Alternative Designs

Assistive Jumping Device

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**Design 2: Trampoline Extended Arm System**

This extended arm design for the assistive jumping device will offer support to the user and compact design. Unlike other designs, this design will not compromise the safety of the user because it will not pass over their head. The design will incorporate bungee cords and a harness for additional support.

There will be a sturdy metal frame work to support the weight of the user and withstand the forces of jumping. There will be a harness which will hold and support the user while on the trampoline. These two components will be connected together using bungee cords. The frame is shown in figure 1. The metal framework will be made out of strong metal with good corrosion resistance. A low-grade carbon steel is a possible choice.

The framework base is vital to the proper functioning of the device. This base must be sturdy enough to keep the framework from tipping forward. The base will have to be long in length to ensure that this will work. The base will also serve as an attachment point for the telescoping support poles. These supports will be attached in the center of the base and will also have lateral links connecting the supports and base to ensure vertical stability of the support poles. These poles will be telescoping and will allow for adjustable height to accommodate for different sized users. This will consist of two poles; the lower pole will have a wider diameter than the upper, so they fit into one another. There will then be holes which can be aligned on both of the poles. Then strong solid metal locking pins can be inserted through the holes to set the height of the support poles, as seen in figure 2.

Since the framework will stand to one side of the trampoline there needs to be arms which extend from the top of the support beams to place the user over the trampoline. There will need to be a lateral support as with the base here too. This will ensure the stability of the extended arms since there will be a load applied to the joint which is at a considerable distance from it. To ensure that the whole frame doesn’t collapse there must be cross braces which connect to each side of the framework. It should be noted that the frame work will be attached by welding the components together to ensure strong joints.

At the end of the extended arms there will be loops to which the bungees can be connected. These loops will be welded onto the frame and must have a strong bond to the frame since there will be a good amount of stress on this point. The bungees themselves can’t be too springy because the user is disabled and we want him to jump under his own power and not be given much force upward by the bungees. To connect the bungees to the frame, carabineers will be used. This will also be the method of attachment of the bungees to the harness.

The harness itself is crucial to the effectiveness of the design. The user needs to have the torso supported, thus requiring a harness. However, the harness should not
impede the movement of the user’s legs, so he can freely and comfortably jump. This harness will be purchased and modified if necessary to meet the needs of the project.

Figure 1. Extended Arm Design Framework

Figure 2. Concept of Telescoping Supports with Locking Pins