

THIS IS A REQUEST FOR FILING A PROVISIONAL PATENT APPLICATION – ECE3760 Assignment

INVENTORS:

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TITLE OF INVENTION:

1. Broom Buddy
 - a. Skip's Single Handheld Controller
 - b. Sweeper's Broom Mountable LED Ring

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ENCLOSED APPLICATION PARTS:

PPA Cover Sheet	2 pages
Specifications (Description)	3 pages
Drawings	2 pages
3D Model Rendered View	1 page

Application Data Sheet (must be attached for filing provisional patent application-
didn't for the assignment).

A cheque (money order for \$130.00US) is enclosed to cover the filing fees. (Included a placeholder where cheque must be placed when filing actual provisional patent application for assignment).


Respectfully submitted: 12th April 2023

Sukhmeet Singh Hora, Ph: +1-431-388-7835

I am claiming small entity status. (Assignment)



Recoverable Signature

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Scanned with CamScanner

Sukhmeet Singh Hora

Inventor - Team1 - 7884859

Signed by: 276eaf8e-737b-4fc2-96d5-3be2d7d09e6c

For Electronic Submission must be emailed to (For filing an actual patent application):

Commissioner for Patents

P.O. Box 1450

TITLE:

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 - a. Skip's Single Handheld Controller
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ABSTRACT:

Curling is a sport that requires effective communication between the skip and sweeper. The device, Broom Buddy comprises of two empathetic devices with connectionless communication– skip's single handheld controller and sweeper's broom mountable LED Ring, designed to enhance the communication between the skip and the sweeper during the game of curling. To be more accessible and inclusive, the device has been equitably designed to meet the needs of both hard of hearing and color-blind curlers. The skips' controller has an ergonomic casing to promote comfort over long durations, a compact form factor and minimalist user interface allows one-handed use. Furthermore, it allows for real-time control over the game with precise and intuitive joystick mappings, eliminating the need for verbal communication. The LED ring is in the Sweeper's field of view and provides multiple easy-to-recognize patterns for different commands.

BACKGROUND OF INVENTION:

- Problem Statement: To design a technology solution to help deaf curlers, especially to overcome the challenge of sweepers on ice not being able to hear the skip yelling sweeping instructions.
- Effective communication is essential in the game of curling. The devices are designed to enhance communication for deaf curlers and overcome the challenges faced by old techniques of communication like using hand visual which disrupts the game because:
 - Sweepers must be looking up towards the skip periodically to look at the hand visual signals which hinders sweeping performance and removes focus from the rock and ice.
 - Sweepers waste time and are more likely to miss messages.
 - If the sweeper's broom hits a rock, it is taken out of play.
- Things considered while designing the devices:
 - Ergonomic and portable.
 - Intuitive Design.
 - Commands must be transmitted in real time with minimum delay avoiding need for hand visuals or voice commands.
 - Prioritizes visibility of signals.
 - Minimal changes with how the game are being played.
 - Messages must be conveyed within view of the sweeper.
 - Communication with sweeper through visual cues.
 - Sweeper device must be mounted with a tight grip as there will be vigorous movement while sweeping.
 - Connectionless communication.

- The design connectivity covers the whole rink (150ft. or more).
- Battery life must last at least the length of a game (up to 3 hours).
- Commands, signals and patterns must be customizable for specific team.

PREVIOUS DESIGN SOLUTIONS USED AND PROBLEMS:

- Hand visuals were by the skip to convey the messages to the sweeper which disrupts the game because sweepers must be looking up towards the skip periodically to look at the hand visual signals which hinders sweeping performance and removes focus from the rock and ice.
- Deaf curling had started using hearing implant and microphone on team members but still due to noisy ice sweeper, they used to miss certain calls.

DETAILED DESCRIPTION OF INVENTION AND PROBLEMS SOLVED:

- Skip's Single Handheld Controller:
 - Oval shaped controller.
 - Consists of joystick and power button.
 - Maintains channel for the range of the motion of joystick using a gear.
 - Ergonomic and portable Design.
 - Intuitive design allowing the skip to easily give command.
 - Real-time control over the game because of single input with precise and intuitive joystick mappings.
 - Optimized to eliminate unnecessary complexity and redundancy.
- Sweeper's Broom Mountable LED Ring:
 - The LED is made to go through the broom, placed in a circular case on top of a rectangular box and then mounted to the broom.
 - The skip's commands are conveyed to the sweeper using visual cues on LED Ring to provide a non-verbal communication option for deaf curlers, allowing them to communicate effectively without relying on spoken language.
 - Provides multiple easy-to-recognize patterns for different commands, making it accessible to both deaf and color-blind users.
 - The LED ring is always in the Sweeper's field of view which does not disrupt the way game is being played, sweepers don't have to look at the skip for cues and can focus on the rock and ice ahead.
- The devices are made to implement power saving modes so that devices can last for at least the length of game (3 hours).
- Connectionless communication – broadcasts skip commands to the sweeper's MAC Addresses.

USER DEMOGRAPHICS:

- The target users for the product will be heavy or competitive curlers in Canada. Since the product solves the problem of deaf curlers, most of the users will be hard of hearing heavy/competitive curlers.
- Considering the hard of hearing statistics in Canada, Canadian Curling Statistics, and age distribution of Canadian curlers, it can be estimated that

the market size for our product would be between 10,000 – 30,000 individuals.

PRICE:

- The cost for 2 sweeper devices and 1 skip device including the costs of materials, manufacturing, marketing, and distribution is calculated to be \$55.5 and the selling price is \$69.99 at a profit of 25.9% on each bundle. Along with the product, services like warranty, customer support, and a return policy will be provided.

SUMMARY OF DISCLOSURE:

- According to curling rules, sweepers are only allowed to sweep in front of ice. Sweepers must focus on the ice ahead; device is made such that visual cues always stay in sweeper view.
- The visual cues also allow sweepers to focus so that the broom must not touch the stone.
- Nothing should be placed on the curling rock; the sweeper's device is broom mountable.
- According to the rulebook [1], players must declare the type of sweeping device and shall use the same device for entire length of the game. The devices are designed to last for the length of game by using battery/power saving modes.

CLAIMS:

- Real-time control over the game because of single input with precise and intuitive joystick mappings.
- Channel for the range of motion of joystick.
- Enhanced communication between skip and sweeper using visual cues and multiple easy to recognize patterns for different commands making it accessible for both deaf curlers and color-blind curlers and more intuitive.
- The LED ring is always in the Sweeper's field of view which does not disrupt the way game is being played, sweepers don't have to look at the skip for cues and can focus on the rock and ice ahead.
- Ergonomic and portable design.

DRAWINGS:

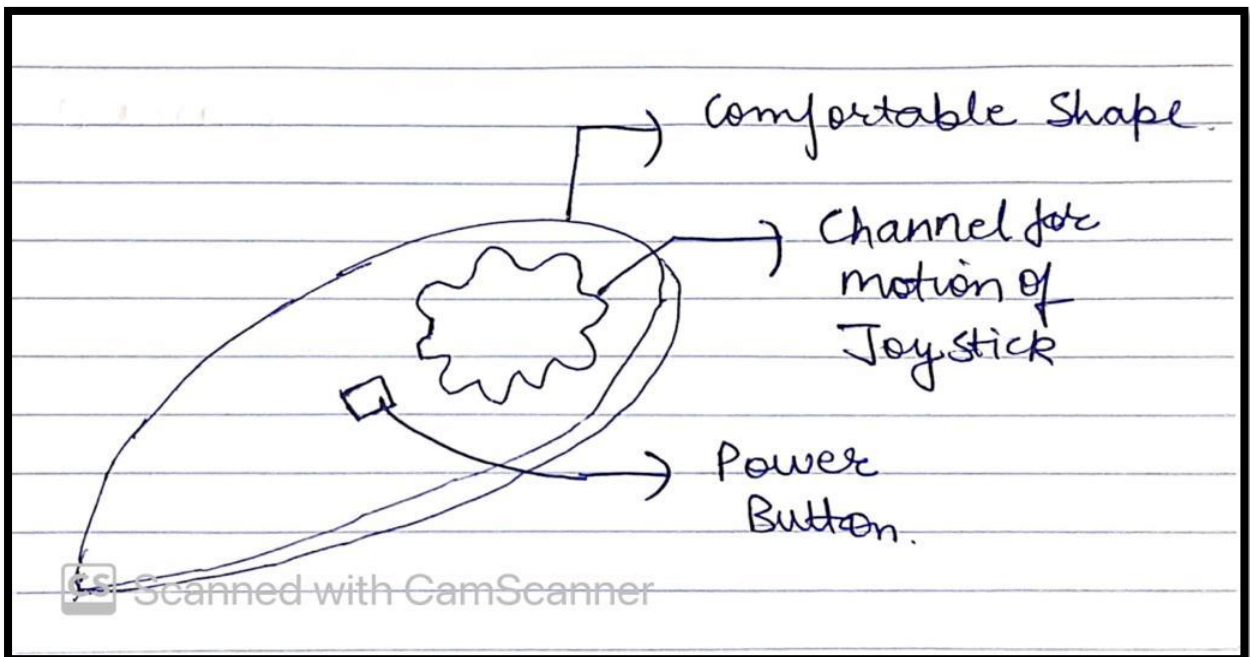


Figure1: Skip's Single Handheld Controller

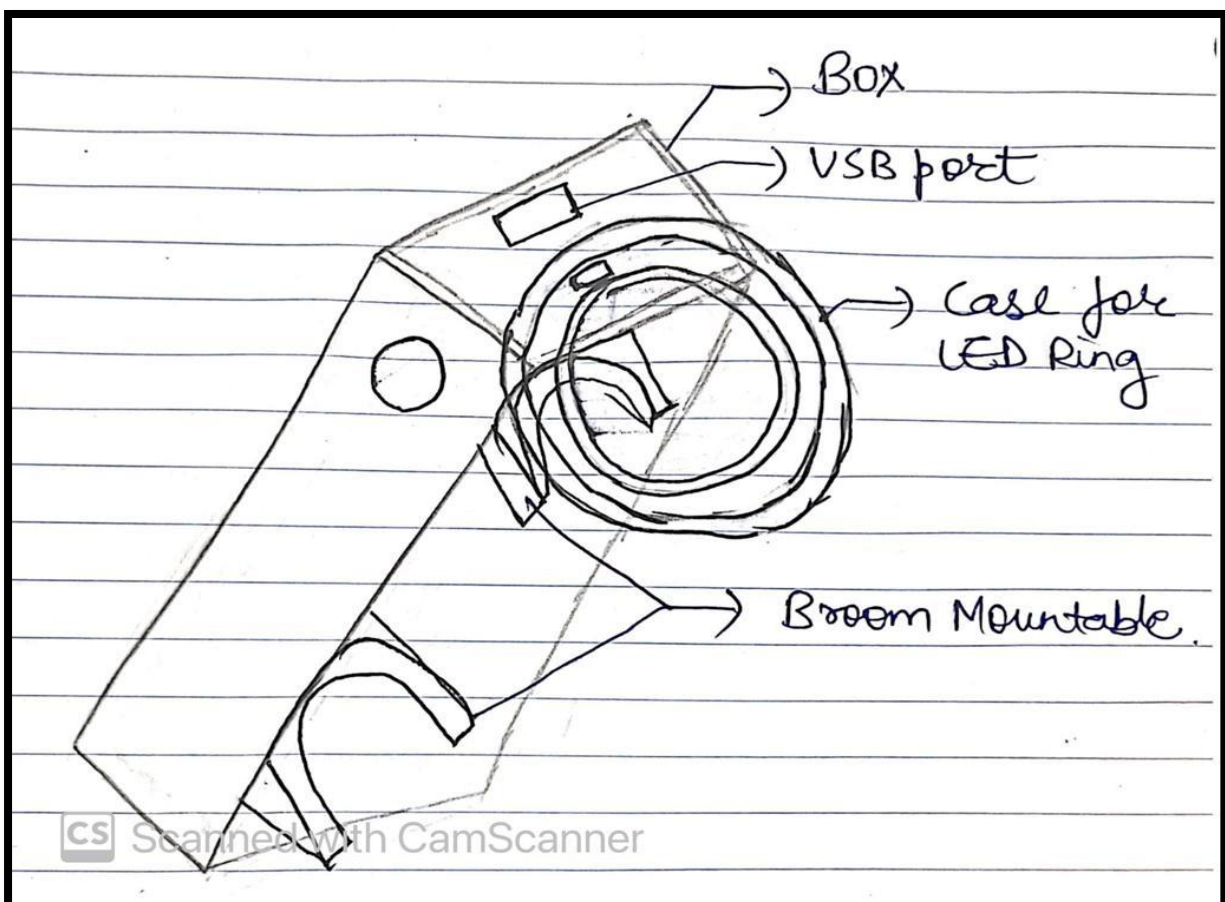


Figure2: Sweeper's Broom Mountable LED Ring

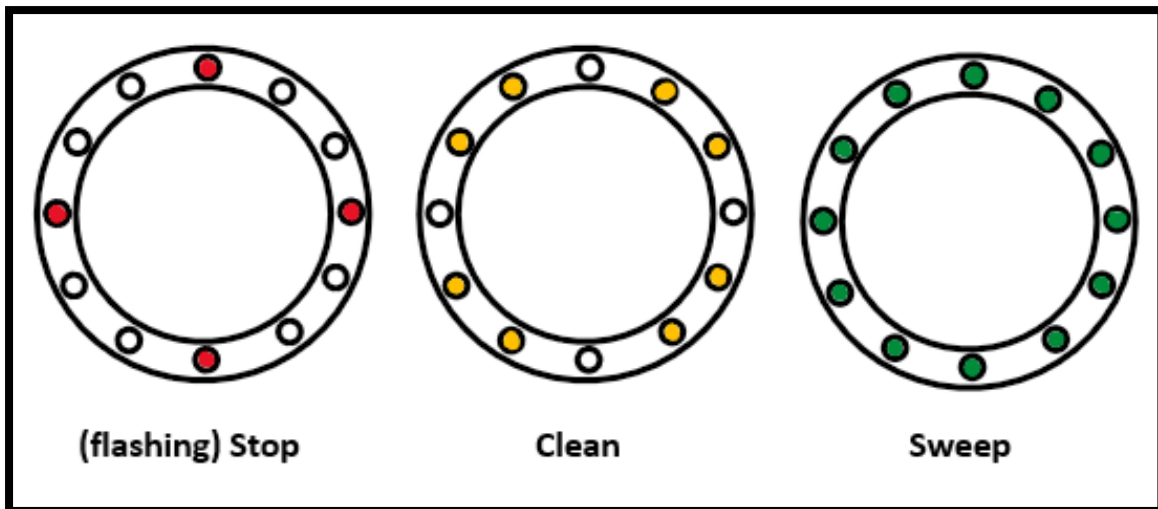


Figure3: Sweeper's Display Pattern Signals

DESCRIPTION OF DRAWINGS:

- **FIGURE1: SKIP'S DEVICE**
 - Ergonomic and portable oval shaped design.
 - Contains a channel for the range of motion of joystick which will be fitted inside that channel gear.
 - Contains a power button to turn on skip's device.
 - A band can be attached to wear it like a band on the palm and control easily.
- **FIGURE2: SWEEPER'S DEVICE**
 - LED Ring fitted in the spherical case which is placed on top of the rectangular box and then mounted to the broom with 2 broom mountable for firm grip.
 - LED Ring used to display visual cues as colorful patterns.
- **FIGURE3: SWEEPER SIGNAL DISPLAYS**
 - Multiple different colors easy-to-recognize patterns for different commands, making it accessible to both deaf and color-blind users.
 - The patterns are kept symmetrical.

MEASUREMENTS OF THE COMPONENTS:

- The Skip Controller must be less than 2.5 inches so that fit in the palm easily.
- Dimensions of the broom: 1inch in diameter
- Dimension of Ring:
 - Inside Diameter: 36mm
 - Outer Diameter: 50mm
- Broom Mountable: 2-inch diameter to fit the broom.
- LED Ring Case: 50-55mm to fit LED Ring.

3D MODEL RENDERING:

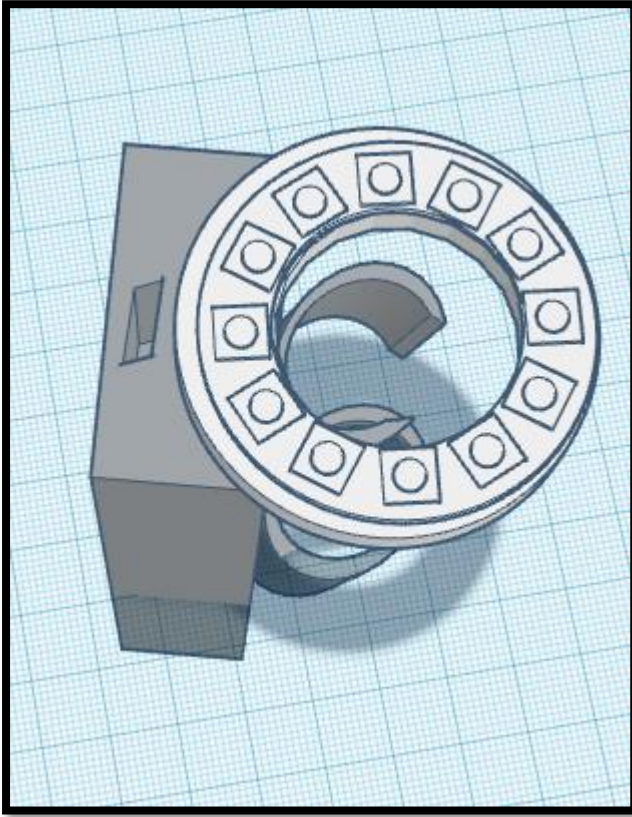


Figure 4: 3D Rendering Sweeper's Broom Mountable LED Ring

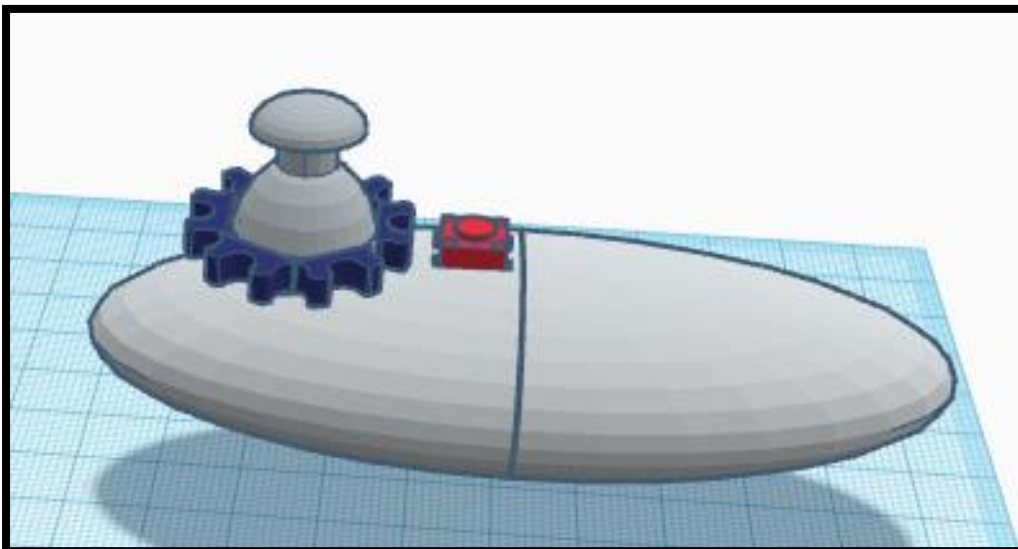


Figure 5: 3D Rendering Skip's Single Handheld Controller

CHEQUE OR MONEY ORDER:

CAD \$174.64

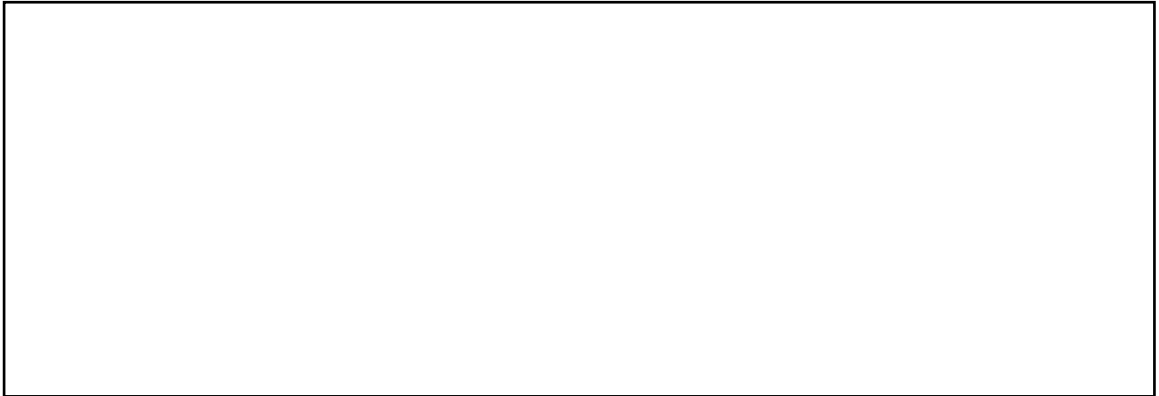


Fig6: Money Order of CAD \$174.64 for filing fees

(Must be attached for patent application- didn't for assignment).

References:

1. Rule Book Curling Canada. Available Online: <https://www.curling.ca/about-curling/getting-started-in-curling/rules-of-curling-for-general-play/> Accessed 12th April 2023.