Following information is required from applicant for drafting of patent application.

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2. **Full name (including middle name), nationality, address (VIIT address), mail id, and phone number of inventor(s):**

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3. Title of the invention:

Adjustable Ring Dispenser Mechanism with Precise Launch Control

4. Technical field of the invention:

Mechatronics

5. Prior art:

Earlier methods and devices in the prior art frequently suffered from a lack of adjustable launch distances and precise control over shooting angles, resulting in inconsistent and imprecise delivery of rings. Moreover, they struggled to accommodate variable requirements efficiently. The problem to be solved by the present invention is to provide a ring dispenser mechanism that overcomes these shortcomings. Through the incorporation of counter-rotating wheels, a timing belt pulley transmission, and a linear actuator, this groundbreaking innovation enables customizable launch distances and precise angle control, effectively remedying the shortcomings observed in prior art mechanisms.

6. Object:

The key objective of the Adjustable Ring Dispenser Mechanism outlined in this patent application is to provide a flexible and exceptionally controllable solution for launching rings. The primary aim is to offer a ring dispenser capable of customizable launch distances and precise angle control, guaranteeing uniform and precise ring delivery across diverse applications. Ancillary objectives include enhancing user experience in games and entertainment, improving target accuracy in industrial processes, and enabling customization based on specific requirements. Essential aspects encompass counter-rotating wheels, BLDC motors, a timing belt pulley transmission, a sheet metal plate, a linear actuator, and an external structure. Preferred aspects may include additional safety features and remote control capabilities, further enhancing the mechanism's utility.

7. Synopsis:

The innovatively designed Adjustable Ring Dispenser Mechanism seeks to transform ring launching systems. This groundbreaking creation incorporates two counter-rotating wheels, each driven by high RPM BLDC motors through a precise 1:3 timing belt pulley transmission. This mechanism provides customizable ring launch distances and facilitates meticulous control over shooting angles, thereby ensuring a dependable and accurate delivery of rings. Supported by a sturdy sheet metal plate and enclosed in a durable 20x20 aluminum extrusion structure, this device offers versatility across applications, from gaming to industrial processes. Its simplicity and adjustability address prior art limitations, making it a valuable addition to the world of ring dispensers..

8. Brief description of drawings (if any)

Rendered Images of the mechanism designed is shown below, these are the components used:

1- Linear Actuator
2- Acrylic shooting ramp
3- Pneumatics(200mm Stroke Length)
4- Pushing Block (3d print)
5- Shooting Wheel
6- 20x20 Aluminum Extrusion
7- Left Support Plate
8- Bldc Motor
9- Middle Support Plate
10- Right Support Plate
11- GT2 60 teeth Timing Pulley
12- Timing Belt
13- GT2 20 teeth Timing Pulley

9. Detail description of the invention:

External Structure: The complete mechanism is enveloped in a casing made of 20x20 aluminum extrusions. This framework not only provides durability and stability but also allows for convenient customization and expansion.

Timing Belt Pulley Transmission: To address the inherent low torque of BLDC motors, an integrated timing belt pulley transmission with a precise 1:3 ratio is employed. This transmission incorporates two GT2 pulleys, featuring 20 and 60 teeth, respectively, ensuring synchronized and robust wheel rotation.

BLDC Motors: The mechanism is driven by high RPM Brushless Direct Current (BLDC) motors that power the counter-rotating wheels. These motors guarantee swift and efficient rotation, ensuring a seamless and efficient ring launching process.

Sheet Metal Plate: A robust sheet metal plate, constructed in three sections using mild steel, forms the foundation of the mechanism. It provides a stable base for mounting the motors and pulleys, ensuring rigidity during operation.

Linear Actuator: Positioned beneath the sheet metal plate, a linear actuator is employed to control the angle at which rings are launched. This actuator allows for precise adjustments to the shooting angle, catering to various applications.

Counter-Rotating Wheels: At the heart of the mechanism are two strategically positioned wheels rotating in opposite directions, engineered to receive and propel rings. These wheels are meticulously designed to ensure optimal friction and durability.

10. Best method of performance of the invention:

The Adjustable Ring Dispenser Mechanism is designed for precise and reliable ring launching. The following example outlines the practical working steps of the invention:

Initialization: Ensure that the mechanism is securely set up on a stable surface. Connect the BLDC motors to a power source and the linear actuator to a control unit.

Adjusting Launch Parameters: Depending on the desired ring launch distance and angle, use the control unit to configure the mechanism. The linear actuator allows for fine-tuning of the shooting angle, while the timing belt pulley transmission can be adjusted to set the launching distance.

Loading Rings: Place the rings to be launched into the entry point of the mechanism, ensuring they are properly positioned between the counter-rotating wheels.

Activating the Mechanism: Start the BLDC motors using the control unit. The counter-rotating wheels will begin to rotate in opposite directions, pushing the ring between them.

Launch and Angle Control: As the ring passes between the wheels, the linear actuator simultaneously adjusts the shooting angle. This fine control allows for precise targeting.

Repeat as Needed: Continue the process as required, launching rings with consistent accuracy and adjusting parameters as needed for different scenarios.

Shutdown: After completing the task, deactivate the BLDC motors and power down the mechanism.

This method of operation ensures that the Adjustable Ring Dispenser Mechanism performs optimally, offering users the ability to fine-tune and control the ring launching process according to specific requirements.

11. CLAIMS:

Claim 1: Ring Dispenser Mechanism Overview:

- Counter-Rotating Wheels: Two wheels designed to rotate in opposite directions.
- BLDC Motors: High RPM Brushless Direct Current (BLDC) motors linked to the counter-rotating wheels.
- Timing Belt Pulley Transmission: 1:3 ratio transmission with GT2 pulleys (20 and 60 teeth).
- Sheet Metal Plate: Comprising three mild steel parts, providing support for motors and pulleys.
- Linear Actuator: Positioned beneath the sheet metal plate to control the ring shooting angle.
- External Structure: Constructed with 20x20 aluminum extrusions.

Claim 2: In accordance with claim 1, the ring dispenser mechanism is configured such that the distance between the counter-rotating wheels is adjustable, allowing for meticulous control over the launching distance of rings.

Claim 3: In accordance with claim 1, the ring dispenser mechanism incorporates a control unit designed to modify the rotational speed of the BLDC motors, thereby allowing for customization of the launching force.

Claim 4: Claim 1 includes a ring dispenser mechanism, additionally equipped with safety features such as emergency stop functionality and obstruction sensors, contributing to an enhanced level of user safety during operation**.**

Claim 5: Claim 1 asserts that the ring dispenser mechanism is furnished with remote control capabilities, enabling users to operate and make adjustments to the mechanism from a distance. This feature significantly enhances the versatility and adaptability of the mechanism across various applications.

12. Inventive step of your invention:

The innovation of the Adjustable Ring Dispenser Mechanism is rooted in its capacity to deliver a distinctive blend of technical advantages surpassing those of existing ring dispensers. In contrast to conventional mechanisms, our invention not only provides adjustable ring launch distances but also precise angle control, guaranteeing a level of consistency and precision in ring delivery that is unparalleled. This innovation significantly enhances user experience in gaming and entertainment, improves target accuracy in industrial processes, and allows for versatile customization based on specific requirements. Moreover, it achieves this without compromising cost-effectiveness. The timing belt pulley transmission and BLDC motors work in synergy, optimizing torque and RPM for efficient ring launching. Furthermore, the use of aluminum extrusions in the external structure guarantees durability without escalating production costs, positioning it as an innovative solution with a clear competitive advantage.

13. Industrial application:

1. **Manufacturing and Quality Control:** This mechanism can be integrated into manufacturing processes to accurately test and inspect products. For instance, it can be used in quality control procedures to assess the durability of products with ring components.
2. **Automated Assembly Lines:** In assembly lines requiring the installation of rings on components, this device can automate the process, ensuring consistency and precision.
3. **Entertainment and Amusement:** In theme parks, arcade games, and entertainment centers, the mechanism can be employed for ring-toss games, enhancing user engagement and enjoyment.
4. **Training and Simulation:** The precise control over ring launching distance and angle makes this mechanism suitable for training simulations in various industries, such as military, aviation, and sports.
5. **Material Handling:** It can be used for controlled delivery and sorting of materials in industrial environments

14. Abstract:

The Adjustable Ring Dispenser Mechanism is an innovative device designed to revolutionize ring launching systems. Comprising counter-rotating wheels driven by high RPM BLDC motors through a 1:3 timing belt pulley transmission, this invention offers adjustable ring launch distances and precise angle control, ensuring consistent and accurate ring delivery across a wide range of applications. Supported by a robust sheet metal plate and enclosed within a durable 20x20 aluminum extrusion structure, this mechanism combines versatility, adjustability, and

durability to address the limitations of prior art ring dispensers, making it a valuable addition to the field.

15. Drawings: