Disassembly and Study of Single Use Camera

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Functional Components of Camera

- Lens - The lens is a clear plastic structure through which light travels to be recorded on the camera film. When the camera is activated, it “snaps” an image through the lens, which is then imprinted on the film.
- Shutter Mechanism - The shutter mechanism is a piece of plastic that opens and closes when a picture is taken. By opening the shutter, light is allowed to pass through the lens and into the camera, so that a picture can be taken.
- Film - The film is made out of specially coated plastic that is engineered to record images. When film is exposed to light, the light sensitive coating imprints the current camera view so that an image is saved on the film. The film can later be processed so that the images are saved.
- Viewfinder - The viewfinder consists of two clear pieces of plastic that are housed near the upper portion of the camera. By looking through the viewfinder, users can orient the camera so that they can choose what will be seen in the picture. The pieces of plastic are positioned and constructed in such a way that whatever is in the user’s view, will be the image recorded by the camera.
- Film Transport and Counter Mechanism - The film transport is a container inside the camera that stores the film that has already been used. By storing the film in the cylindrical container, the film can be taken out after all pictures have been taken without ruining the film through light exposure. The counter mechanism is a plastic piece with numbers on it that spins as the film is wound so that users know how many more pictures they can take.
- Electronic Flash - The flash system is composed of a light bulb, circuit board, wiring, and a capacitor. When the flash is on and a picture is taken, energy stored in the flash system is released so that the bulb lights up and illuminates the image that is being taken.
- Energy Cell - The energy cell is a capacitor that is connected to the electronic flash system. The capacitor is charged by a battery, so that when the flash is used, the charge in the capacitor is released and turned into light energy.
- Outer Housing Shell and Internal Frame - Both the outer and internal frame are composed of plastic pieces that hold the rest of the camera parts together. The housing provides structure, while also protecting the inside parts from damage. Additionally, the outer shell keeps the film in darkness so that the film is not affected by outside light exposure.

How It Works

While the optical and electrical systems seem to be the main components of the single-use camera, the mechanical system allows the whole system to work. This system has

gears in place in order for everything to go smoothly and result in a clear picture. Several things must happen in order for this to occur. First, we must turn the winding wheel to move the film to a clear section of film. If we want to use flash, we can hold down the flash button until it the capacitor charges and the red light turns on, indicating we can proceed with taking a picture. Now, we can press the shutter to engage the shutter spring and open the shutter flap. This exposes the film to light and captures the picture that we see through the viewfinder. Once our picture is captured, we release the shutter which disengages the shutter spring. As a result, the shutter flap quickly closes. To take another picture, we can start the process over again by turning the winding wheel.

Materials Used

Structurally, most of the camera is made of plastic. Both the internal and external structures are completely made of plastic, as well as the gears, the lenses, and the film container. Most of the small pieces are also made of plastic. However, there are a few exceptions, those being the screws and the springs, which are made of metal. In addition, the electrical system, including the battery, contains metal, with the battery as a mix between metals and acids.

Assembly

To assemble the disposable camera, all pieces are initially placed their own location within the internal frame. Most of the parts can simply be slid into their location. However, pieces that belong to the gear system have to be put together somewhat delicately so that the gears work in the correct way. Furthermore, some pieces do have to go on before others in order for all of the parts to fit. For example, the flash system and circuit board have to be placed before the lens and shutter mechanism are attached. Additionally, the film and film transport have to be placed before the gears are placed. The internal design of the camera is fairly compact since many parts of various sizes are able to fit all on one piece of plastic. After the camera parts are in their respective locations, the outer shell snaps onto and over the internal frame. The outer housing further keeps any of the parts from falling out and protects them from damage.

Disassembly

First, remove the external frame by unhooking the sides. The internal structure will still be attached to one of the sides of the external frame. We can pull the two apart and remove the battery. Even though we have removed the powersource, there will still be energy stored in the camera and we need to release this by hitting the capacitor. Next, the exposed film can be removed to give access to the rest of the internal structure. We can continue on removing different parts, including the shutter and it’s mechanisms, as well as the circuit.

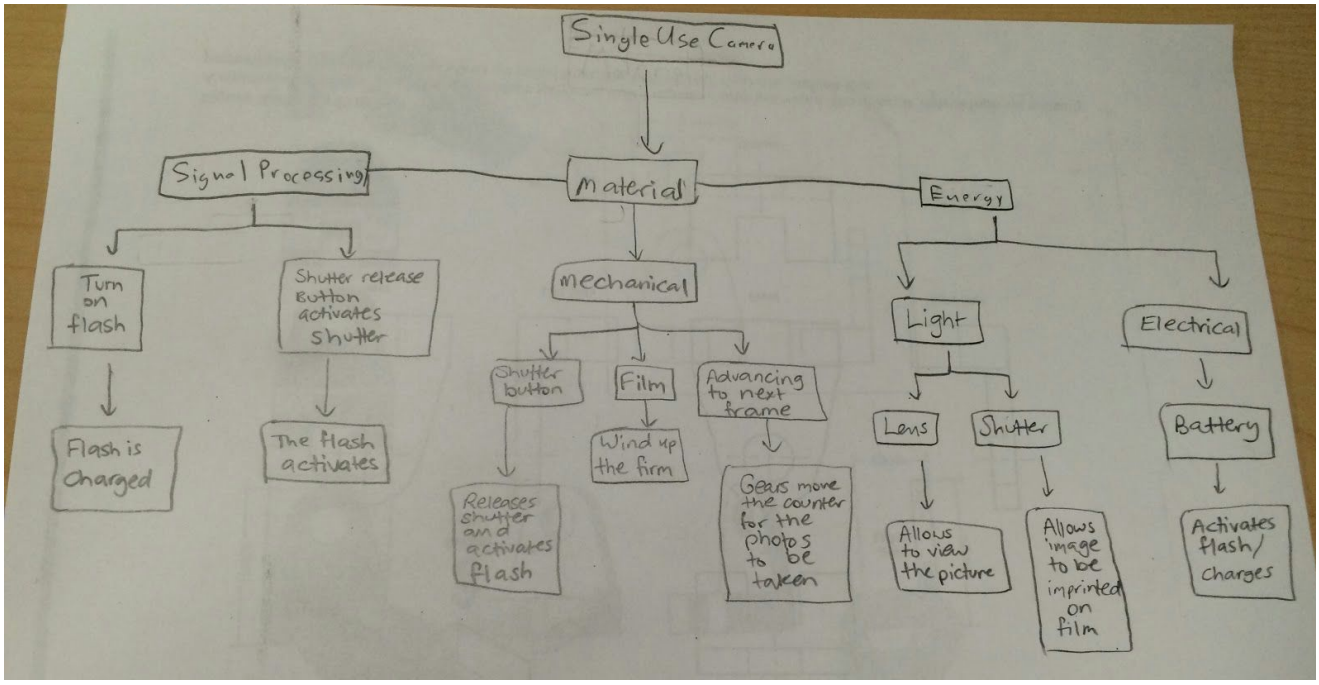
1 - Front Outer Shell
2 - Rear Outer Shell
3 - AA Battery
4 - Circuit Board and Energy Cell
5 - Camera Lens
6 - Viewfinder
7 - Film Gear
8 - Film with Cartridge
9 - Middle Casing
10 - Shutter Mechanism

Reusable Parts

Most of the parts of the Kodak camera are reusable except for the film and the circuit board. All other components of the camera come from reused camera parts. Most Kodak single-use cameras are made from recycled camera bodies. The plastic components, including the shells and casing, are very reusable since plastic is an easily recyclable good. The shells and casing are made into raw materials first and then are remade and reused for a new camera. Also, the battery in the camera is also a reusable part and can be used more than once. The exact same battery is used up to twelve times for twelve different cameras.

Source: http://www.kodak.com/eknec/PageQuerier.jhtml?pq-path=4213&pq-locale=it_US

Flow Chart



The AA Battery

In the camera, the AA battery is in the final stage of its product life cycle - its usage. The battery supplies power to the camera. Before going into the camera though, the battery goes through a long manufacturing process. The process starts with adding the cathode, the separator, and the anode into the battery container. These components are the driving forces behind the chemical reaction that goes on in a battery. Once these components have been added, the batteries receives three seals, one metal nail through its center, one plastic seal, and a metal end cap. These batteries once they have lost their charge can be reused and recycled. For the camera specifically, a possible redesign to make the camera more efficient would be to make a more powerful and rechargeable battery.