Alternative Design #1

Hand Controlled Lawn Mower

Team #4
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This design calls for a system of actuated pistons and assists levers that will mechanically provide the needed force to control the various functions of the lawn mower. The power to generate the force controlling these mower controls will be provided by battery powered motors. Assisting lever arms will connect the main operating lever to the enclosed motor housing unit, located behind the driver’s seat. The motor carriage will be connected to a control unit, which includes the mower’s rear wheel controlling joystick and switches to control the mower’s cutting blade, drive train gear, and emergency power shutoff. This housing unit will be located on the left side of the chair on top of a modified armrest.

1.1 Seat

Modifications will have to be made for safety and will promote easy use for the client. The end of the seat, which supports the client’s back, will have to be extended and mounted with armrests to ensure the client has more stability when operating the mower. The seat will also be fitted with a standard seat belt to ensure the client’s safety.
In order for ease of access, additional modifications will be made to the mower near the seat, including the addition of a handle and step. On the base of the mower a small ledge will allow the client to support one of his legs while he transfers from his wheelchair to the mower. The left side of the mower will act as the loading and unloading area of the mower. Along with the transferring step a handle grip will assist the client into getting into the mower chair from the left side.

1.2 Steering

The joystick will be programmed to understand and equate the force in which the client pushes on it and translate that into a rate of turning by the wheels. Once the mower is in gear the joystick will be able to control the precise amount of speed being derived from the engine. The joystick will be integrated in such a way that it will control the amount of force that the brake pads place on the mower’s brake rotors, controlling the speed in which the wheels turn. When the joystick is turned to the right or left there will be a translation into a change of direction of the mower’s turning wheels, by way of a mechanically controlled motor.

1.3 Mower Controls

This design will control the mower functions from the joystick mount at the left armrest of the mower. Small enclosed cases will be built around each control, the mower blade, the gear control, and the emergency power switch. Inside each case a secondary lever and an assisting piston will be connected to the normal operational lever, which is also connected to the motor sitting behind the driver’s seat. The mechanical force and power needed to perform each of the mower functions will be transferred through wiring to the enclosed main lever area. The operators control for these mower functions will be wired to the housing unit, located on the armrest, for the joystick, cutting blade, gearbox, and emergency power switch.