Beverage Can Opener
DESIGN RATIONALE

Makers Making Change
A Neil Squire Program

Introduction

A device is needed in the Makers Making Change Assistive Device Library which can provide a way for those with arthritis, low finger dexterity, low vision, or other related disabilities open beverage cans with a pull-tab with little strength or accuracy needed.

This device is not intended for tin cans used for storing food, another device for that purpose is provided at https://makersmakingchange.com/project/pull-tab-tin-can-opener/.

Requirements

Goals

G01	To provide a way for those with arthritis or low finger dexterity open the pull-tabs on beverage cans.
G02	To provide a device cheaper than the commercial option.
G03	To fit all pull-tabs on beverage cans available in grocery stores in Canada

Functional Requirements

F01	Must not deteriorate with daily use.

Non-functional Requirement

NF01	Must be 3D-printable in one piece with no supports.

Constraints

C01	Must be cheaper than $5 to produce.

Ideation

Since so many open-source designs are available for this device, it did not seem necessary to re-design a new product. Several different designs seemed promising using different methods to open the cans. The various designs and their pros and cons are listed below in the testing section.

One particular concern with some of the designs was the difference in the tabs of different beverage cans. Some tabs lack a hole in the top of the tabs which many can opener designs rely on.

Figure 1: An image showing the difference in Can Tabs. The bubly™ can tab lacks a hole which the generic pop can has. Other commercial drinks such as RedBull™ Energy drink lack this hole as well.

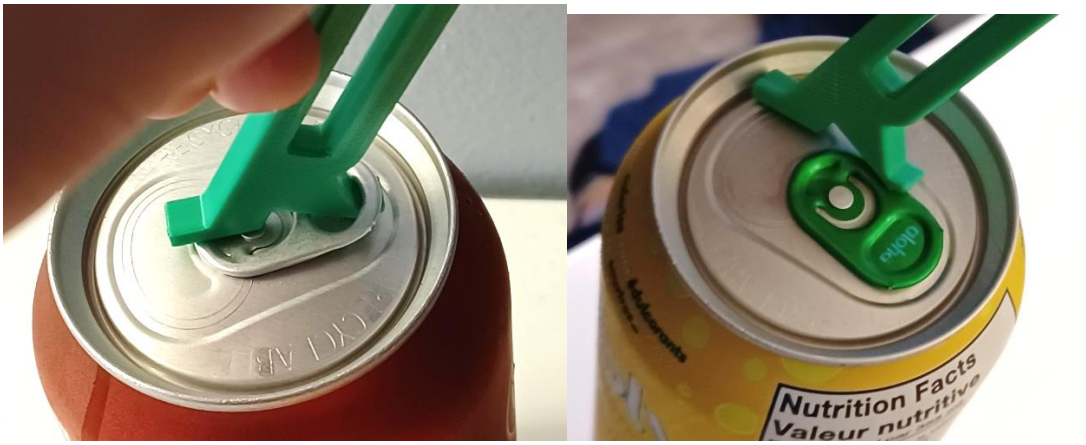

Figure 2: These 2 images demonstrate how a "hook-style" can opener cannot be used to open a beverage can without a tab which doesn't contain a hole in the top of the tab.

Testing

A variety of open-source designs for can-openers were printed and tested for ease-of-use, ease-of-printing, and functionality.

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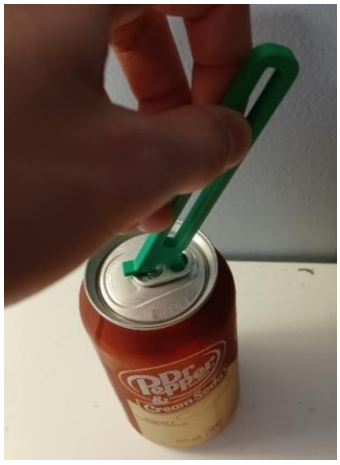
Design 1: Jason from PrintLabs



Summary

This design uses a hook to grab the pull-tab using the top hole, then a levering action to open the can. The handle is large, easy to hold and the device is overall effective and easy to use.

Pros

- Easy and very quick to print (no support (~0.5 hours).
- Uses very little filament (~5 grams).
- Easy to use, large handle, lots of leverage.

Cons

- Does not work on bubly™ or energy drink pull-tabs.

Design 2: Can opener and lid by osund - Thingiverse

Summary

This is a small device which slides over the whole pull-tab of the can, allowing all tabs to be opened, including ones without a hole in the top. The small size of the device makes print time fast, and material use small. However, this comes at the expense of a difficult to hold and difficult to use device. This Can Opener also tends to slide off the tab while being used, making for a somewhat frustrating overall experience.

Pros

- Very easy and quick to print (no supports ~0.5 hours).
- Opens all styles of cans.
- Slides over pull-tab easily.
- Also serves as a lid to protect drink from flies once opened.

Cons

- Not very easy to use due to the device sliding off the pull-tab.
- Doesn't give much leverage.

Design 3: [Pop Top Can Opener - Final by VegasGuy - Thingiverse]

Summary

This device, like the one above, slides over the whole can pull-tab, allowing all tabs to be opened, including ones without a hole in the top. The Pop Top Can Opener is very small, making print time fast, material use small, but difficult to hold. However, this can opener is very effective, and for those with enough dexterity to hold the device, this Can Opener is probably the quickest and easiest to use on this list.

Pros

- Very easy and quick to print (no supports ~0.5 hours).
- Opens all styles of cans.
- Slides over pull-tab easily.
- Easy to use, effectively opens cans.

Cons

- Handle is tiny; can be difficult to hold.
- Design is closed for derivatives.

Design 4: [OT student project : Can opener helper by Pole_ergo - Thingiverse]

Summary

The Can Opener Helper by Ergo Pole is different than other Can Openers in that it includes a huge, paddle-like surface for opening cans using an elbow or wrist. However, the design is flawed in that it doesn't grip the can-tab well and easily slides off. This would be an easy modification however this design is closed for derivatives.

Pros

- Opens all styles of cans.
- Slides over pull-tab easily.
- Provides Larger Handle (Not sure how beneficial this is).

Cons

- Design is closed for derivatives.
- Longer Print time.
- Doesn't open cans as effectively as expected (reversible design makes can opener slide off).

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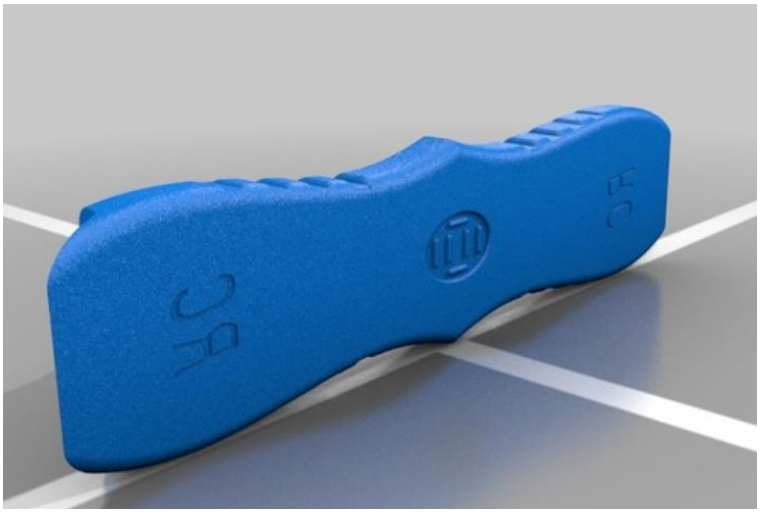
Design 5: Soda Can Opener by ryancoretz - Thingiverse



Summary

This design also can also open pull-tabs with no hole in the top as it slides over the can pull-tabs. The handle is nice to hold in the hand, the device easily and snugly slides over the pull-tab, but this device most often fails to open cans, and instead bends the tab.

Pros

- Opens all styles of cans.
- Slides over pull-tab easily.
- Good size handle.
- Double-sided.

Cons

- Slightly longer print time (~1 hr).
- Will very often bend tab instead of opening can.
- Does not reliably open generic pop cans.

Detailed Design

Recommended design from testing: Design 1 - Jason from PrintLabs

The hook-style design from Jason at Printlab proved to be very quick to print, used very little filament, needed very little force to open the can and was easy to insert into the tab.

While this can opener cannot open the closed-hole style tabs, this device has many merits over other designs, so the Printlab Beverage Can Opener is beneficial to add to the Makers Making Change Device Library. A second can opener device will also be added for those who wish to open the closed-hole tabs.

The device is 106 mm long, 26 mm wide, and 6 mm thick.

Opportunities for Improvement

- A design which can open beverage can tabs which have closed-hole style tab as well as the generic tabs may be beneficial to add to the library.