Trash Can Cleaner

Nicholas Tortora, Michael Luchini, Sara Perez, Jenna Saiontz

Summary

Appliance to clean plastic trash cans using spraying water and a wiping mechanism to get trash and smell out of the trash can.

Wiping mechanism uses a scissor jack to control vertical motion of pipe cleaning attachment.

Water is sprayed by pump sitting in clean water reservoir. Removable dirty water reservoir is included.





Top section



Original Design Specifications

- Trash can is visibly cleaned using less than
 1 liter of water in under 5 minutes
- Interior trash bin can be removed and replaced in 10 seconds
- Scissor jack capable of providing 73cm vertical range of motion forward and reverse
- Drain mechanism capable of draining > 2L/min
- Removable 5L drain reservoir
- One button press to initiate whole cleaning process

Prototype Specifications

- Sprays water with switch input (19 Liter/minute)
- 4x 1"x2" holes in bottom to drain trash can
- 2 stage scissor jack attached to brush-dry extension operated by button press, extends 40 cm forward and reverse
- LED that displays while cleaning cycle is active
- Removable 19L drain reservoir
- Interior trash bin can easily be removed and replaced

Original Circuit Design Diagram





Actual Circuit Design Diagram

Servo Part1 **S**1 D3 PWN D5 PWN D6 PWI Arduino Uno (Rev3) N/ D9 PWA D10 PWM/S D11 PWM/MOS R2 10kΩ D12/MIS0 D13/SC R1 10kΩ N' -WW-

Currently only the servo and LED are controlled by the Arduino and button press. Pump is controlled separately.

Rinsing Mechanism







Early-Stage Scissor-Jack Design





Strengths - What went right?

- Rinsing Mechanism strong pump and thorough cleaning of insert
- DC Electronics Control circuit for servo, button, and LED runs smoothly
- Reservoir holds amount of water up to and exceeding specifications, works smoothly in tandem with pump
- Scissor-Jack extends smoothly out and in for wiping mechanism, spans height and width of trash can insert
- Housing stable and functional

Problems – What went wrong?

- A/C to DC conversion for pump
- Wood vs. plastic
- 3D Printing was used to create gear and rack for scissor-jack
- Incorrectly selected acrylic as initial material for scissor-jack, which was too brittle.

Future Design Changes

- Material used would stainless steel instead of wood for the outer casing
- Gear and rack for scissor-jack would be machined with metal instead of 3D-printed in PLA
- Use two servo motors to allow the scissor jack to move more easily
- Material for scissor-jack extension arm would be plastic instead of wood
- Wiping mechanism would be made out of form fit rubber wipers as opposed to pipe cleaners

Thank You!

Questions?