mechanism

- **Initial Collision:** When you toss the torpedo magnets into the air, their momentum causes them to first collide.
- **Magnetic Attraction:** As they hit, their strong magnetic fields pull them together, attempting to align their opposite poles.
- **Momentum vs. Magnetism:** The initial impact's momentum momentarily overpowers the magnetic attraction, causing the magnets to separate slightly.
- **Rebound and Rapid Vibration:** The magnetic forces then quickly pull them back together, causing them to hit and then separate again in a rapid, alternating sequence of collision and rebound.
- **Sound Generation:** This rapid vibration and clattering create the distinct buzzing or singing sound associated with torpedo magnets.
- **Sound Stops:** The sound ceases once the magnets find a stable magnetic connection and settle into a final position, as there is no longer any rapid movement. The sound is a direct result of the magnets' inability to maintain a stable, locked-in position due to their shape and the forces involved. Torpedo magnets make a buzzing sound when thrown together! This is due to the shape of the magnets which is designed to produce minimal contact between them. Either hold the magnets in two different hands or alternatively hold the magnets in one hand, keeping a finger between the magnets. In these devices, variations in an electric current cause variations in the magnetic field produced by an electromagnet. This causes a cone to move, which creates pressure variations in the air and forms sound waves. When tossed into the air, the two ellipsoidal magnets collide and then wrestle for equilibrium in a great clattering, buzzing collision. Simply rest one magnet between your index finger and thumb, and the other between the thumb and middle finger, and then gently toss the magnets into the air. Throw them together in the right way to make loud buzzing sound. Set of two. Rattlers Powerbuzz Magnets when thrown together, they rapidly repel and attract, emitting a loud eerie buzzing sound. Great for stress relief and for use as a sensory fidget toy. Some tangential magnetic force harmonics can directly create magnetic vibrations and acoustic noise when applied to the stator teeth: tangential forces create a bending moment of the stator teeth, resulting in radial vibrations of the yoke. With a strong enough magnetic field, we should be able to steer sound waves, too." People might be surprised enough to learn that heat and sound have anything to do with each other, much less that either can be controlled by magnets. If something is buzzing, it's vibrating or making a whirring sound, like a buzzing bee or a buzzing toy airplane. Things making the sound of an angry insect are literally buzzing, like a buzzing doorbell or telephone.[3]

Figure-2: Robert Whitehead and Masato Sagawa.

Invention

There isn't a single "torpedo magnet inventor" but rather inventors of torpedoes, like **Robert Whitehead** [1823–1905], and inventors of strong magnetic materials, like **Masato Sagawa** [3 August 1943], who developed neodymium magnets used in many applications, including possibly some modern torpedoes. Robert Whitehead is known for inventing the first modern, self-propelled torpedo in 1866. Masato Sagawa invented the strong neodymium permanent magnet (NdFeB) in Japan, which is crucial for many modern technologies. Masato Sagawa, a Japanese scientist and entrepreneur credited with inventing the sintered permanent neodymium magnet (NdFeB). These powerful, permanent magnets are widely used in various modern applications. The term "torpedo magnet" isn't a recognized invention. If the question refers to magnets used in or for torpedoes, then Sagawa's neodymium magnets are a strong candidate, given their widespread use. However, if the question is about the invention of the self-propelled weapon, then Whitehead's invention is relevant. A torpedo magnet is either a rattle magnet made of high-density, highly polished hematite that creates a "zipping" sound when clashed in the air, or it is a magnetic component of a torpedo level tool which uses powerful rare earth magnets (like Neodymium magnets) housed in a durable, often aluminum or stainless steel casing. The type of torpedo magnet depends on its intended use – a simple toy or a tool for construction and plumbing.[4,5]

Torpedo Magnets (Rattle Magnets)

- ✓ **Material:** These are made from naturally occurring hematite. Hematite is a common iron oxide mineral with the chemical formula Fe_2O_3.
- ✓ **Appearance and Function:** They are smooth, highly polished, and can be a pair of metallic bullets. When thrown and allowed to collide, they produce a distinctive sound.
- ✓ **Torpedo Magnets** (in Torpedo Levels)
- ✓ **Magnet Type:** These are typically powerful rare earth magnets, such as those made from Neodymium (NdFeB).
- ✓ **Housings:** The magnetic cores are enclosed in a sturdy casing made of durable materials like:
- ✓ **Aluminum alloy:** Providing a lightweight but strong frame for the level.
- ✓ **Stainless steel:** Used for in-line magnetic cartridges.
- ✓ **Purpose:** They provide hands-free work on iron surfaces by attaching the level to metal pipes or structures.

Conclusion: This electro-acoustic phenomenon is caused by magnetostriction. When ferromagnetic materials are exposed to alternating magnetic fields at certain frequencies, it is possible to hear audible noises due to magnetostriction, something which may not be desirable in many products. Made out of the strong magnetic material, hematite, the two highly-polished magnet's poles are aligned through the narrow circumference. As the magnets fall, both the North and South poles are trying to make contact, which results in a bizarre buzzing sound as they constantly move around each other.

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