Project Scope

Team 510

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Mechanical Engineering, FAMU-FSU College of Engineering

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Project Description

The objective of this project is to design an innovative gate latch mechanism that effectively addresses current customer acclaimed issues with misalignment and improper latching of Ghost Control's current system. Our goal is to develop a solution that ensures reliable engagement, enhanced durability, and ease of installation. As gates age, they may begin to sag due to repeated impact during closing, along with various external factors. This occurs from a lack of support opposite of the hinges, putting all the weight of the gate on the hinges and supporting posts. Weather events such as heavy rain, wind, or freezing temperatures can cause soil to expand or contract, leading to movement in support posts, resulting in misalignment over time (Fence Finders, 2024). Bouncing is an accepted part of having a swinging gate, however, it eventually deteriorates its ability to close. Sagging can be addressed externally by adjusting the gate closure itself. To effectively prepare for sagging, a new method of gate latching must be considered that not only accounts for the factors that cause it but actively anticipates it.

Key Goals

This project aims to create a new lock or latch mechanism that accommodates extensive sagging in swing gates. Sagging on the end opposite of the hinges causes alignment issues between the current lock and receiver system offered by Ghost Controls. The product will be designed to be commercially produced and sold on a large, profitable scale. It must also be universal to many gate configurations, easy to install, and function regardless of relatively poor installation, as this product is aimed at do-it-yourselfers (DIY). There must also be a mechanical method of locking and unlocking the latch in the event of a loss of power due to a dead battery,

broken wire, etc. The latch will be resilient to adverse environmental conditions, tamper resistant for increased safety, and contain a passive method of releasing in the event of a loss of power.

Market

Primary Markets

Primary markets include homeowners, farmworkers, and other property owners who feel a need for added security. This also includes large corporations, such as U-Haul, lumber companies, or potential agricultural businesses; any company needing locks for their storage facilities would benefit from this product.

Secondary Markets

Secondary markets include businesses specializing in gate installations or fence contractors. Some clients may specifically ask for Ghost Control locks, or Ghost Controls may be recommended to them by installers. Another secondary market would be retailers distributing Ghost Controls at their stores, such as Tractor Supply Co., Home Depot, Lowes, or other agricultural stores selling them.

Assumptions

Assumptions can be made about the project regarding power supply, installation, and design. The power supply is assumed to be a 12V DC battery; the gate does not require power when stationary and will not receive continuous power. When installation occurs, the installer will have proper tools and instructions appropriate for a DIY install. A limited number of tools are required, a small hand tool set including a ratchet, and sockets will be sufficient. The gate will not use wheels and will swing freely throughout the entire range of motion. The gate post will be securely set in concrete or some other anchoring medium to maximize rigidity. A reasonable adult will be able to operate the gate opening and latching systems using remote control. The gate the Ghost Controls opens will not exceed 20ft, nor will it go on any contact

gates for properties or fencing. It will also not be used for animal containment. The existing "ZombieLock" may be used as a reference for design. The system will be used in all climates.

Stakeholders

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Consumers/Customers of Ghost Controls | https://www.amazon.com/stores/GhostControls

UL Standards (Code and Safety Compliance) | https://www.shopulstandards.com/

The opportunity for this project is offered by the FAMU-FSU College of Engineering. Dr. McConomy and Dr. Hruda will be the majority advisors on this project. Darryl Beadle and Mickey Nguyen are Head Engineers at Ghost Controls and have granted us access to their local facilities in Tallahassee, FL. The future consumers of ghost control will benefit greatly from a successful design that accounts for misalignments with their gates.

References

- Ghost Controls. (2024). Ghost Controls DIY automatic gate openers. https://ghostcontrols.com
- Fence Finders LLC. (2023, July 31). Misaligned fence posts. Milwaukee Fence Finders. https://milwaukeefencefinders.com/help/troubleshooting-guide/misaligned-fence-posts/#:~:text=Loose%20or%20sandy%20soil%20may,movement%20in%20the%20fence%20post.