Opportunity and Significance

Developing an easier method of removing compacted snow and ice.

Provide a more comfortable experience for the user through the use of heated hand grips.

Overall an electrically heated shovel will make the shoveling experience less stressful.

Technical Objectives

1) Heat the edge of the shovel head to a temperature that “slices” through compact snow and ice.
   - How hot does the blade need to be?

2) Developing an adjustable grip that promotes user comfort for all over the duration of shoveling.
   - What type of handle/grip would best reduce user fatigue?

3) Provide warmth to the user’s hand, via heated grips, to better combat harsh winter conditions.
   - What method of heating would be most appropriate to promote a safe working condition?

Technical Approach, Accomplishments and Results

We performed a patent search:
- Heated Snow Shovel w/ Ice Chopper Attach.
- Heated Ice Scraper
- Heated Handle Construction
- Long Handle Striking Tool and Sliding Handle

From the patent search the project was split into two key components: the blade and the grip.

Blade

1) What material should the blade be?
   - General Purpose Low-Carbon Steel – Provided the strength and thermodynamic properties required.

2) How will the blade be heated?
   - Nichrome Wire was chosen to heat the blade due to its high temperature range and it packability.

3) How will the blade be attached to the shovel without disturbing the functionality of the shovel?
   - 4 flush screw end pins will hold the blade on the top side of the shovel head.

Grip

1) How will the grip be heated?
   - An electric heater wire pad, designed to fit around a motorcycle handlebar, was used to provide heat to the user’s hand while simultaneously ensuring safety.

2) How will the grip be able to lock/adjust?
   - The grip is designed to fit flush to the shaft to allow enough clearance to slide freely. Pipe clamps are then tightened at both ends to prevent slippage.

3) What method provides the most comfort for the user?
   - A grip that slides up and down the shaft to provide comfortable handling for users of all sizes

Next Steps for Development and Test

Testing
- Further testing in winter conditions are required to show proof of functionality.
- Prototype needs to be refined according to the test results.
- Aesthetics of the shovel can be improved to hide loose wires.
- Pipe clamps could be replaced with modernized locking mechanisms.

Commercialization Plan & Partners

Partners
- Professor Mohammad Ali Ozbeki
- Bob Kas-Mikha (Machinist)
- Wayne State University

- The first main step to commercialization is to acquire a backer via a kickstarter program.
- We would also need a supplier to support us to reduce the cost of the product
- Some of the main hurdles of commercializing is reducing the cost of our product. Currently our project is expensive for what it is.
- Another hurdle of commercialization is mass production would be difficult without a supplier.

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