Georgia Institute of Technology
Capstone Project
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Project 18: TranzVolt 2.0
Prior Art Analysis

Related Products on the Market:

1. Safety Hoist CH200 200lb. Steel Based Ladder Hoist (https://buymbs.com/p-6010-safety-hoist-ch200-200lb-steel-based-ladder-hoist.aspx)
    a. Able to lift 200 pounds, speed not stated
    b. Dependent on a rope with a pulley and a gas-powered Honda engine
    c. No remote control, controlled by a pedal and a lever attached to the system
    d. 26.5 feet total length

    Better than Tranzvolt 2.0 in terms of weight able to be lifted, but nothing else. The dependency of a rope is still there, and a gas-powered engine can raise environmental concerns as opposed to electric motors on the Tranzvolt. The controls are also with pedals and levers attached to the motor itself, which need constant push or pull by the user for full motion. Not only that, if the carriage were to ever fall off the ladder accidentally, it can hit anyone standing near it. A remote control is most definitely the best control system, which is what we should be striving for.

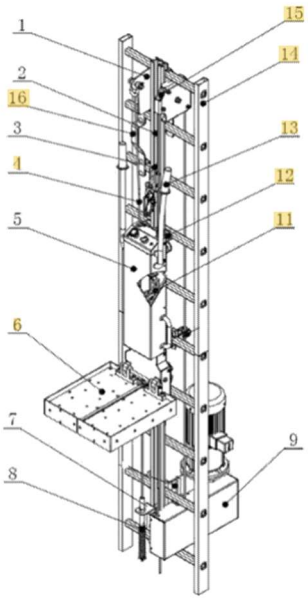
2. RGC Pivoting Platform 400lb. 44ft. Ladder Hoist (https://buymbs.com/p-9184-rgc-pivoting-platform-400-lb-44ft-hoist.aspx?vid=1138907)
    a. Able to lift 400 pounds, 1.833 feet per second
    b. Dependent on a rope with a pulley, both gas and electric motor options available
    c. No remote control, controlled by handles on the side of the ladder
    d. 44 feet total length
    e. Ladder flattens out at the top, ensuring that the carriage goes all the way to the top for easy retrieval by the user.
    f. Contains dual anchor points on the 3rd and 5th rungs, so that the stability isn't just relying on the ladder leaning against the wall.

    Much better than the Tranzvolt in terms of weight able to be lifted and speed. This ladder hoist shows that electric motors are sufficient for lifting much heavier weights at faster speeds, which is the most important improvement Tie Down requires. Handles at the sides of the ladder control the lift, which is still a safety concern in case of any carriage that falls off. However, this product also addresses the concerns of the carriage not reaching the top, by making the ladder itself able to reach well into the roof.

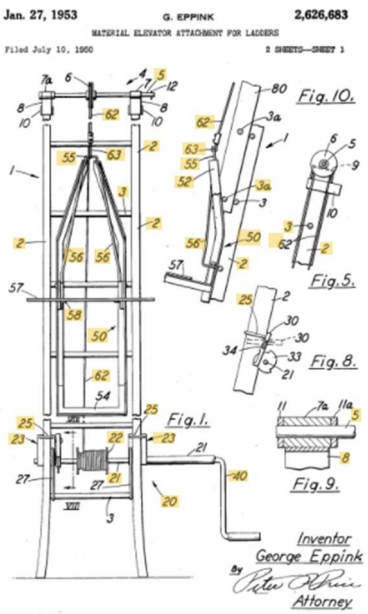
Patents:

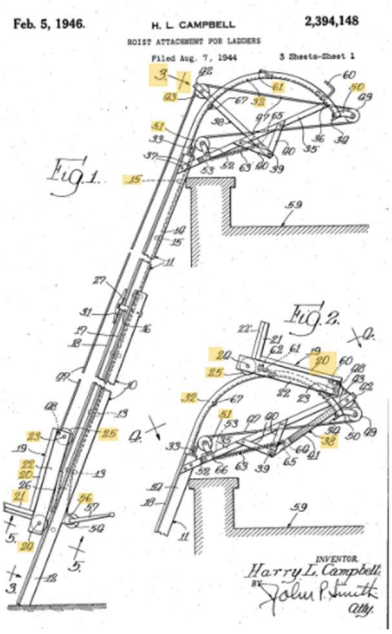
1. Hoisting device for working in heights (US10415309B2) (https://patents.google.com/patent/US10415309B2/en?q=E06C7%2f12)
    a. Load and speed not stated
    b. Dependent on traction rope with electric motor separate from the platform
    c. Controlled by collapsible pedal connected to the platform to carry goods/people
    d. Length not specified
    e. Has a guide rail so that the assembly can be installed without changing the structure of an original safety ladder
    f. A fall arrester installed on the sliding rail
    g. Seems excessively complicated to set up and tear down



While this design does not provide the specific statistics in load, speed, and height, the invention seems very robust, but complex in architecture. TranzVolt 2.0's main goal is to reduce deadweight as well as have a simple architecture for easy set up and tear down. While this patent seems very functional, its complex architecture, large platform apparatus, and on-platform controls all deviate from the goals of the TranzVolt 2.0. A major positive for this patent, however, is its ability to be installed on any ladder, even though considerable effort and time would be needed. Maybe a central driving rail would be a good thing for our version to incorporate so that our product could be universal as well.

Prior Art:





Here are two separate examples of prior art, but they both have a defining downside: they are both human powered. These prior designs both include pulleys as well as levers to provide the lifting force for the platform. Also, they both rely on ropes without any failsafe mechanism for a rope failure. One important aspect to note is that the design on the right includes a top portion to allow easy removal of the payload once it is up on the roof.

Reflection:

Taking all these designs into consideration, a common theme is that they all rely on ropes to provide lifting force on the platform/carriage. All but one do not include an emergency stop mechanism. While these all attempt to accomplish a similar goal, none of them really address the low deadweight, simple architecture, and easy setup that are the goals of our project. The way we have defined our problem is unique in this manner and shouldn't conflict with any of the previous designs. On the other hand, some aspects will inspire ideation for our solution, most notably the mechanisms to ensure simple unloading of the payload on the roof as well as the single universal rail to attach to standard safety ladders.