Aly Alharbi

David Trevas

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Rotating Easel

Existing models of art tables and easels are not ideal for artists with disabilities. There is not always sufficient space underneath the tables to allow room for a wheelchair and for the artist's feet. Also, many disabled artists find it difficult to bend over or reach the easels they are using, since most easels are designed so that they tilt away from the artist. The easel and table are being designed for any person that is confined to a wheelchair and has limited mobility. People with conditions like cerebral palsy, multiple sclerosis, or paralysis are examples of those who would benefit from these products. If someone has cerebral palsy they have had some injury to their brain and they cannot use some of the muscles in their body. Multiple sclerosis is an autoimmune disease that affects the central nervous system. Myelin is lost and when this happens, the nerves' ability to conduct electrical impulses to the brain and from the brain is disrupted. This often results in paralysis.

INTRODUCTION

An easel that is constructed for a handicapped artist is constructed with a horizontal baseboard and an easel board fixed at the anterior end for rotation through an angle of 180° relative to the baseboard. At least one retractable and extendable arm is coupled between the baseboard and the

easel board. This enables a variation of angles of easel board relative to baseboard from an acute angle to an angle large enough to present the front side of the easel board in front of the artist's face. The telescoping arm helps to set the desired angle. A support structure is provided to hold the weight of the cantilever board at an obtuse angle without limiting the artist's access to the easel board.

 The easel board invention is significantly applicable to artists that are confined to a wheelchair or bed. The device can be used in several ways, but importantly it allows an artist to perform their hobby while confined to bed or a wheelchair. The easel is collapsible and adapts to a variety of situations. It can also be used to hold books and other reading materials or other art displays, thus it is not limited to only creating graphics.


DISCUSSION:

Adjustable Table

If automated, the table operates using power from a 12V battery which is regulated down to 5V that operates the microcontroller used (Fig. 1). A chip chosen for the table will depend on the designer and which tasks are to be achieved. A switch us operated by the user for the adjustment of the table. Information is interpreted by the microcontroller using an assembly program. The output is amplified and communicated to the linear actuators. Actuator on each leg of the table moves the table vertically to the direction desired by the artist.
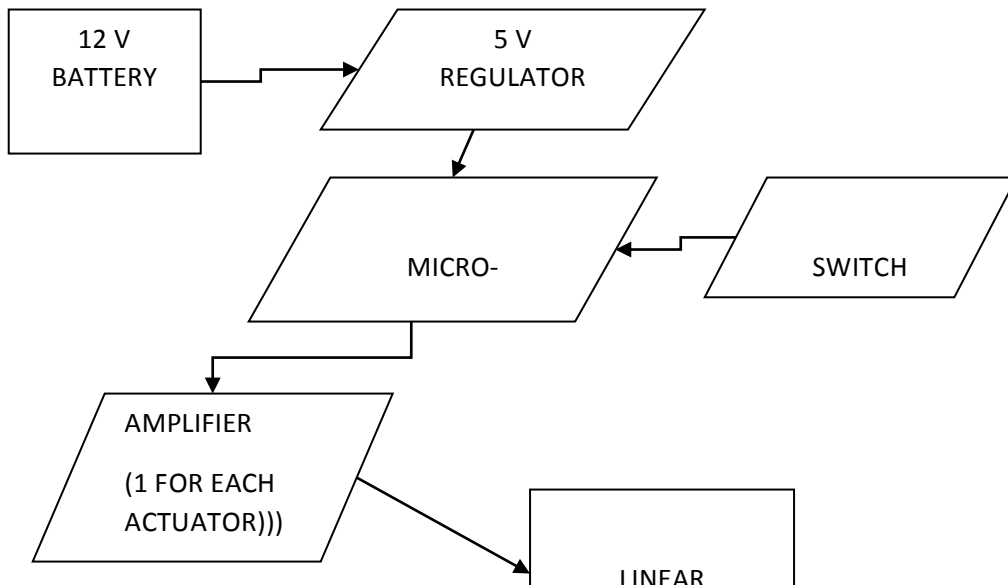
**Fig. 1   Flow Diagram of circuitry for table**

Frame:

The main construction material for the table will be aluminium as it provides a sturdy, lightweight surface where artwork can be done. The table top is rectangular with a surface area of about 15 square feet. The outside edge of the table, there is a strip of rubber that provides a softer edge. The legs are also made from aluminum. The device consists of two table legs of about 5"x 5" and it is about 15" high. A plate of 0.5" is fixed on top of the table legs connected to the actuators. A plate is fixed to the underside too and attached to the other end of actuators.
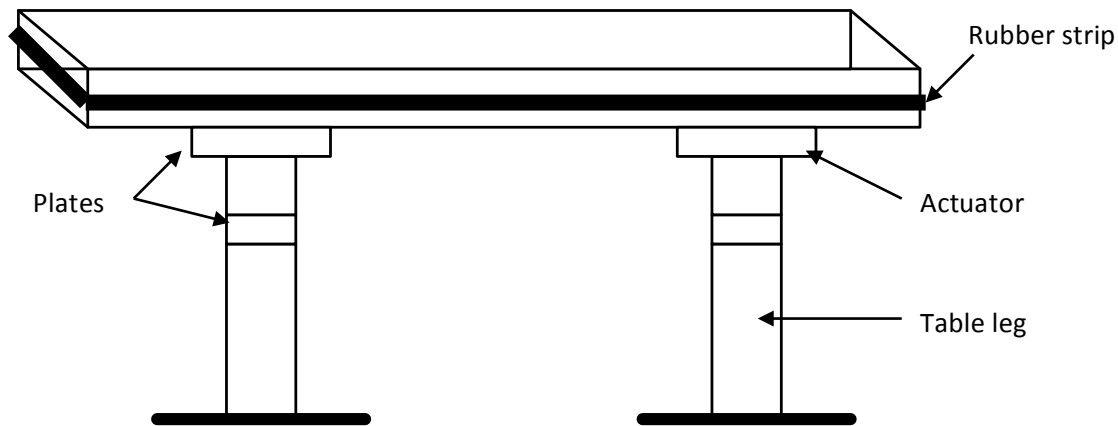
**Fig. 2 Side view of Table**

Linear Actuators:

Vertical movement of the table id powered by electromechanical linear actuators (Fig 2). They allow about 12 inches of movement to take place and are run by a 12V DC signal. The actuators can support up to 100 pounds and can operate at 30 inches per minute. The actuators are fixed with limit switches which can stop the motion at any point. This is a safety feature to prevent the table from moving either too high or too low.

**Fig. 2 Linear Actuator**

Adjustable Easel

This is the part that will tilt towards the artist. It will be mainly made of aluminum board with a canvas on it. The back of the board is attached to a stand, one at the top edge of the board, and the other at the bottom and both are centered with respect to the width of the board. There is a hinge attached to the bottom where a fixed point of rotation of the easel stems from. A linear actuator is attached to the top of the easel which is then fixed to the stand. Bothe attachment points of the linear actuator are able to pivot. The stand is equipped with three legs to achieve maximum balance. The user is able to use briefly the contact rocker switch to move the easel to a desired angle. The switch directs the linear actuator to extend or retract.
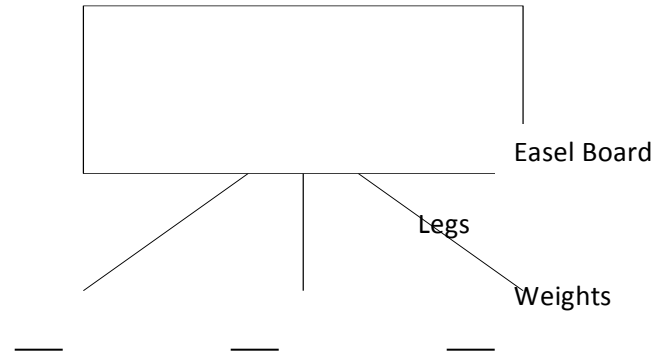
**Easel Board**

**Legs**

**Weights**

**Fig. 3 Front View of Easel**

**Linear Actuator**

**Easel Board**

**Hinge**

**Stand**

**Legs**

**Weights**

**Easel Board**
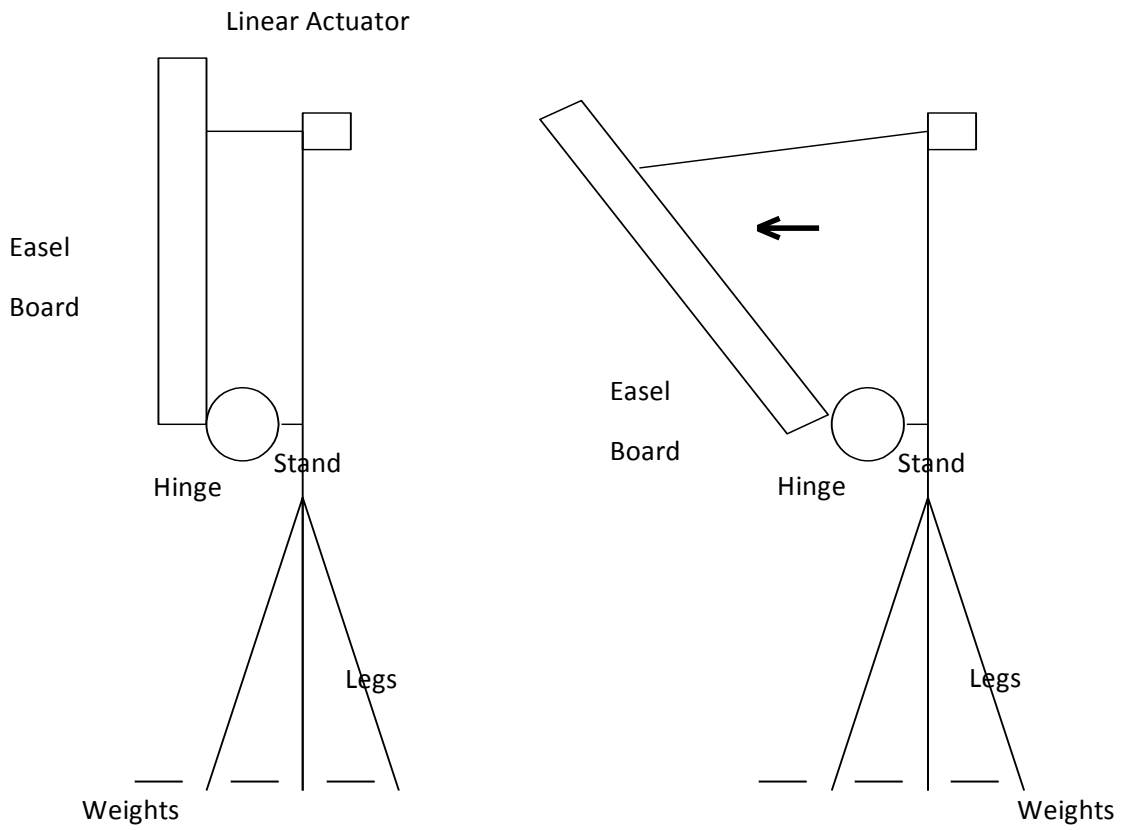
**Hinge**

**Stand**

**Legs**

**Weights**

**Fig. 4  Side View of Easel**

Easel Board:

The easel board needs to be big enough to support large enough canvases of about 25 by 30 inches, therefore, the dimensions of the board is about 25 by 30 inches. The main material used is a thin sheet of aluminum as it is lightweight and sturdy enough to support the canvas. A small tray will stick out, 2 inches, along the length of the board where the canvas will rest. For safety purposes, an edge of rubber is to be applied.

Stand:

For maximum balance, three legs are to be used for the easel stand. They will be about 35 inches above the ground and extend at an angle of 60 degrees towards the floor from their intersection. Attached to the stand will be the board which will extend straight up from the intersection. The legs will criss-cross eac other hence will provide room for the wheelchair to move closer to the easel as desired.

The stand will be of a 4x4 inch aluminium tubing for it previously discussed characteristics. Each leg will weigh about 5 pounds.

Hinge:

There will be a hinge attached to the bottom of the board for the easel to rotate with respect to it, where it will remain in a fixed position. The material preferred is stainless steel for its durability. The hinge is to be welded and screwed onto the stand with steel screws.