

LED Stapler

Description

Components

- Transparent Blue Mini-Stapler
- RadioShack 5mm (10mm unavailable) Green LED
- Energizer 3V Lithium Watch Battery (CR2032)

Inspiration and Rationale

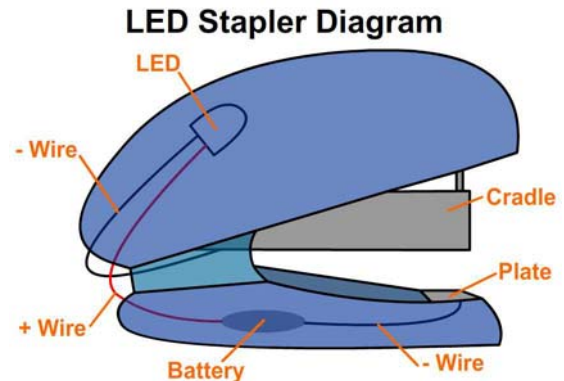
I want to use a transparent case (to hold the LED, battery, and switch) so the user can see the LED glowing inside, as opposed to mounting the LED to the outside. I put this constraint on the design when I found a transparent toy gun in a local Dollar Tree store, which I thought would look awesome with an LED inside. Since the gun was cheaply made and did not look like I could take it apart without breaking it, I decided to go to a local Target to look for a gun that I could take apart easily (with screws, preferably).

I figured that Target would be a good place to brainstorm for ideas, whether or not I found an appropriate toy gun, especially since it is easier for me to visualize ideas when I can physically pick something up and play with it. I was not able to find a toy gun in the Toys and Games department that was both transparent and easy to disassemble, so I moved on to the adjacent Sporting Goods department of the store.

I found a transparent bicycle horn, and thought it would be really cool to use air as the LED switch. When the horn is squeezed, air rushes out of the rubber bubble and across the sound mechanism. Through testing, I did not feel there was enough air movement to activate a switch, so I moved on to the nearby School and Office Supplies department. There I found a lone transparent blue stapler with blue staples.

Then it (could I use a stapler as a switch?) hit me. If you look at a stapler, there is a large metal cradle for the staples and spring apparatus that pushes the staples to the front. When the stapler is compressed, a metal lip pushes a staple through a hole in the cradle. Whether or not it goes through paper first, the staple is pressed into a tiny metal plate, which bends the ends of the staple over. This forms a temporary connection (switch?) that is not connected otherwise.

In this particular stapler, there was just enough room in the top (near the spring apparatus) for an LED lamp. The bottom of the base of the stapler has a small compartment that has just enough room for a watch battery. Conveniently, this places the battery next to the tiny metal plate, and there are channels just large enough to fit wire. So I soldered a negative wire to the plate and the battery, a positive wire from the battery to the LED lamp (running the wire through the back of the stapler), and a negative wire from the LED lamp to the cradle.

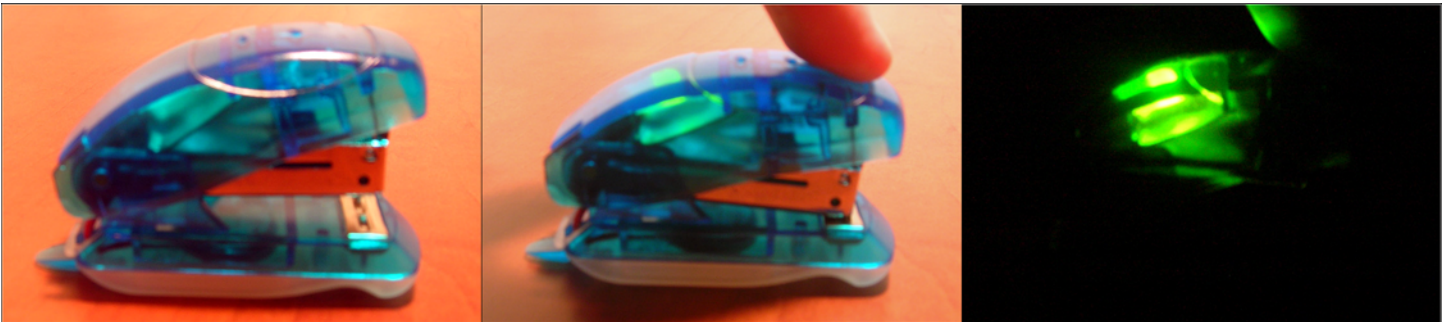


I cut the connection wires on the LED lamp short, and a soldered coated wires to them since that joint would have to be flexible. Then I wrapped the solder joints in electrical tape to increase the rigidity of the LED lamp connection wires (since I had already broken 6 of them during testing). This approach finally proved to be successful because the LED lamp connection wires did not break due to the strength of the electrical tape reinforcement. The result is an LED stapler that lights up when they cradle touches the plate or the instant a staple is punched through paper, momentarily connecting the plate with the cradle.

Documentation

LED Stapler without Paper

The photographs below illustrate how the LED Stapler works without paper, meaning the LED lights up when the cradle touches the plate.



LED Stapler with Paper

The photographs below illustrate how the LED Stapler works with paper, meaning the LED lights up when the staples punches through the paper and connects the cradle to the plate.

