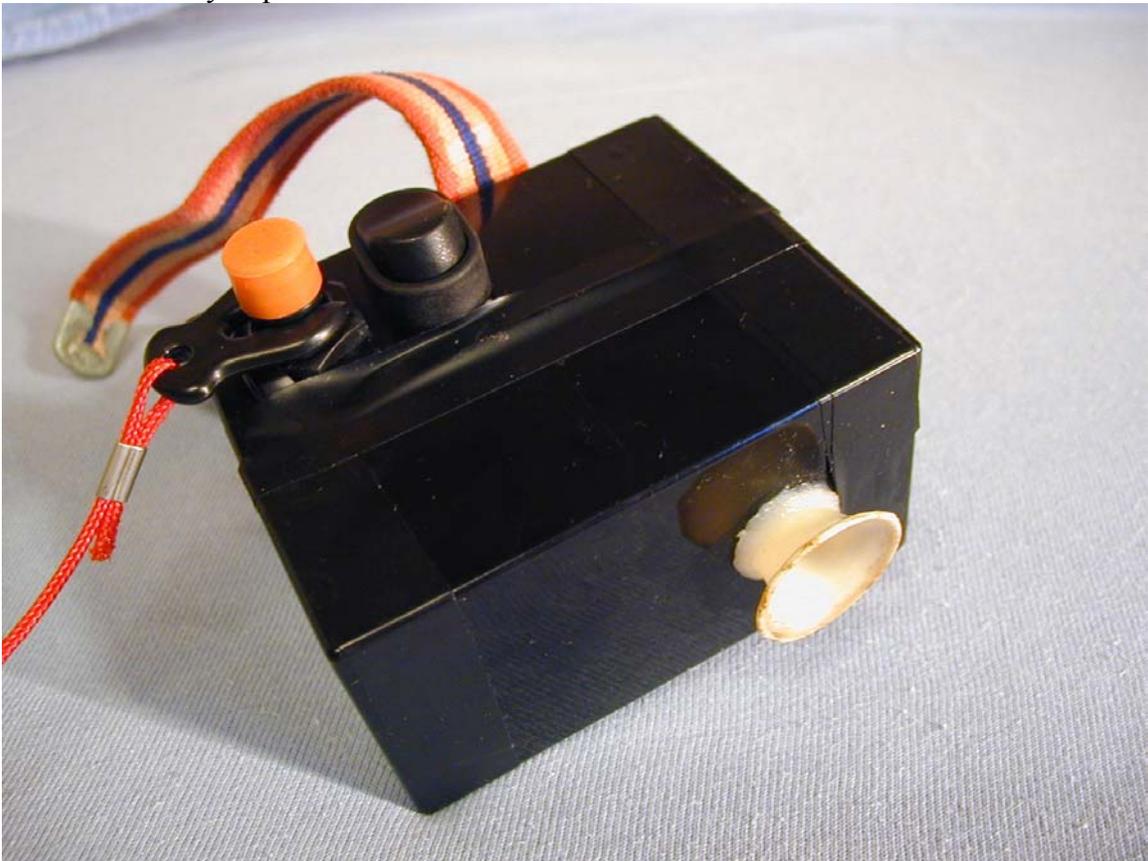


Construction of the bear trap

I have structured this document as follows: First I describe the design of the bear trap as it was on the Ellesmere trip; then I summarise my experience with it; then follow my ideas for improvement and finally a design for a new model.

Ellesmere Mark I

The bear fence was made out of a smoke detector alarm, two deadman switches for boat outboard engines, and one 9V battery. The system used on the Ellesmere Island trip also had an on-off switch and a connection for attaching an extra beeper on an extension cord. The extra beeper was meant as insurance against not hearing the main beeper in windy conditions. It was connected via a robust mil-spec connector with a bayonet collar that fastened securely in place.



Each deadman switch has a removable line attached, which is normally around the wrist of the person running the boat. If he falls overboard, the line is pulled away from the switch and the engine stops. The line is short and was extended using heavy-gauge multifilament fishing line. This kind of fishing line is extremely “static”, i.e., it has very little stretch, so that it works reliably even if it becomes quite long.

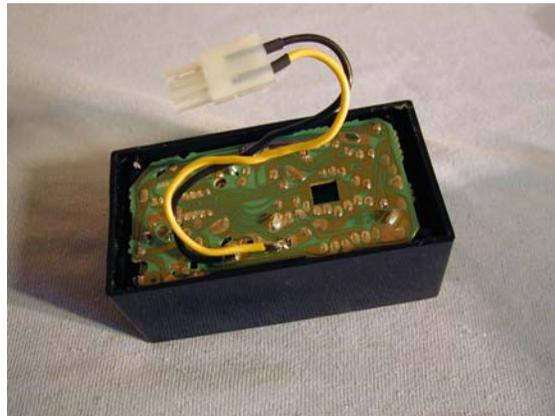
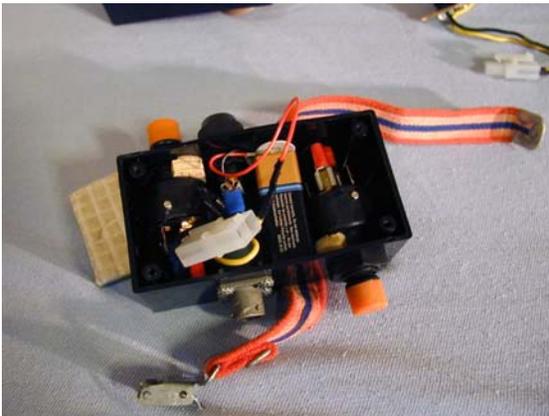
There was no mechanism for adjusting the length of the line, it was simply unwound to its full length and fastened by repeatedly winding it around the ski at the other end; the leftover line was generally just stretched out and left in the snow.

The alarm box had an adjustable strap screwed securely to its rear wall for fastening to the ski used as a fencepost.



Internal design

Inside, there are two boxes taped together. It turned out that the smoke detector unit fit perfectly into one box, and the switches, connector and battery completely filled the other. Instead of making some kind of complicated fastening system, I simply taped the two halves together, this is simple and can easily be maintained in the field.

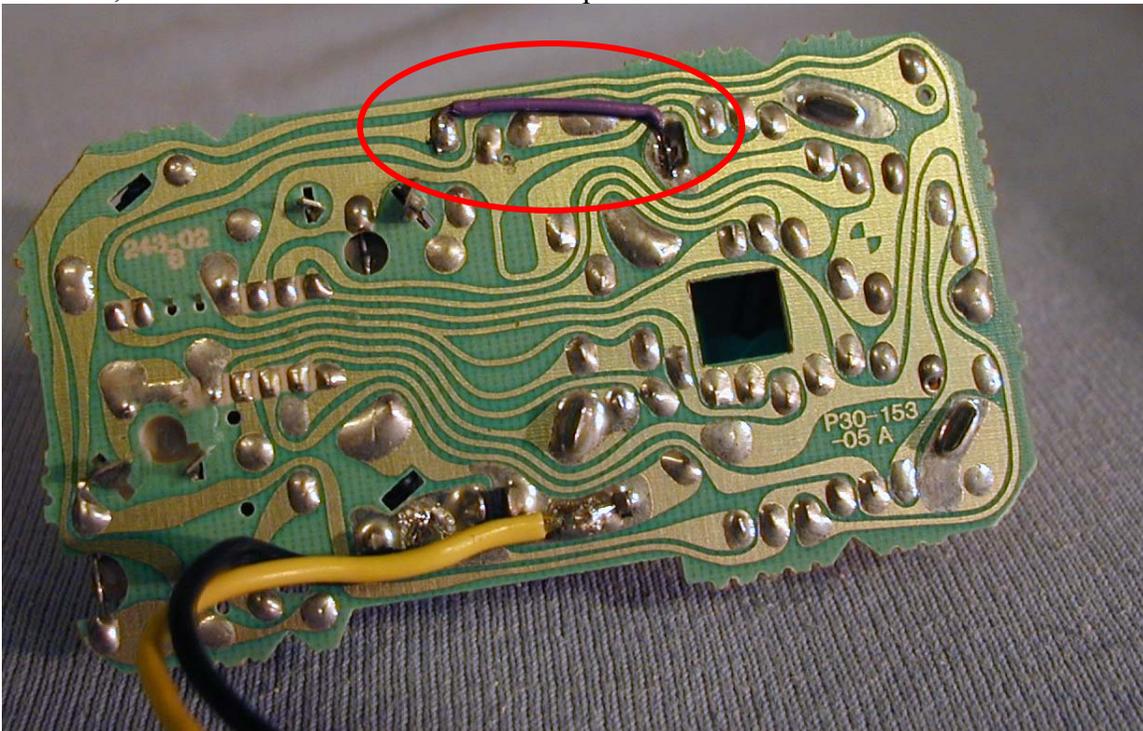


The connection between the two halves was made using a connector meant for radio-controlled models (cars & planes); it's very robust and available from hobby shops.

The orange caps are on the deadman switches, the khaki thing on the lower left is the extension connector and the black one on the opposite (top) side is the on-off switch. The smoke detector has a test switch which sounds the alarm when depressed. Internally the switch is just a piece of metal that is bent to make contact with a wire on the circuit board.



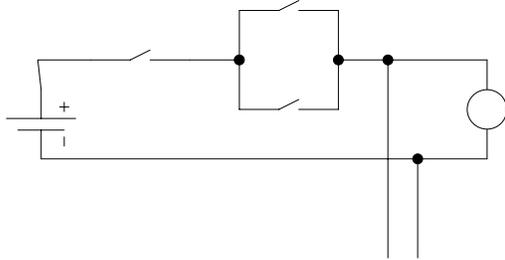
By looking at the front and back of the board, I located the corresponding ends of the “switch”, and soldered a wire across to make permanent contact.



Finally, I soldered new wires on the battery contacts, so I could supply 9V power to the smoke alarm via the deadman switches. Because of the short-circuited test switch, it

would simply start beeping immediately when power came in, and would go on until the battery was exhausted or it was turned off.

In the other box were the switches: Two deadman switches in parallel, then in series with an on-off switch and the battery. The connection diagram was like this:



With the main switch on, any of the deadman switches would activate the beeper (and the extension beeper, if connected).

Practical experience

Setting up tended to be a hassle for two reasons:

- 1) Getting skis to stand in 2cm of snow is not easy
- 2) There was no way of adjusting the length of the fishing line to give good tension

As a result we used quite a lot of time to set it up, and sometimes the line was either too slack (bears step over) or too tight (line pulled out by wind or other random movement). Several times we forgot to turn the thing on! Conversely, it started beeping in the sled when something else pushed the switch and one or both lines were out.

In any significant wind, noise would probably drown out the sound of the beeper, so we wouldn't get any warning. The bear would have heard it and maybe been distracted a little, but that's not much help when you're fast asleep.

The only thing we actually "caught" were Canadians on their way to/from the toilet 😊. The extension beeper was used a few times, but I did not see much point as long as the wind was calm. The contacts also tended to fill up with snow due to the lack of caps/lids on them, and then getting them together was almost impossible.

Ideas for improvement

9V

The original design tried to achieve two things: 1) Warn people, and 2) distract the bear. From that came the requirement for a loud beeper, and a smoke detector was the simplest and cheapest available. What sounds loud in a room sounds rather less loud when you have the whole High Arctic around you. The distraction part still remained.

Of course, the simplest way of achieving both goals is to use a pyrotechnic tripwire. You pull out the string, it goes bang, smoke & flames. The bear gets something to think about and you wake, guaranteed. So the simplest would be to get a dozen or so of these.

Electric Mark II

I'll assume that pyrotechnics are not an option, so we need a beeper. It seems to me that warning people is the most important, and that leads to putting the beeper in the tent, and the tripwire switches where we had them. How the bear will react to loud beeping coming

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On/Off

from inside the tent is something I won't venture to predict, I just don't know. It might be a good idea, or a bad one.

There are three changes I would definitely make:

- 1) Get rid of the on-off switch. Forgetting to turn the thing on can be fatal.
- 2) Rig some kind of tightening device on the fishing line, to make setup easier. Also bring some short hammer-in ice bolts to use as guy lines for the skis holding the fence.
- 3) Work on the "tuning forks" that the tripline is bound to (the ones you insert into the switches) to make them easier to pull out. They were quite hard and I think they could do with some enlargement.